D.3.4.1 Investment plans for energy efficiency mobility at each project pilot site

WP3. Nautical marinas framework analysis and investment plans

1. **PILOT Ponikve eko otok – ISLAND OF KRK**
2. **PILOT Porto San Rocco, Muggia; Marina Lepanto, Monfalcone; Ocean Marine, Monfalcone – ADRIATIC ITALIAN COAST**
3. **PILOT Municipality of Malinska – Dubašnica – Port of Porat - ISLAND OF KRK**
4. **PILOT - Martinis Marchi Marina - Maslinica Bay, Island of Šolta in Central Dalmatia**
5. **PILOT Province of Foggia - Marina del Gargano; Marina di Rodi Garganico; Marina di Vieste; Marina di Mattinata – ADRIATIC ITALIAN COAST**

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1 PILOT Ponikve eko otok – ISLAND OF KRK

Document: Public/Confidential			
Responsible Partner: Ponikve Eko otok Krk Involved Partners: All			
Version	**Status**	**Date**	**Author**
1.0	Final	February 2020	Sensum Ltd.
Authors: **Dr.sc. Duško Radulović** **Sanda Hunjak, mag.ing.** **Ardea Segnan, mag.oec.** **Teo Vuksan, bacc.oec.**			

1. Introduction

As part of the Deep Sea Interreg project, pilot activities that are being carried out are:

- installation of a photovoltaic plant in the parking lot of the administrative building with a battery, a charging station for electric vehicles and a system for renting electric bicycles and scooters in the city of Krk.
- installation of a charging station for electric vehicles and ships in municipality of Omišalj (Luka Njivice)
- installation of a charging station for electric vehicles in Vrbnik.

For the purposes of performing the mentioned pilot activities, this investment study was prepared, which will show the services of current mobility i.e. electromobility on the island of Krk, as well as traffic load and energy consumption caused by traffic. The island of Krk in the Primorsko Gorki Kotar County is an example of pozitive planning for the development of electromobility. This project is complementary to the strategic development of the island of Krk, both in terms of tourism and energy independence.

Investment costs include costs of: (1) Investments in equipment; (2) Staff costs; (3) Expenses of external associates in the total amount of 2,051,978.94 HRK.

The financial analysis was prepared on an annual basis for a project time horizon of 15 years including 3 years of the investment phase (documentation preparation phase and implementation phase) and 12 years of the operational phase of the project. Forecasts are expressed for a period appropriate to its economic life and are long enough to cover medium- and long-term effects. A positive cumulative net cash flow throughout the reference period confirms that the project is financially viable.

Economic NPV for this project is 1.408.602 HRK, and indicates that the project is beneficial from an economic point of view because it creates significant economic benefits for the project implementation area, consequently the region and the state. The economic rate of return on investment for this project is 17.63% and is higher than the economic discount rate of 5% indicating that the project is economically beneficial and creates significant economic benefits for the region.

Benefit-cost ratio - The economic B / C ratio is 1,72 and indicates that the project creates significant economic benefits: at 1 HRK of economic costs it generates 1,72 HRK of economic benefits.

2. Methodology

The methodology for this project, according to the project instructions, is: *This document will capitalise results from the analysis carried out in DEEP SEA WP3, i.e.: 3.1 Analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility, 3.2 Analysis of marinas management and investments model, 3.3 AS IS analysis on current mobility services and related energy consumption. Based on these, specific investment plans are here elaborated for each project pilot site thanks also to specific meetings and working tables with marinas' managers and stakeholders and site surveys carried out during the project. The investment plans are finally fine-tuned thanks to pilot implementation and finally transferred to marinas and relevant stakeholders outside DEEP SEA partnership and pilot areas for potential replication and uptake.*

3. Description of DEEP-SEA pilot site and State of art

3.1 Description of the Institution, the site, the interaction with other stakeholders

The pilots to be performed on the island of Krk consist of a photovoltaic plant in the parking lot of the administrative building with a battery, a charging station for electric vehicles and a system for renting electric bicycles and scooters in the city of Krk, a charging station for electric vehicles and boats in the municipality Omišalj and charging stations for electric vehicles in the Vrbnik.

