

DEEP-SEA

Development of Energy Efficiency Mobility services for the Adriatic MARINAS

Nautical marinas (harbours for sailing and motor boats) along the Adriatic Sea are the main tourism hubs for inward and outward mobility flows.

They spread along the Adriatic seacoasts, generating a considerable number of different types of mobility and transport flows, both inside and outside marinas with huge negative environmental externalities, like CO2 emissions, noise pollution and traffic congestion. Road and maritime transport are the most polluting and the most used ones, while other types, even if less harmful to the environment, are less commonly present. Public Administrations (PAs) and mobility operators made great steps forward in the mobility sector, developing, promoting and implementing different set of mobility services with low or zero negative impacts, such as electric vehicles (e-vehicles) and boats (e-boats), electric charging stations (ECS) for cars and boats, e-vehicles rental and sharing. However these services are rarely offered in nautical marinas, most of which usually offer highly polluting services, i.e. endothermic engines cars and motorbikes, and very few offer some kind of sustainable services, such as bike and car rental and sharing.

Our objective

The overall project objective is to improve current marinas mobility services and turn them into low-carbon or zero emission, environmentally friendly and energy efficient systems.

DEEP-SEA will develop and implement, through pilot actions, innovative mobility services with the introduction of innovative technologies in support to marinas mobility enhancement and greening.

Furthermore it will integrate Adriatic marinas in a unique cross-border cooperation where management capacity and networking among relevant bodies will be the main focus. Innovative and transferable tools and methods provided by the project will improve mobility services available, boosting the quality of passengers transport, reducing CO2 emissions, lowering noise pollution and cutting energy consumption. DEEP-SEA partnership has also a high capacity to transfer outputs, hence the results will be easily duplicated in other Adriatic marinas and across the Mediterranean basin.

The project builds on the Universities' high level knowledge and on the existing e-mobility sustainable solutions (technical and organizational ones). DEEP-SEA will also involve the owners of the marinas and other private operators and their associations in order to have an active and participatory process.



Partnership

Aries

Special Agency Venezia Giulia Chamber of Commerce
www.ariestrieste.it

University of Trieste

Department of Engineering and Architecture
<https://dia.units.it/en>

Chamber of Commerce of Foggia

www.fg.camcom.gov.it

University of Rijeka

Faculty of Maritime Studies
<https://www.pfri.uniri.hr>

Municipality of Malinska-Dubašnica

<https://www.malinska.hr>

University of Split

Faculty of Civil Engineering, Architecture and Geodesy
<https://www.gradst.hr>

Public Institution RERA S.D.

for coordination and development of Split-Dalmatia County
<https://www.rera.hr>

H. L. Dvorac D.O.O

<https://www.martinis-marchi.com>

Ponikve Eco Island of Krk

<http://www.ponikve.hr>

Province of Foggia

www.provincia.foggia.it

PROJECT EVENTS

KICK OFF MEETING

26-27 feb 2019
TRIESTE
ITALY

The project kick off was organized in Trieste on February 26th and 27th 2019, by the Lead partner Aries limited liability consortium, in house of the Chamber of Commerce Venezia Giulia, with the participation of all project partners and the Joint Secretariat project officer.

The meeting was the occasion to introduce the partners competences and the expected contribution to the project implementation, the expected results for the relevant project areas, and how the challenges will be tackled.

The current e-mobility scenario, trends, evolution were described and their link to the project objective of turn marinas into low carbon or zero emission, environmentally friendly and energy efficient systems, was clarified to the partners.



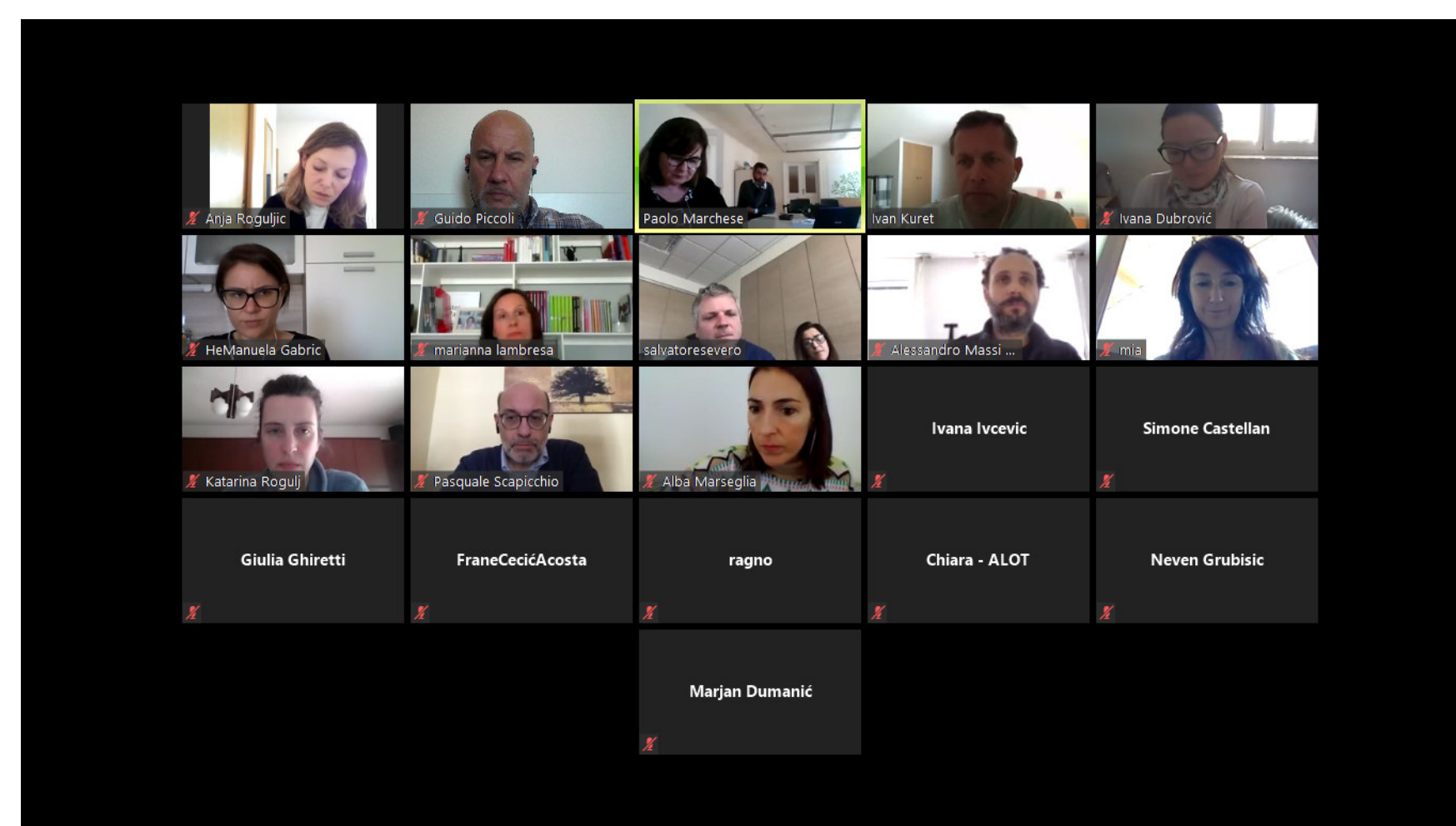
2nd Partners and Steering Committee meeting