The project is implemented by the company Ponikve eko otok Krk, which is registered for performing communal activities (waste management and energy) on the island. Regarding energy, the company is registered for a number of activities such as: electricity generation, electricity trade, construction, installation and maintenance of electronic communications infrastructure, maintenance and management of public lighting system, design, construction and professional supervision of construction, activity certification of buildings and other structures, energy inspection of buildings and other structures, production of plants for the use of renewable energy sources and cogeneration, design and development of renewable energy sources and energy efficiency, energy production, energy transmission, energy storage, energy distribution, management energy facilities, energy supply, energy trade, energy market organization, electricity transmission, electricity distribution, electricity market organization, electricity supply, research, development and design ktiranje in energy, production of solar radiation systems, production, repair, installation and maintenance of electric power facilities. construction of power lines, repair of electrical equipment, electrical installation works, activity of electronic communication network and services, repair of electronic and optical equipment, construction of lines for telecommunications.

The company was founded by a unit of local self-government on the island of Krk (City of Krk, Municipality of Baška, Municipality of Dobrinj, Municipality of Malinska-Dubašnica, Municipality of Omišalj, Municipality of Punat, Municipality of Vrbnik). These pilots that will be performed are in cooperation with the municipalities / cities where they are located, namely: the City of Krk, the Municipality of Omišalj and the Municipality of Vrbnik, which also represent the most important stakeholders. Since it plans to combine a charging station for electric boats, one of the important stakeholders is the County Port Authority of Krk.

The Port of Njivice, which is administratively located within the Municipality of Omišalj, is an open port for public transport of local importance, whose area consists of the coastal and mainland part and the water area. It covers an area of 27,690 m2, of which 3,172 m2 is land and 27,978 m2 is sea area. It consists of an operational part of the port with a total length of 146 for the purpose of loading and unloading passengers in occasional coastal traffic, a communal part of the port for mooring of 122 meters up to a length of 12, and a nautical part of the port for mooring 17 yachts and boats. The additional content of the port constitutes an area for the raising and lowering of sea-bound vessels, secured places for the supply of electricity and drinking water, and 1 container for the collection of solid waste and 1 container for the collection of liquid waste. The illustration of the port area is shown in the figure below.

Picture 1. Orthophoto of the port of Njivice

3.2 Current management models

The County Port Authority performs the following activities within its scope of work:

- care for the construction, maintenance, management, protection and improvement of the maritime domain that represents the port area;
- construction and maintenance of port substructure,
- professional supervision over the construction, maintenance, management and protection of the port area (port substructures and superstructures);
- ensuring permanent and uninterrupted performance of port traffic, technical-technological unity and safety of navigation;osiguravanje pružanja usluga od općeg interesa ili za koje ne postoji gospodarski interes drugih gospodarskih subjekata;
- harmonization and supervision of the work of concession holders performing economic activity in the port area;

making a decision on the establishment and management of a free zone in the port area in accordance with the regulations governing free zones;

The County Port Authority of Krk si non-profit legal entity to which the regulations of institutions apply, and the Regulation on Accounting of Non-profit Organizations applies to financial operations.

In ports, the management model is based on public-private partnership, in the form of concessions. Under the concession, the private partner (concessionaire) bears overall responsibility for the services, including operation, maintenance and management, as well as capital investments for the rehabilitation and reconstruction of assets and the expansion of services. The concession period depends on the country. In Croatia, concession contracts usually last between twenty and thirty years, depending on the level of investment and the period required for the concessionaire to repay its investment. Concession contracts for smaller ports, such as the port of Njivice, are significantly shorter.

3.3 Analysis of current mobility services – ONGOING in Act. 3.3 -

Regarding electromobility on the island of Krk, there are 10 charging stations for electric vehicles that are distributed throughout the island (Baška - 2 charging stations, Dobrinj, Krk - 2 charging stations, Malinska, Omisalj, Punat, Silo, Vrbnik, Airport). The locations are shown in the image below.