17 jul 2019
OPATIJA
CROATIA



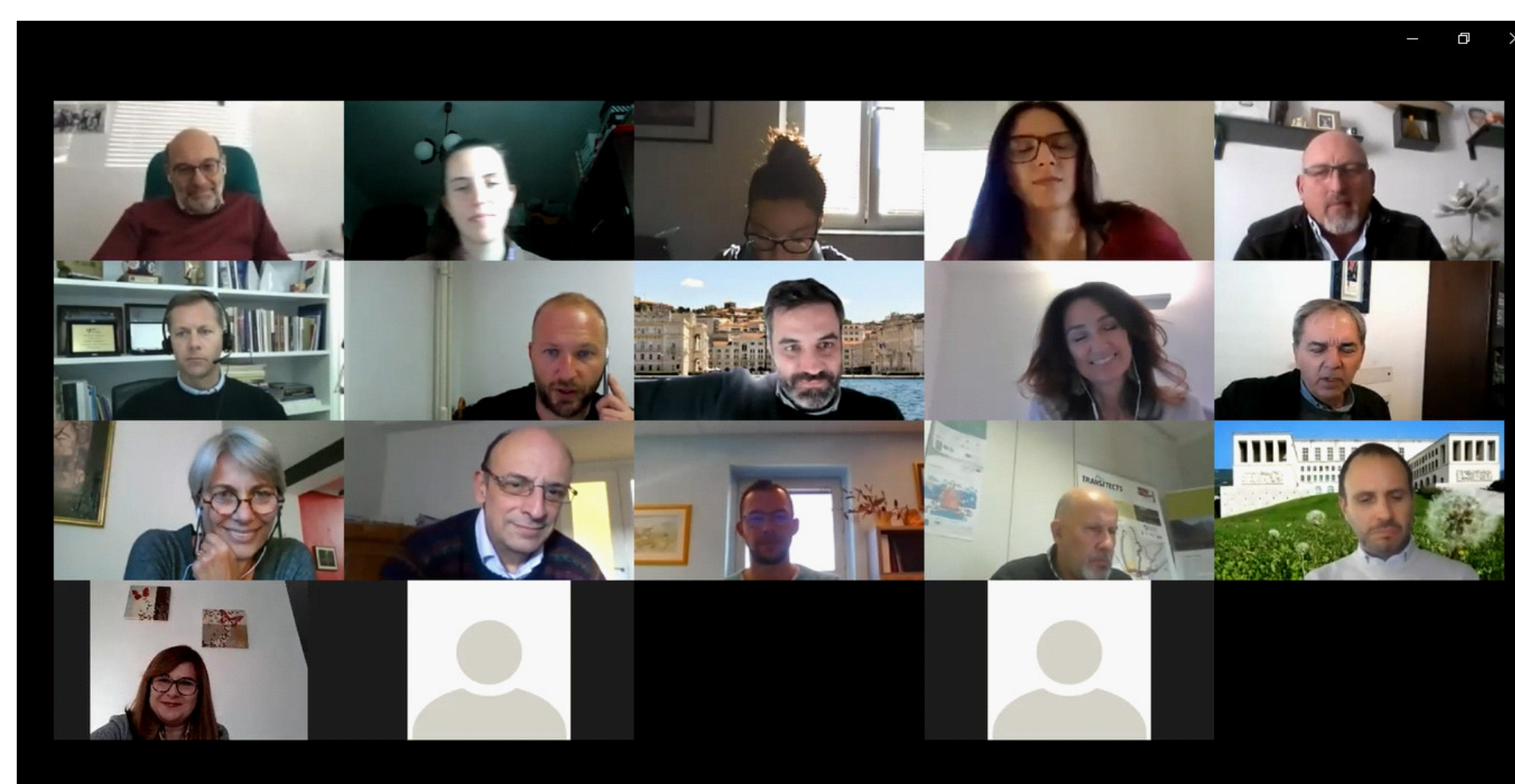
3rd Partners and Steering Committee meeting

15 apr 2020
web call



4th Partners and Steering Committee meeting

19t Nov 2020
web call





DEEP-SEA PARTNER INTERVIEW

Aries Scarl

Lead Partner of DEEP-SEA project



Aries Scarl - Lead Partner of DEEP-SEA project - is the in-house company of the **Venezia Giulia Chamber of Commerce**, supporting the Chamber body since 1997 in its institutional tasks, in services to businesses and in the promotion of the territory.

Thanks to its **20-year experience**, Aries combines the ability to operate in complex administrative scenarios with the flexibility and expertise required by the market and its operators.

Main services offered by Aries relates to:

- entrepreneurship and orientation
- promotion of the territory, value chains development, territorial marketing and innovation
- organization of local fairs and events
- institutional support.

Specific expertise is held in managing territorial cooperation projects for valorization of coastal areas, foreseeing activities to reconcile the efficient development of services and economic growth in the nautical sector with environmental protection and cross border cooperation issues.

The role in the DEEP-SEA project

Aries is Lead Partner of DEEP-SEA project and leader of work package 1 "Project management and coordination of activities".

It is indeed fully engaged in ensuring a sound day-to-day management, coordinating partners in project activities and enabling an effective internal communication.

Within the "technical" work packages (WP), Aries is involved in work package 3 "Nautical marinas framework analysis and investment plan", aimed at producing an AS IS analysis on current mobility services inside the marinas involved in the project and calculating the related energy consumptions.

In particular, Aries has been contributing to the analysis by administering questionnaires to the managers and users of selected Venezia Giulia marinas.

Results will be elaborated to define a tailor-made investment plan for each marina, thus providing a concrete instrument to mobility operators and public authorities for their future planning and investments, with a special focus on marinas features and services to achieve improved coastal, inland/maritime transport and mobility services. In WP4 "Pilots: small technological investments, equipment installations and new services start up",

Aries is responsible for pilot implementation within marinas of the Venezia Giulia area, thus taking care and monitoring:

- the installation of 6 e-charging stations for e-cars and/or e-boats (power of 22 kWh or more) with interoperable management system;
- the installation of 3 racks with electric and muscular bicycles for bike sharing services and the purchase of at least 4 muscular bikes and 8 bicycles, including a charging system for e-bikes;
- installation of 1 micro-grid system, composed by a photovoltaic system, storage system, monitoring and power management system, display.

Realized activities

Partners have recently finalized the **Catalogue of best available solutions for energy efficiency and sustainable mobility in the coastal and nautical sector**, as well as a **SWOT analysis** outlining traffic volumes scenarios and trends of tourism in the Adriatic.

These represent important steps in the improvement of marina operators' competences towards sustainable mobility services, hence contributing to a **better understanding of current and forthcoming tourism mobility phenomena** in the Adriatic area directly involving the marinas sector and the hosting cities and regions.

In addition, during the midterm conference of the project a public event held on **February 2021**- DEEP-SEA consortium had the chance of setting-up a fruitful moment of dialogue and debate around these issues with marinas, mobility operators, stakeholders from the nautical sector, mobility and public authorities.

The dialogue continued at local level in pilot marinas for the technical definition of the pilot equipment to be installed within the project.

DEEP-SEA PARTNER INTERVIEW

Public Institution RERA S.D.

Public Institution RERA S.D. is a regional development agency, and interdisciplinary institution established by Split-Dalmatia County (regional self-government body) for the purpose of preparation and implementation of projects related to the regional development.

The Institution's primary role is to assist public entities in Split-Dalmatia county, to prepare and implement their projects which are mostly financed by EU funds.

The Public Institution also prepares and implements its own projects, recognized as of strategic importance for the sustainable development of the county and region.

Moreover, the Public Institution implements the projects and undertakes other necessary **activities that are closely connected** to the:

- Regional development and competitive economy
- Protection of nature and environment
- Sustainable tourism development
- Protection and valorisation of cultural heritage.

Finally, the Public Institution is organized into **5 departments**:

- The Director's Office
- Regional Development and Strategic Planning Department
- Project Preparation Department
- Project Implementation Department
- Department for General and Administrative affairs

The role in the DEEP-SEA project

PP8 is directly involved in the development of the **overall Project management and coordination activities**, such as day-to-day management, regular internal communication, and financial management. Besides Project management activities, PP8 is involved in the implementation of **several communication activities**, in order to promote the Project, its activities, and results to all the identified stakeholders and target groups.

Concerning the thematic Project Work Packages, PP8 as a regional development agency participates in the development of the analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility; the development of the analysis of marinas management and investments model, as well as the development of AS IS analysis on current mobility services and related energy consumption.

Additionally, PP8 together with PP10 - H.L. DVORAC Ltd. is involved in the **development of the Maslinica-Šolta pilot site investment plan for energy efficiency mobility**. Furthermore, PP8 participates in the development of the Project guidelines for the elaboration of intervention and investment plans related to mobility services in the Adriatic marinas, the development of the Project ICT application and services CARD, and takes part in the Adriatic marina mobility Memorandum of Understanding. Finally, PP8 is involved in the production of the cross-border **Transferability plan** in order to ensure the diffusion of Project knowledge to other marinas and other contexts and territories. .

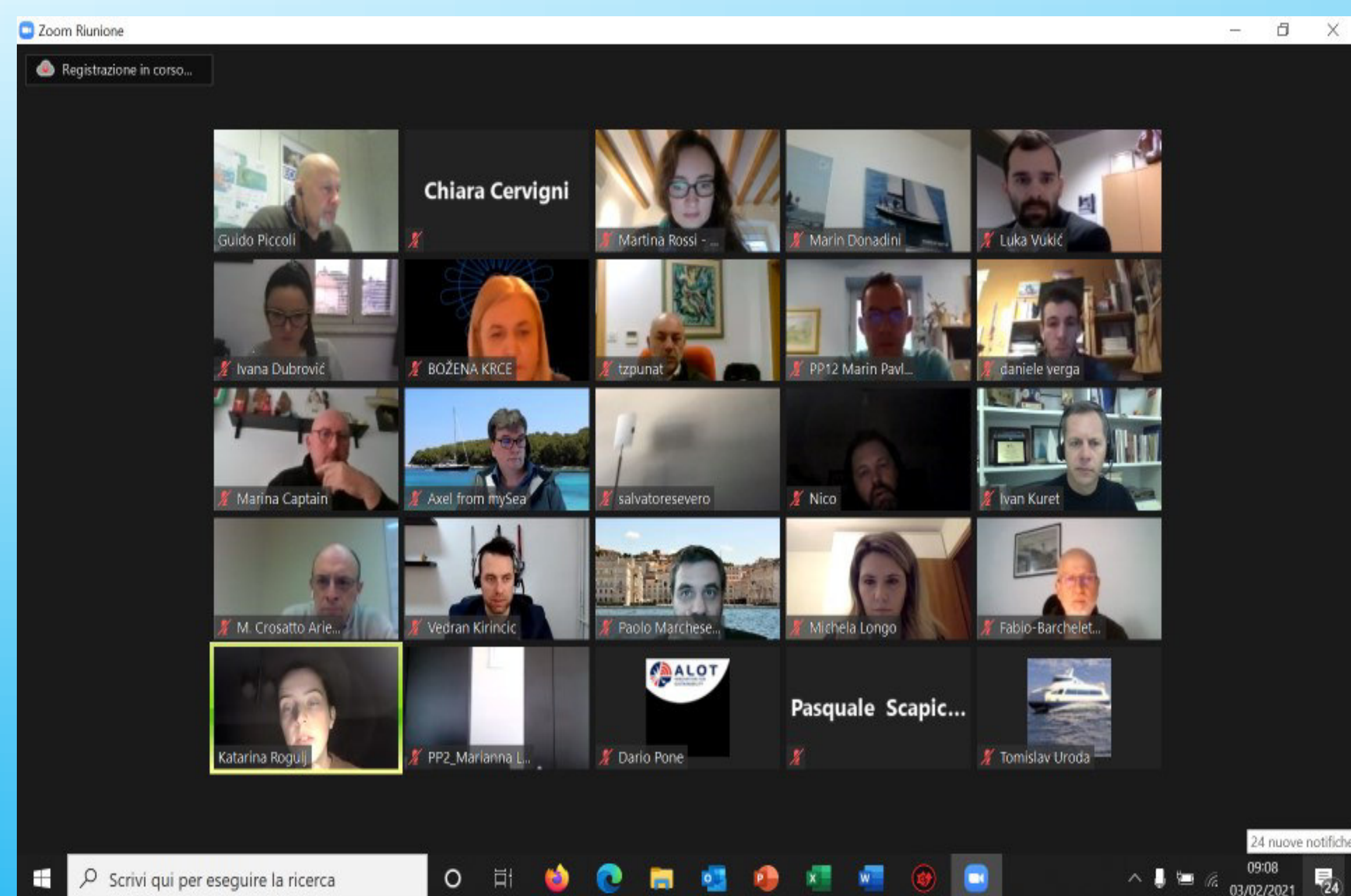
Realized activities

PP8 participated in the **development of the catalogue** of best available technological and organizational solutions for the energy efficiency and sustainable mobility in the coastal and nautical sector (D.3.1.1.). In order to develop the joint SWOT analysis which revealed the key strengths, weaknesses opportunities and threats, PP8 in collaboration with PP10 developed a **SWOT analysis for Maslinica-Šolta pilot site**.

Furthermore, PP8 together with PP10 participated in the development of the analysis of marina management system and investments model (D.3.2.1), by providing inputs from the Maslinica-Šolta pilot area point of view.

The main goal of the analysis was to **define the fundamental pillars for best nautical ports management** on the basis of European best standards and Green port policy, and to support the decision-makers in future investment in efficient systems for mobility and environmentally sustainable services.

PUBLIC EVENT AND MEETING



February 3th, 2021

Diffusion of alternative fuel technologies and sustainable mobility solutions among yachting industry and Marina of Adriatic

On 3rd February, 2021 over 60 participants from the nautical and mobility sectors had the chance to engage in an online interactive dialogue on 3 main themes, i.e.:

- 1) Sustainable mobility: solutions, models, policies for energy sustainability on coastal areas mobility
- 2) Nautical tourism: new pattern of individual behaviors, future trends and prospects
- 3) Yachting and shipyard: the uptake of new technologies and market response

The event was organized by DEEP-SEA partners and structured in two main parts, i.e. an expert plenary session with 12 interventions followed by 3 parallel chatrooms, each one dealing with an open and guided discussion on the 3 topics mentioned before.

During the plenary, speakers and moderators fostered an interesting debate on the challenges faced and solutions found by mobility operators and stakeholders when dealing with alternative fuel technologies and innovations for sustainable offshore and onshore mobility.

The chatroom session opened the stage to further discussion, which guided partners to the clear identification of critical issues, common vision, objectives and concrete pathways of solution to achieve the objectives.