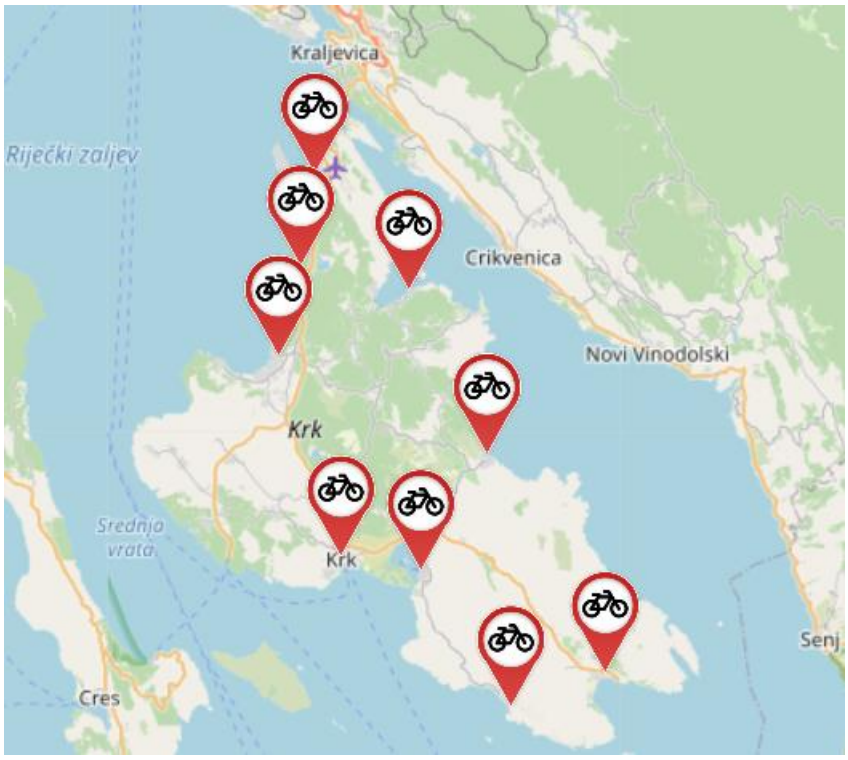
Picture 2. Locations of electric charging stations for vehicles on the island of Krk

2x22 kW charging stations for electric vehicles consist of two sockets and a control system.

Picture 3. Display of charging station for electric vehicles

Regarding the locations for electric bicycles that can be rented on the island of Krk, they are located in 8 different locations, namely Baška, Klimno, Krk, Malinska, Omišalj Punat and Vrbnik, as can be seen in Picture 4.

Picture 4. Location of stations for electric bicycles and rental



They consist of a control pylon and 5 charging stations / stands for electric bicycles and scooters / scooters. The system of public rental of electric bicycles *Krk Bike* works in such a way that the rental price is 20 HRK / hour, of which the first 5 minutes are not charged, and the unit of account is a minute. Electric bicycles can be rented 0-24 h. To use bicycles, it is necessary to use the Go2Bike application, through which bicycles are picked up and returned via the QR code.

Picture 5. Display of a station for electric bicycles and rental.

Regarding port traffic, the County Port Authority of Krk was established in 1999 in order to manage the use, construction and maintenance of ports of county importance, and ports of local importance. They are listed in the table as follows:

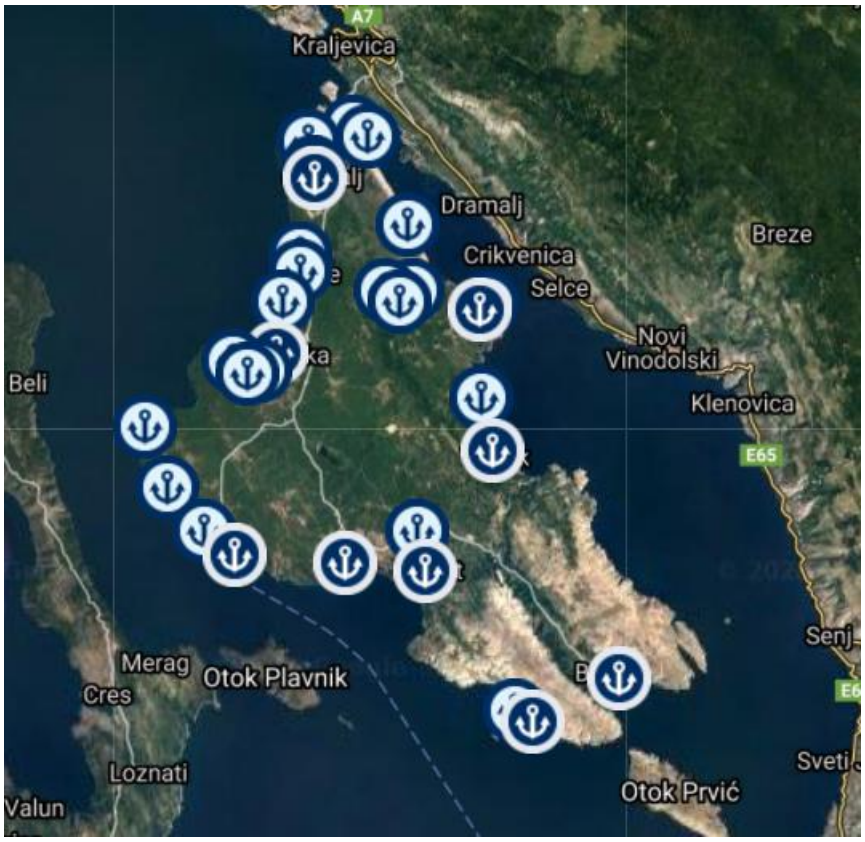
Table 1. Ports on the island of Krk

Ports of county importance	Baška
	Krk
	Malinska
	Omišalj
	Punat
	Šilo
	Surbova- Baška- putnička luka
	Valbiska
	Vrbnik
Ports of local importance	Čižići- Dobrinj
	Dobrinj
	Glavotok
	Klimno
	Lokvišća- Šilo
	Njivice
	Njivice- bazen Kijac
	Njivice- bazen Pod Rov
	Omišalj- bazen hotel Jadran
	Omišalj- bazen Lučica
	Omišalj- bazen pod Dubec
	Porat- Malinska
	Rova- Malinska
	Soline- Dobrinj

	Stara Baška
	Sv. Fuska
	Vantačići- Malinska
	Vela Jana
	Voz
	Voz- bazen Peškera
	Voz- bazen Silvanjska
	Vrbnik- bazen Sveti Marak

The locations of the ports on the island of Krk are shown in the picture below.

Picture 6. The locations of the ports on the island of Krk



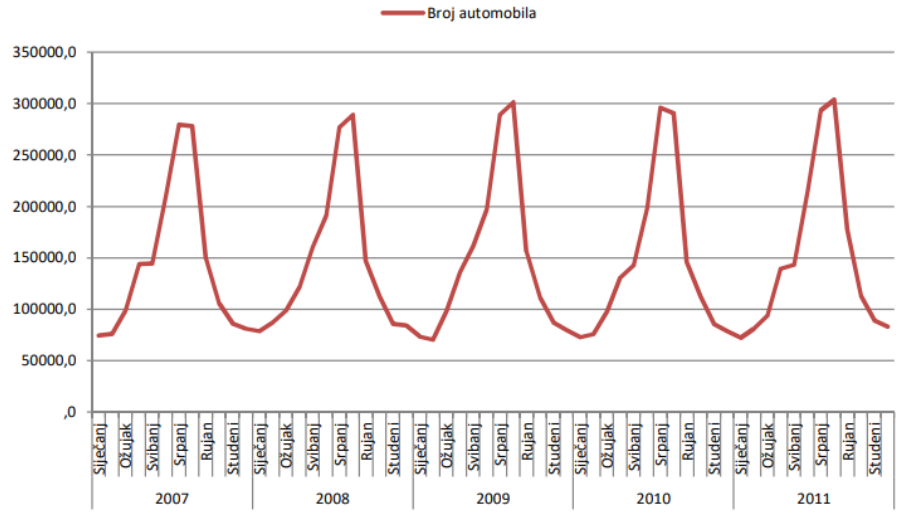
Regarding the collection, the port tariffs of the County Port Authority of Krk have been defined. In ports open to public traffic managed by the Port Authority, ships, the respective owners of ships, yachts and boats are obliged to pay port dues. Port taxes are: shore use fee, shipping fee, berth fee.