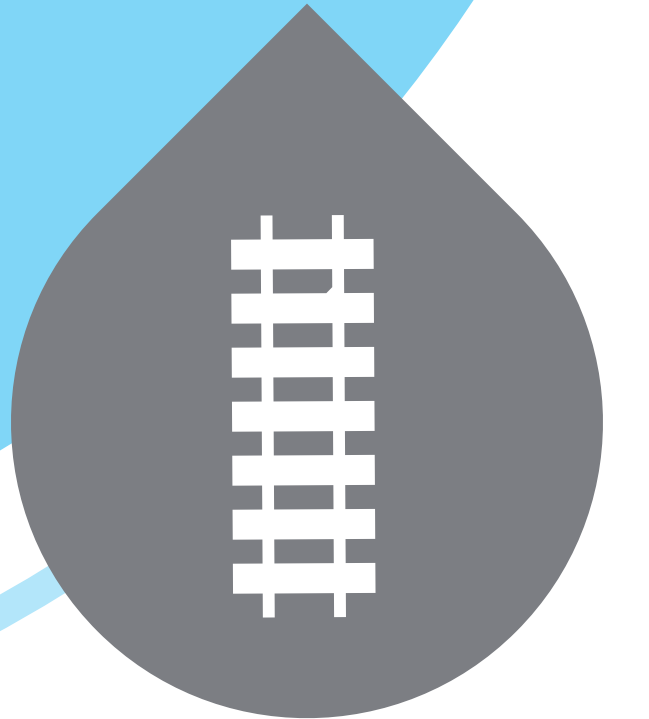
Project Partners



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Communication Chamber of Commerce of Foggia
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In particular, Aries has been contributing to the analysis by administering questionnaires to the managers and users of selected Venezia Giulia marinas.

Results will be elaborated to define a tailor-made investment plan for each marina, thus providing a concrete instrument to mobility operators and public authorities for their future planning and investments, with a special focus on marinas features and services to achieve improved coastal, inland/maritime transport and mobility services. In WP4 “Pilots: small technological investments, equipment installations and new services start up”,

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- installation of 1 micro-grid system, composed by a photovoltaic system, storage system, monitoring and power management system, display.

Realized activities

Partners finalized the “AS IS analysis on current mobility services and related energy consumption”, which aims at assessing the energy consumption profile and related CO2 emissions of the mobility associated to the marina pilot sites participating to DEEP-SEA.

This activity will be the basis to guide the development of the investment plans for each pilot area of the project, and it includes:

- A complete framework of the mobility services currently provided by the marinas involved in DEEP-SEA pilot actions;
- the volume of passengers using on-road vehicles generated by each marina;
- the volume of nautical mobility activities in each pilot site.

Starting from there, the energy consumption generated by these traffic volumes and the consequent CO2 emissions were estimated based on formulas referring to the most recent indicators. The data collection was supported by questionnaires and data sheet submitted to the participating marina and their users.

In parallel, partners have been working on the elaboration of the investment plans for energy efficiency mobility at each project pilot site. Five investment plans will be soon delivered, and they will provide a clear picture on each pilot site’s vision and strategy, starting from the consideration of their baseline energy consumption profile.

DEEP-SEA PARTNER INTERVIEW

University of Rijeka Faculty of Maritime Studies

The Faculty of Maritime Studies promotes science and research directed towards the application of contemporary scientific achievements in the area of Maritime Studies for the requirements of maritime economy in order to achieve greater economic success, as well as for fulfilling the requirements of all social factors, primarily with the goal of preserving the natural and other resources of the sea and the coast and establishing new theoretical and practical scientific insights in the complex area of Maritime Studies.

The Faculty of Maritime Studies continuously develops its cooperation with the national economy and actively participates in the development of maritime economy by conducting various development projects.

The Faculty of Maritime Studies actively participates in the preservation of objects, items, publications and documents witnessing the long and significant Croatian maritime history, the rich Croatian maritime heritage and history and it participates and supports the initiatives for the protection, preservation and revitalization of maritime and shipbuilding heritage.

The role in the DEEP-SEA project

UniRI, with the review of all PPs, mainly the public port authorities, marinas operators and representative of pilot site, defines the fundamental pillars for best nautical ports management on the basis of European best standard and "Green port" policy. The standards were used to improve the performance and capability on investment focused on the development of efficient system for mobility of port users and quality of service for boats in accordance with the local PA planning.

UniRI coordinates the analysis of marina management system and investments model on the basis of its long term experience in this field with the support of other PPs in order to describe the state-of-art of each marina management and financial outlook.

University of Split Faculty of Civil Engineering, Architecture and Geodesy

22 departments, 9 laboratories, 6 research centres, and a total of 130 employees with all the necessary experience and knowledge. Project and Technology Consulting Office was established in order to ensure a centralized sound management of all projects. It has all necessary institutional, human and financial capacities for implementation of the project. Faculty of Civil Engineering, Architecture and Geodesy has a strong experience in development of organizational solutions, and development of energy efficient solutions for coastal and nautical mobility in collaboration with public authorities and mobility services providers. During the CAMPsUmp (Interreg MED) project, it gained expertise in mobility analysis and mobility planning which will be essential for the implementation of the project. Participation in the project represents a continuity of work on the addressed issues. Therefore, it positions the institution as a strong partner for mobility services planning with regard to smart and energy efficient solutions in the Adriatic Croatia. It participates in DEEP-SEA as Responsible partner in WP4 and partner in WP3.

The role in the DEEP-SEA project

Improved sustainable passengers' mobility services in the cities and connected them to nautical marinas.

Increased competences of decision makers and operators involved in marina mobility management.

Integrate management, cooperation and networking between mobility operators, public authorities and key stakeholders.

Realized activities

3.3. - The analysis of mobility services is based on the methodology used in the framework of SECAP (Sustainable Energy and Climate Action Plan), Mobility Management Handbook and SUMP (Sustainable Urban Mobility Plan). The analysis provides a complete framework of the mobility services and the volume of passenger using private vehicles. It includes the level of nautical mobility activities in each pilot site. Each mobility value is linked to energy consumption and its environmental impact.

3.4. - The Investment plan integrates two models: i) for PA responsible for the site where marina is located; ii) for marinas operators. The two models are matching different types of PAs investments and private sectors. Both models integrates socio-economic KPIs to monitor the investment process and measures of the related results.

Public event

June 25th is the Day of the Seafarer, an annual and international event day coordinated by the International Maritime Organisation. The Day of the Seafarer was established in 2010 by a resolution adopted at a diplomatic conference in Manila. On this day, people pay respect to Seafarers and recognize the invaluable contribution they make to international trade and the world economy.

The Faculty of Maritime Studies in Rijeka joined the celebration of this important day, and on June 25th organized a gathering with a program in which attention was paid to students and their vision of their future in maritime affairs.

The event activities were carried out from 10 am to 1 pm in cooperation with the Association of North Adriatic Captains "Queen of the Sea", IMO Ambassador, Capt. Berislav Vranić and the Student Union of the Faculty of Maritime Studies.

According to the International Maritime Organization (IMO), the celebration of World Seafarers' Day, through the media and various publications, will raise awareness of the vital role that seafarers play in the world economy. Seafarers' Day is also an opportunity to educate the public about the work and life of the modern seafarer.