In addition, the Port Authority continuously monitors electricity consumption through the Energy Management Information System as part of the project "Systematic Energy Management" of the Primorje- Gorski Kotar County. Consumption varies throughout the year, with much higher consumption recorded during the summer months than in the winter months.

3.4 Traffic volumes and energy consumption baseline – ONGOING in Act. 3.3

An important element of the traffic of the island of Krk is the fact that it is an island that is connected to the mainland by a bridge, and since it is a significant tourist destination, there is a significant flow of tourists and thus greatly increased traffic capacity in summer. Large traffic oscillations in traffic are visible in Graph 1.

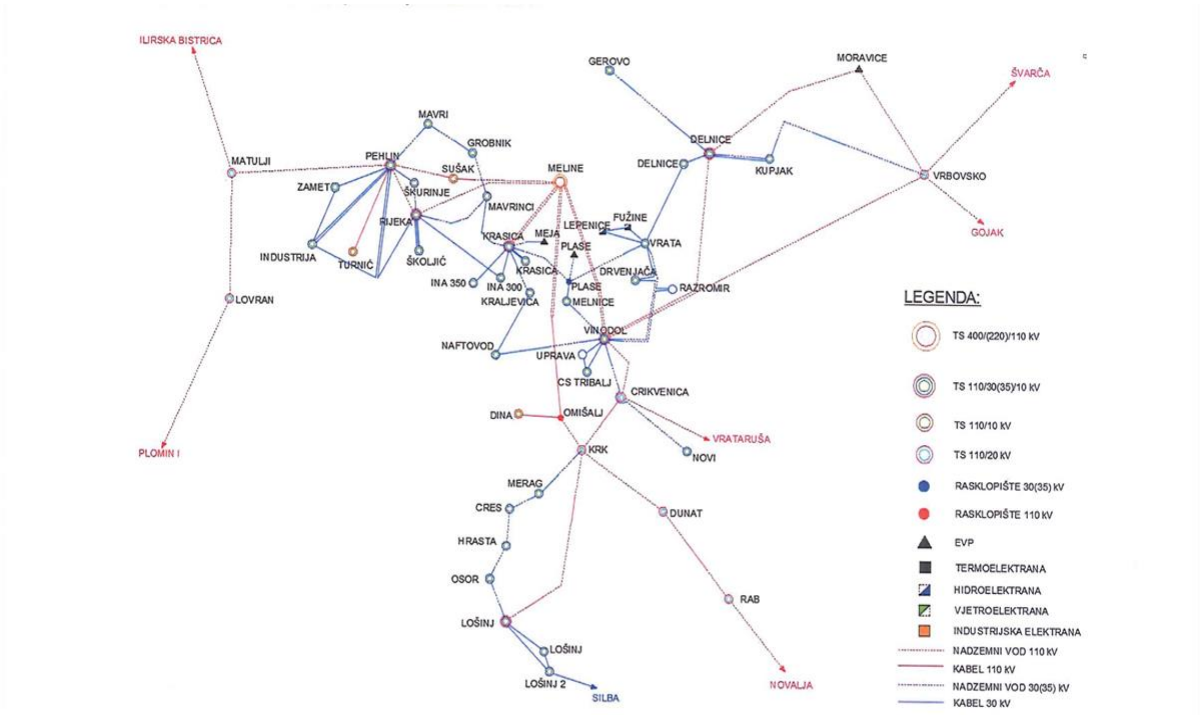
Graph 1. Monthly (one-time) vehicle traffic across the bridge (Source: Strategija_0_emisije_Krk_final_srpanj2012)



According to the Interdisciplinary Strategy of Zero Greenhouse Gas Emissions for Integrated Sustainable Development of the Island of Krk, energy consumption in the transport sector of the energy balance for 2011 for the island of Krk amounted to 3,614,178 kWh and amounts to 1,185 t CO_2. Traffic referred to the part caused by private, commercial and touris acitivities. The data that were taken into account refer to the number of registered vehicles on the island, the monthly crossing over the Krk bridge, and the share of visitors by local self-government.