Realized activities

Definition of the methodology;

Description of the passengers' volumes per transport mode including indication of energy consumption (baseline for the further investment plan) and environmental impacts (emission factors and emission reporting unit) based on the fuel emission factors database;

Description of services offered, the equipment used in service provision and the integration with the local planning;

End- user perception of the mobility services;

Mitigation report, Monitoring Report and Adaptation Report

Ex-ante evaluation with possible intervention investments;

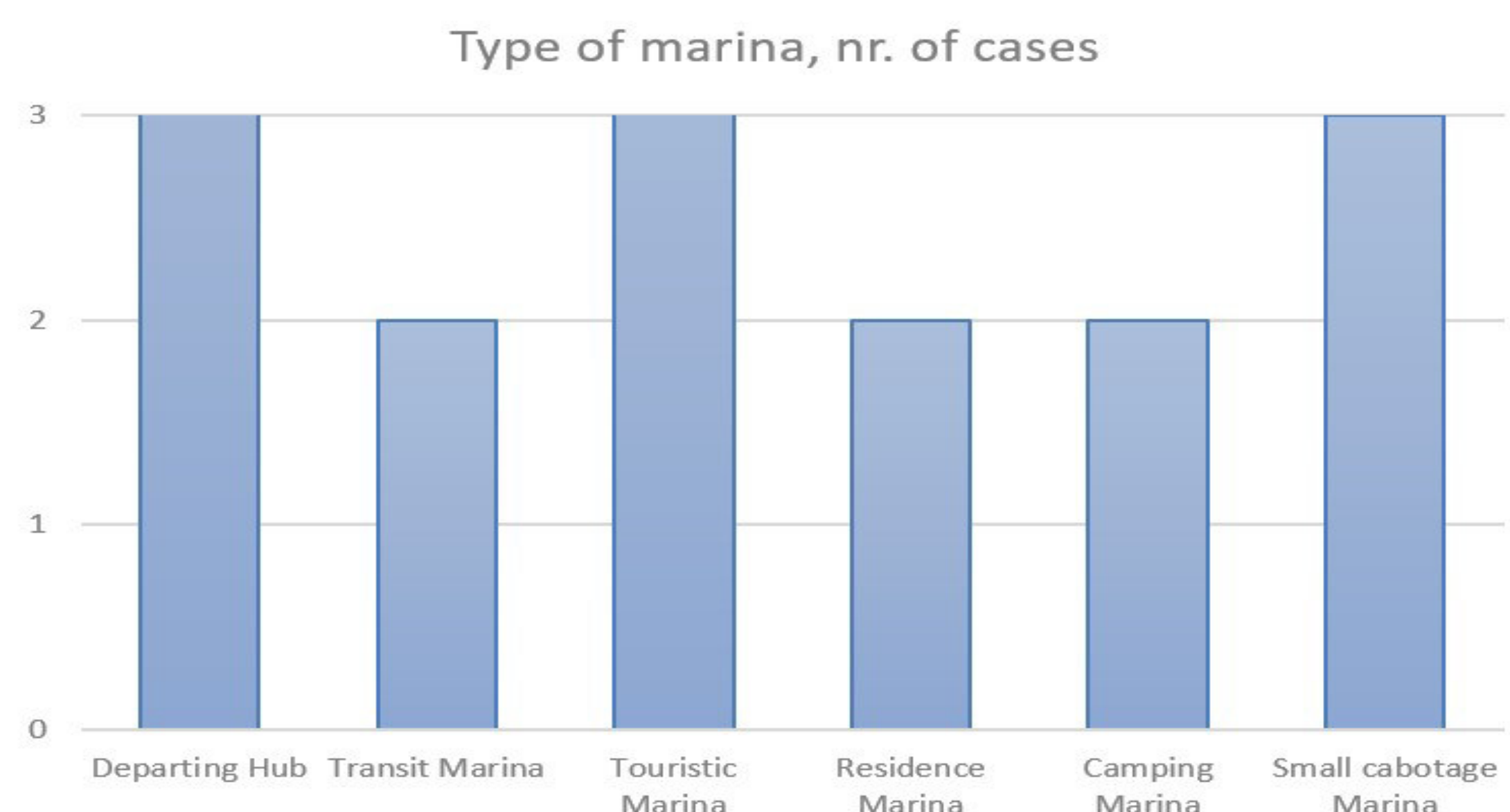


Figure 1. Results from the questionnaire administered to marinas: type of marinas.

Project Partners



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Partners' publications

Real-time prediction of grid voltage and frequency using artificial neural networks: An experimental validation

N. Chettibi, A. Massi Pavan, A. Mellit, A.J. Forsyth, R. Todd

In grid-connected Distributed Generation (DG) systems, with high-penetrations of renewable and energy storage assets, the prediction of grid voltage and frequency plays an important role in enabling the power quality support, the stabilization and monitoring of distribution networks. In this paper, a method based on Artificial Neural Networks (ANNs) and Deep Recurrent Neural Networks (DRNN) has been developed for very short-term prediction of grid voltage and frequency. For different time scales (183ms, 1s, 10s, 60s), one-step and multistep ahead forecasters are developed to predict the future behavior of grid parameters. This type of predictors can be used in distributed generation systems to enhance the control performance, to prevent the occurrence of grid faults and to improve the power systems stability. The data used to establish and validate the ANNs forecasters are provided from grid connected battery storage system installed at the University of Manchester. The developed prediction models have been validated experimentally via a dSPACE real-time controller. The obtained results show that the ANNs forecasters are able to predict in real time the grid voltage and frequency with satisfactory accuracy as the largest mean absolute percent error is 0.32%.

<https://www.sciencedirect.com/science/article/abs/pii/S2352467721000734?via%3Dihub>

Deep learning neural networks for short-term photovoltaic power forecasting

A. Mellit, A. Massi Pavan, V. Lughi

Accurate short-term forecasting of photovoltaic (PV) power is indispensable for controlling and designing smart energy management systems for microgrids. In this paper, different kinds of deep learning neural networks (DLNN) for short-term output PV power forecasting have been developed and compared: Long Short-Term Memory (LSTM), Bidirectional LSTM (BiLSTM), Gated Recurrent Unit (GRU), Bidirectional GRU (BiGRU), One-Dimension Convolutional Neural Network (CNN1D), as well as other hybrid configurations such as CNN1D-LSTM and CNN1D-GRU. A database of the PV power produced by the microgrid installed at the University of Trieste (Italy) is used to train and comparatively test the neural networks. The performance has been evaluated over four different time horizons (1 min, 5 min, 30 min and 60 min), for one-Step and multi-step ahead. The results show that the investigated DLNNs provide very good accuracy, particularly in the case of 1 min time horizon with one-step ahead (correlation coefficient is close to 1), while for the case of multi-step ahead (up to 8 steps ahead) the results are found to be acceptable (correlation coefficient ranges between 96.9% and 98%).

<https://www.sciencedirect.com/science/article/abs/pii/S0960148121003475?via%3Dihub>

An iterative adaptive virtual impedance loop for reactive power sharing in islanded meshed microgrids

H. Sellamna, A. Massi Pavan, A. Mellit, Josep M. Guerrero

This paper proposes a control strategy for the optimization of the reactive power sharing based on an iterative adaptive virtual impedance (IAVI). The IAVI includes two elements: the first is proportional to the reactive power delivered by the distributed generation units at the current iteration, while the second is proportional to the sum of the reactive power variations at the previous iterations. The proposed control strategy has been verified under a Matlab/Simulink environment for an islanded meshed microgrid with three distributed generators. The simulation of different scenarios considering feeder impedance mismatches, different microgrid configurations, and variable loads has shown a good accuracy in the sharing of the reactive power in the microgrid. The control strategy proposed in this paper can be easily implemented as it does not require any communication link between the generators, any knowledge regarding the feeder impedances, and any local load measurement.