Regarding the electricity system, and in the context of electromobility, the area of Primorje Gorki Kotar County belongs to the distribution area of Elektroprimorje Rijeka, which after Elektra Zagreb and Split has the largest share of load. The network covers the territory of the Primorje Gorski Kotar County and the connection of the island with the mainland, as well as the islands with each other. The picture below shows that the island of Krk is connected by multiple connections to the mainland, while the islands of Cres, Lošinj and Rab are fed radially via the network of the island of Krk, which is a critical connection.

Piicture 7. Overview of the power system of Primorje- Gorski Kotar County (Source: EnerNETMob: Action plan "Sustainable electromobility plans˝)



In the Primorje Gorski Kotar County, the island of Krk can be singled out as a positive example of electromobility development planning, where traffic is developed as part of a zero greenhouse gas strategy for integrated sustainable development, which is further elaborated through several strategic documents related to electromobility and vehicle sharing systems. The electromobility system of the island of Krk consists of a network of 12 charging stations and 10 electric vehicles distributed in 7 local self-government units, and 10 bicycle rental systems distributed in 8 locations on the island. Also, taking into account modern digital trends, mobile applications have been developed that encourage alternative ways of moving. As an example, the already mentioned Krk Bike with a display of a network of charging stations for electric vehicles and a map of bicycle paths, and Krk Hike with a map of hiking trails.

Regarding the number of sessions, the total and average charging time, and the total energy consumed, the data are given in Table 2.

Table 2. Overview of consumption of electric charging stations for 2019.

Location	Number of sessions	Total charging time (h)	Average charging time (h)	Total energy consumed (kWh)	Average energy consumed (kWh)
Baška - Bus station	207	890,65	4,30	2.191,65	10,59
Baška	360	5.395,02	14,99	2.861,22	7,95
Dobrinj	166	3.844,24	23,16	1.083,07	6,52
Krk	858	2.527,61	2,95	7.682,50	8,95
Krk - Ponikve	692	5.458,69	7,89	5.378,61	7,77
Malinska	686	1.496,09	2,18	5.477,06	7,98
Parking lot	422	4.423,31	10,48	2.497,61	5,92
Punat	242	2.334,90	9,65	3.567,40	14,74
Šilo	1.193	4.876,54	4,09	6.324,70	5,30
Vrbnik	180	1.426,76	7,93	1.503,77	8,35
Zračna luka	125	691,29	5,53	1.095,79	8,77

The total annual number of sessions is 5,131, and the total charging time is 33,365.11. The largest number of sessions was realized in Šilo, while the highest energy consumption (kWh) was in Krk.

Regarding the number of leases, the duration of the lease, and the total energy consumed for the period from May to September, the data are given in Table 2.

Table 3. Overview of electric bicycle rental in 2020.

	number of rentals	duration (min)	duration(h)	cost with VAT (kn)	consumption (kWh)
BAŠKA	568,00	28.496,00	472,44	9.500,20	1.009,30
KLIMNO	286,00	14.466,00	241,08	4.821,60	764,20
KRK	440,00	27.838,00	464,05	9.280,80	801,80
MALINSKA	504,00	32.046,00	534,28	10.685,60	1.001,30
OMIŠALJ	706,00	37.596,00	626,54	12.531,20	n/a
PUNAT	554,00	34.384,00	573,18	11.463,60	n/a
VRBNIK	414,00	25.882,00	430,48	8.628,00	861,90
TOTAL	3.472,00	200.708,00	3.342,05	66.911,00	4.438,50

The total number of rentals in the period from May to September on the island of Krk was 3,472, most of them in Omišalj, 706 times in the total duration of 626.54 hours.

As part of sustainable electromobility plans at the level of PGC, scenarios for 2025 and 2030 for electromobility have been created, and the number of sockets, charging poles and charging station

locations by cities and municipalities has been estimated. As a criterion for distribution, the share of the working age population of an individual city or municipality in the total number of working age population in the Primorje Gorski Kotar County was used, according to the last census from 2011.