<https://www.sciencedirect.com/science/article/abs/pii/S235246772030326X?via%3Dihub>

Application of multi-criteria analysis for the introduction of green port management practices: an evaluation of energy efficient mobility in nautical ports

Helena Ukić Boljat, Siniša Vilke, Neven Grubišić, Livia Maglič

In Europe, at the end of the 20th century, the growth of marinas followed the rapid development of recreational marine activities. This trend has now slowed and today the creation of new marinas or the extension of existing marinas is less common, mainly due to the enforcement of protective environmental regulations. As the port sector is facing some major sustainability challenges, like tackling the pollution generated from port activities, the "green port", or "green marina", concept has now become a requirement. Both types of nautical ports, public ports and private marinas, share the same responsibility to achieve management standards. The term "green port" in practice describes the responsible behavior of all stakeholders in the port's business, with a focus on the long-term vision towards the sustainable and climate-friendly development of the port's infrastructure. This paper aims to confirm the adequacy of multi-criteria analysis (MCA) for the evaluation and introduction of energy efficient mobility options in nautical ports. Within the paper, a multi-criteria based model for energy-efficient mobility selection is presented. This model is tested on two Croatian private marinas and obtained results indicating the most suitable action for both. The output of the model showed that by far the best energy-efficient solution was the installation of electric charging stations (ECS) for cars. The presented model can assist decision-makers in port authorities and marina administrations in planning and finding the best scenario for the development of energy efficient systems and services.

<https://repository.am.szczecin.pl/handle/123456789/2661>

5th Project Partners Meeting and Steering Committee

30th September
1st October 2021

Malinska Krk (Croatia)

Between 30/09 and 1/10/2021, the 5th partner meeting was held in Malinska, Krk (Croatia).

Partners and Steering Group members had the chance to meet in person after months of webcalls and online work, and update each other on the status of all project activities and deliverables.

During day 2, partners were involved in a site visit of Krk pilots, and in an e-bike and boat tour to the island of Košljun.

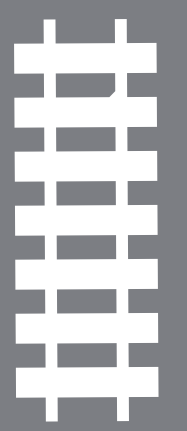
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DEEP-SEA PARTNER INTERVIEW

Municipality of Malinska-Dubasnica



Municipality of Malinska-Dubasnica is a local government authority responsible for conducting of a referendum of self-management issues, local self-government, organization and operation of public services, cooperation with other units of local and regional self-government. Supervises the work of some public organizations such as Touristic board of Malinska, communal society Dubasnica and elementary school. We have a very huge experience in conducting of infrastructure works. Municipality of Malinska-Dubasnica is a tourist municipality, with around 3.500 inhabitants. Besides the local authorities' typical functions and activities, our attention has always been put towards the sustainable development. Activities of Municipality are dedicated to safeguarding and valorising the environment and its natural resources (sea), as well as the historical-cultural heritage. Also, thanks to long experience in the touristic promotion, Municipality has a long experience in organizing national events.

Municipality of Malinska-Dubasnica acts through single administration department integrating spatial planning, marine domain management, construction and utility services and environmental protection. Department is divided in sections with total of 18 employees. A strong cooperation with Tourist-Board of Malinska has established through organization structure and on operational level.

The role in the DEEP-SEA project

- further development of the port (limited capacity)
- ecological awareness (accepting, separating the waste)
- renewable energy sources (sun, tidal wave)
- sustainable development, improvement of services for tourists, maintain traditional values
- promoting Malinska as a tourist destination

Realized activities

Objectives of the project:

- Installation of 2 ECS : 1 combined for e-vehicles and 1 mooring for e-boats, 1 ECS for e-vehicles, on two locations
- Installation of 1 rack with electric and muscular bicycle for sharing system and purchase of at least 4 muscular bikes and 4 e-bikes
- Charging system for e-bikes and software for rental
- Installation 1 Micro-grid system
- Start up of 1 e-car sharing service for Malinska Area

Realized activities:

Installation of photovoltaic power plants and charging stations has been completed. The commissioning of the charging station for e vehicles and bicycle rental systems in the sharing system and the testing of technical systems are forthcoming.

Public events and meetings

At the end of September and the beginning of October, the project partners gathered on Krk for a two-day working meeting, the fifth in a row. On the first day, a conference was held at the Hotel Malin, where the partners reported on the progress made so far in the assigned activities within the project. Several interesting lectures were held, and special attention was drawn to the presentation of representatives of the University of Trieste on the production of electricity from renewable sources. The gathering of partners was an opportunity to once again highlight all the values and benefits that this project brings.

On the second day of the meeting, the conference participants visited the Ponikve and got acquainted with the activities and achievements of this utility company and local government units, especially on projects aimed at transforming the island of Krk into an energy independent island. This was followed by an e-bike ride from Ponikve to Punat, and a visit to the Punat marina and the island of Košljun, which wanted to show that electromobility is everyday and can be an incentive to extend the tourist season.

DEEP-SEA PARTNER INTERVIEW

Province of Foggia

Province of Puglia, 6965 km², with 640,752 inhabitants, 92 abs. /km², with capital: Foggia. Municipalities: 61. Acronym: FG.

It occupies the northern part of the region, called Capitanata, and is the largest and least densely inhabited among the Apulian provinces. It faces the Adriatic Sea to the North and East and is bordered by the provinces of Bari, Campobasso, Benevento, Avellino and Potenza.

The Province of Foggia as a public entity with functions of a vast area exercises the following fundamental functions:

- provincial spatial planning, as well as the protection and enhancement of the environment;
- planning of transport services in the provincial area, authorization and control in the field of private transport, construction and management of provincial roads and road traffic regulation;
- provincial planning of the school network;
- data collection and technical and administrative assistance to local authorities;
- school building management;
- control of discriminatory phenomena in the field of employment and promotion of equal opportunities in the province

RERA S.D.

Public Institution RERA S.D. is a regional development agency, and interdisciplinary institution established by Split-Dalmatia County (regional self-government body) for the purpose of preparation and implementation of projects related to the regional development. The Institution's primary role is to assist public entities in Split-Dalmatia county, to prepare and implement their projects which are mostly financed by EU funds. The Public Institution also prepares and implements its own projects, recognized as of strategic importance for the sustainable development of the county and region. Moreover, the Public Institution implements the projects and undertakes other necessary activities that are closely connected to the: (1) Regional development and competitive economy, (2) Protection of nature and environment, (3) Sustainable tourism development and (4) Protection and valorization of cultural heritage. Finally, the Public Institution is organized into 5 departments: (1) The Director's Office, (2) Regional Development and Strategic Planning Department, (3) Project Preparation Department, (4) Project Implementation Department and (5) Department for General and Administrative affairs.

The role in the DEEP-SEA project

PP8 is directly involved in the development of the overall Project management and coordination activities, such as day-to-day management, regular internal communication, and financial management. Besides Project management activities, PP8 is involved in the implementation of several communication activities, in order to promote the Project, its activities, and results to all the identified stakeholders and target groups. Concerning the thematic Project Work Packages, PP8 as a regional development agency participates in the development of the analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility; the development of the analysis of marinas management and investments model, as well as the development of AS IS analysis on current mobility services and related energy consumption. Additionally, PP8 together with PP10 - H.L. DVORAC Ltd. is involved in the development of the Maslinica-Šolta pilot site investment plan for energy efficiency mobility. Furthermore, PP8 participates in the development of the Project guidelines for the elaboration of intervention and investment plans related to mobility services in the Adriatic marinas, the development of the Project ICT application and services CARD, and takes part in the Adriatic marina mobility Memorandum of Understanding. Finally, PP8 is involved in the production of the cross-border Transferability plan in order to ensure the diffusion of Project knowledge to other marinas and other contexts and territories.

The role in the DEEP-SEA project

The benefits of participation in the project are related to the capacity of the Province of Foggia to capitalize previous projects related to public mobility infrastructures and related to sustainable public transport.

The main role of PP11 is related to the possibility to implement replicable energy-efficient mobility services in and connected to marinas and to develop an investment plan in 4 pilot areas of Foggia to implement energy-efficient solutions for land and maritime mobility, e-mobility, and shared mobility for tourists in marinas.

Realized activities

The WP4 outputs are:

- Installation of 6 e-charging stations (power of 22 kWh or more, with interoperable management system) for e-cars and/or e-boats
- Installation of 2 racks with electric and muscular bicycles for bike sharing services, with at least 4 muscular bikes and 4 e-bicycles, including a charging system for e-bikes and software for rental:
- Start-up of e-car sharing services

Realized activities

PP8 participated in the development of the catalogue of best available technological and organizational solutions for the energy efficiency and sustainable mobility in the coastal and nautical sector (D.3.1.1.). In order to develop the joint SWOT analysis which revealed the key strengths, weaknesses opportunities and threats, PP8 in collaboration with PP10 developed a SWOT analysis for Maslinica-Šolta pilot site. Furthermore, PP8 together with PP10 participated in the development of the analysis of marina management system and investments model (D.3.2.1), by providing inputs from the Maslinica-Šolta pilot area point of view. The main goal of the analysis was to define the fundamental pillars for best nautical ports management on the basis of European best standards and Green port policy, and to support the decision-makers in future investment in efficient systems for mobility and environmentally sustainable services. Moreover, PP8 in collaboration with PP10 prepared the Maslinica-Šolta pilot site Investment plan, (D.3.4.1 - Investment plans for energy efficiency mobility at each project pilot site). Furthermore, PP8 in collaboration with PP10 has revised the prepared analysis of mobility services and related energy consumption (D.3.3.1 - AS IS analysis on current mobility services and related energy consumption). The analysis was elaborated by the responsible Project Partner - PP7 University of Split - Faculty of Civil Engineering, Architecture and Geodesy, based on the questionnaires collected and inputs delivered by PP8 and PP10. Also, PP8 in collaboration with PP10 participated in the development of the ICT Application and Services card through revision and testing of the prepared web-based ICT Application and Services card. Finally, PP8 has revised the prepared Adriatic marina mobility Memorandum of Understanding. Furthermore, PP8 did a comprehensive literature review in order to implement Activity 5.1. Guidelines for Elaboration of intervention and investment plans related to mobility services and Activity 5.2 DEEP-SEA ICT Application and Services CARD.

Public events and meetings

PP8 participated in the organized Project public event on the topic of Diffusion of alternative fuel technologies and sustainable mobility solutions among yachting industry and Marina of Adriatic, held via virtual platform „Zoom“. The public event has been divided into three expert plenary sessions: (1) Sustainable mobility, (2) Nautical tourism and (3) Yachting and shipyard. Further on, PP8 in collaboration with PP10 and E.C.H.R. Ltd, has organized two local dissemination events. The first local dissemination event was organized, at the premises of the Faculty of Civil Engineering, Architecture and Geodesy in Split, in order to disseminate the main Project results, as well as to encourage knowledge and experience exchange among a wider range of stakeholders. The main target group of the event were representatives of local and regional public authorities, marinas, non-governmental organizations and SMEs in the field of tourism, transport and sustainable mobility. Further on, the second event was organized as a part of the international SplitTech conference, held in Bol. The main target group of the event were stakeholders from various fields of work - representatives of local, regional, and national public authorities, as well as experts in the area of innovation and technology development. The main goal of the second dissemination event was to present the Project, its goals and results, to encourage knowledge and experience exchange among a wider range of stakeholders in order to increase their knowledge, change behaviour, and raise awareness towards energy efficient and sustainable mobility.

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DEEP-SEA PARTNER INTERVIEW

Aries Scarl, in-house company of the Venezia Giulia Chamber of Commerce



Aries Scarl –Lead Partner of DEEP-SEA project- is the in-house company of the Venezia Giulia Chamber of Commerce, supporting the Chamber body since 1997 in its institutional tasks, in services to businesses and in the promotion of the territory. Thanks to its 20-year experience, Aries combines the ability to operate in complex administrative scenarios with the flexibility and expertise required by the market and its operators. Main services offered by Aries relates to:

- entrepreneurship and orientation
- promotion of the territory, value chains development, territorial marketing and innovation
- organization of local fairs and events
- institutional support.

Specific expertise is held in managing territorial cooperation projects for valorization of coastal areas, foreseeing activities to reconcile the efficient development of services and economic growth in the nautical sector with environmental protection and cross border cooperation issues.

The role in the DEEP-SEA project

Aries is Lead Partner of DEEP-SEA project and leader of work package 1 “Project management and coordination of activities”. It is indeed fully engaged in ensuring a sound day-to-day management, coordinating partners in project activities and enabling an effective internal communication. Within the “technical” work packages (WP), Aries is involved in work package 3 “Nautical marinas framework analysis and investment plan”, aimed at producing an AS IS analysis on current mobility services inside the marinas involved in the project and calculating the related energy consumptions and CO2 emissions. In particular, Aries has been contributing to the analysis by administering questionnaires to the managers and users of selected Venezia Giulia marinas. Results were elaborated to analyze marinas consumption and emission profiles, and contributed to the elaboration of a tailor-made investment plan. The plan offers a concrete instrument to mobility operators and public authorities for their future planning and investments, with a special focus on marinas features and services to achieve improved coastal, inland/maritime transport and mobility services. In WP4 “Pilots: small technological investments, equipment installations and new services start up”, Aries is responsible for pilot implementation within the marinas of the Venezia Giulia area, thus taking care and monitoring:

- the installation of 6 e-charging stations for e-cars and/or e-boats (power of 22 kWh or more) with interoperable management system;
- the installation of 3 racks with electric and muscular bicycles for bike sharing services and the purchase of at least 4 muscular bikes and 8 bicycles, including a charging system for e-bikes;
- installation of 1 micro-grid system, composed by a photovoltaic system, storage system, monitoring and power management system, display

Realized activities

ARIES elaborated a Guideline for Elaboration of intervention and investment plans related to mobility services. The Guidelines shall be conceived as a standard model for all Mobility Operators and Public Authorities responsible for accessibility to sustainable inland, coastal and maritime mobility services of passengers and tourists. The document can be also replicated in other contexts because it includes universal recommendations on e-mobility and on energy efficient mobility services planning adaptable to local needs. In addition, the University of Trieste developed a web-based ICT Application to provide a map of the electric charging stations and the sharing services kick-started within the DEEP-SEA project. The App enables users to book e-mooring, e-charging parking places or the rental of e-vehicles. The App also monitors end-users behaviors and usage (with aggregated info for privacy reasons), and provides data for the investments improvements. The App has been designed also to inform (push approach) the user about new services during high and low tourism seasons, and will contribute to establish a community with local tourists operators. The user is then profiled and receives a Services CARD for using the DEEP-SEA e-mobility services. The card will be delivered to users crossing the first marina and it will be applied in marinas within the same network.

DEEP-SEA PARTNER INTERVIEW

Public events and meetings

Italian and Croatian stakeholders of the nautical and coastal mobility sector gathered in Trieste on 23rd November to explore DEEP-SEA main findings. After the institutional greetings, project aims and key achievements were presented to the audience, followed by a high-level dissemination event composed of three panels on policy, technology and tourism. The round tables involved international experts and stakeholders, who debated with the participants on the following themes, i.e.: (i) policies for the promotion of electric mobility and energy transition; (ii) state-of-the-art in the nautical electric mobility technologies; (iii) state-of-the-art in the use of nautical electric mobility.

Ponikve eko otok Krk



Founded in 1960, Ponikve eko otok Krk is a company based on the island of Krk, Croatia. A communal organization owned by all 7 municipalities on the island is in charge of waste management, water management, and recently takes care of telecommunications infrastructure (optical network) and public lighting. Ponikve works hard to educate local citizens and youth groups on the importance of environmental protection and a circular economy. Ponikve organizes and carry out numerous beach and natural area clean-ups throughout the course of the year, operating across the entire island of Krk. Celebrated as the largest island in the Adriatic, Krk is known within Croatia primarily for the efficiency of its separate waste collection and management, as well as for being a strong candidate for the Mediterranean's first zero-waste island. These achievements have been recognized by the EU's prestigious certificate of Best Practices in Waste Management.

E- mobility is a part of Krk's long-term strategy to become the first 'smart island' in Croatia. Island has "Zero Emission Development Strategy" since 2012, pushing for the integrated and sustainable development that goes far beyond in the context of energy. It introduces a long-term socio-economic development plan for the island, with special focus on energy savings through increasing energy efficiency and the share of renewable energy sources (wind, sun and biogas). As 53% of Krk's CO2 emissions come from transportation, the island installed 12 chargers for 24 electric vehicles and 8 chargers (prior to deep sea) for 80 e-bikes, the latter being part of a bike-sharing system. The island of Krk stands out with numerous bike paths separated from traffic. Compatible with the idea of DEEP-SEA project, all the bike sharing stations on the island are located in the vicinity of electric cars charging station, offering mobility while charging e-vehicle. Ponikve already had experience with PV installation on the waste management facility.

Ponikve engages in diverse and ambitious projects: door-to-door waste collection, organizing nature clean-ups, researching new ways to recycle plastic, water management with climate changes in mind, implement sustainable solutions and support investments in green energy.

The role in the DEEP-SEA project

The role of Ponikve eko otok Krk as Project Partner 12 was to offer location for another pilot installations and monitoring of the implemented solutions. Ponikve joined to the project consortium as last partner and took over responsibilities in necessary WPs: equipment procurement, participation in sharing of implementation experiences, periodical evaluation and mitigation of COVID-19 situation, dissemination and participation in project meetings and regular communication.

Realized activities

Main objectives of the project were to develop and implement innovative solutions in electrification of coastal mobility. Mobility services on island Krk were incorporated in already existing net of sharing system for electrical bicycles. Installation of microgrid system secured green energy for e-vehicles. The logic of pilot was to offer the use of electric bicycle or scooter to explore town while leaving e-car on charger, as both bicycle CS and electric car CS are next to another. Two e-car charging stations were placed next to existing bicycle sharing station and next to the port and boat charger. This approach secures convenience in mobility planning.

The Ponikve eko otok Krk pilot area implemented these activities:

- Installation of 1 rack with electric and muscular bicycles for bike sharing services;
- Purchase of 4 e-scooter for sharing services and startup of 1 e-scooter sharing;
- Installation of 3 e-charging stations for e-cars;
- Installation of 1 e-charging stations for e-boats;
- Installation of 1 microgrid system.

All of the above has been incorporated into e-mobility smartphone app which allows users to find and rent e-vehicles integrated to one sharing system. This effectively improves sustainable passengers mobility in coastal area. The app was also used by the partner to follow through with monitoring.

Other activities were promotion and dissemination: participation in conferences, collaboration in promotional events for e-mobility, and working with local stakeholders as signatories of project's Memorandum of Understanding. Team members also participated in research activity, working with survey for marina users and marina operators.

Public events and meetings

Ponikve eko otok Krk hosted DEEP SEA consortium meeting in the fall of 2021, and few other workshops dissemination events. PP12 project manager mr. Dejan Kosić presented the project at Deep Sea workshop on conference „Climate change and preservation of marine ecosystems of the Adriatic Sea" held in Krk on September 30th 2022, under topic „Application of new technologies in adaptations to Climate Change".

Interesting public events were e-cycling events organized in cooperation with NGO Moj otok (My island), signatory of DEEP-SEA Memorandum of Understanding and local promoter of e-mobility. There were 3 e-cycling days organized for promotion of e-mobility, which gathered local and foreign cycling enthusiasts on riding scenic routes connecting neighboring municipalities. Some participants joined with their own e-bikes, while others used DEEP SEA and compatible public sharing bikes.

One route went from Ponikve building to municipality Malinska (PP6), cca 13 km distance. Following lunch break in Malinska participants visited newly opened Maritime heritage interpretation centre DUBoak, which connects Slavic mythology, maritime tradition and love towards sea and nature. Interdisciplinary approach to promotion of project goals secures reaching out to diverse profile of citizens.



Project Partners



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DEEP-SEA PARTNER INTERVIEW

Chamber of Commerce of Foggia



The Chamber of Commerce (CCIAA Foggia) is competent for the whole territory of the province of Foggia (61 municipalities, population of 628.221). Referring to 2014, the Chamber of Commerce gathers about 80.114 companies, of which 71.766 regularly operate on the territory. The functions of the Chamber of Commerce of Foggia are essentially three: - administrative functions assigned by law and delegated by the State - commercial functions/regulation of the market - promotional functions: initiatives to support economy and business system of the Province, activities by means of special agencies to carry out services with a high level of specialist expertise through streamlined and flexible structures, organisation of training courses, conferences and seminars, support for participation in exhibitions/fairs, projects of particular importance for the economy of the area (ex., in tourism, energy management), information and support to local entrepreneurs.



The role in the DEEP-SEA project

The Chamber of Commerce coordinated the communication activities of the project ensuring the needed external communication of project results and achievements towards main outlined targets, has provided channels and means tailored to achieve the selected objectives: increase knowledge and influence the attitude towards efficient and energy-sustainable passenger mobility services. The CCIAA of Foggia, with the support of the other Partners has developed a Memorandum of Understanding model (MOU) of the Adriatic for the strategic implementation of results of the project. The Memorandum expressed the will of the participants, outside and inside the project, to channel efforts towards the development of services and technologies sustainable and energy efficient mobility.



Realized activities

The Chamber of Commerce of Foggia has drafted the document "Memorandum of Understanding". This document was developed with the collaboration of the LP and with the contribution of the project partners. The Memorandum of Understanding is useful for involving stakeholders in the achievement of the project objectives, even after the end of the project.

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