Table 4. Charging infrastructure development scenario for the island of Krk for 2025

Year	**2025.**								
Scenario	**Basic**			**Middle**			**Dynamic**		
City/Municipality	Total locations	Number of charging lines (pillars))	Number of locations	Total locations	Number of charging lines (pillars))	Number of locations	Total locations	Number of charging lines (pillars))	Number of locations
Krk	7	5	3	8	7	3	10	8	3
Baška	2	2	1	2	2	1	3	2	1
Dobrinj	2	2	1	3	2	1	3	3	1
Malinska-Dubašnica	3	3	2	4	3	2	5	4	2
Omišalj	4	3	2	5	4	2	6	5	2
Punat	2	2	1	3	2	1	3	3	1
Vrbnik	2	1	1	2	2	1	2	2	1
Total Island Krk	**22**	**18**	**11**	**27**	**22**	**11**	**32**	**27**	**11**
PGK	289	231	110	374	299	126	447	361	126

Table 5. Charging infrastructure development scenario for the island of Krk for 2030

Year	**2030.**								
Scenario	**Basic**			**Middle**			**Dynamic**		
City/Municipality	Total locations	Number of charging lines (pillars))	Number of locations	Total locations	Number of charging lines (pillars))	Number of locations	Total locations	Number of charging lines (pillars))	Number of locations
Krk	7	6	3	9	7	3	10	8	4
Baška	2	2	1	3	2	1	3	2	1
Dobrinj	3	2	1	3	3	1	4	3	2
Malinska-Dubašnica	4	3	2	4	4	2	5	4	2
Omišalj	4	4	2	5	4	2	6	5	2
Punat	3	2	1	3	3	1	3	3	2
Vrbnik	2	2	1	2	2	1	2	2	1
Total Island Krk	**25**	**21**	**11**	**29**	**25**	**11**	**33**	**27**	**14**
PGK	321	264	122	394	323	134	457	375	164

As for the marina, Njivice location has a contracted nominal power of 130 kW, while the nominal voltage is 400 V, and the connections in the marina are directly connected to the network. There are currently 10 mooring points available with electricity connection, each with a nominal power of 76.8 Kw. The total average electricity consumption (for 2019) is 965 kWh, which is fully absorbed by moored vessels. There are currently no electrical panel connections in the port, but there is a charging station for electric cars and motorcycles that has an average consumption of 7,740 kWh per year. There is also the possibility of renting (a total of 10) electric bicycles in the marina. If we talk about passenger arrivals, the average number of arrivals per day is 200 passengers, while at the annual level of 3,500 passengers. The average annual number of ships arriving in the port is 1,000, and the display of passengers by country of origin is shown in the following table:

Table 6. Share of passengers in the port of Njivice by country of origin

Country	**% passengers**
Germany	31,37
Slovenia	19,42
Croatia	16,14
Czech Republic	6,01
Austria	5,27

More than 65% of them are more than 300 km away from the location of the port, while as many as 95 of them come to it by car.

4. Strategy of new development

4.1 Strategic vision on tourism, accessibility and mobility

The island of Krk has excellent transport accessibility. It is connected to the mainland by the Krk Bridge, and then included in the highway systems of Croatia and European countries. Rijeka Island Airport is located on the island, which, although operational all year round, records incoming flights seasonally between the 4th and 10th month, when ˝low cost˝ avio companies are more actively involved.

The island of Krk sees its development strategy through the diversification of the tourism offer, not only through the sun and the sea but also in the development of nautical tourism, active holidays, cultural and rural tourism, health tourism. On the island are among the best marinas and seven local ports with developed nautical services and many diverse facilities, and as an easily accessible starting point and content destination is ideal for yachting and cruising small boats. The desired shift in nautical tourism in the goal of one of the strongest nautical destinations in the Adriatic was emphasized. Omišalj, Punat and Krk are primarily recognized as units of local self-government in which the importance of nautical tourism is emphasized as a primary product. The planned development of nautical activities requires a number of activities to be carried out by all local self-government units, such as sizing the number and types of berths in relation to the island's reception capacity, and differentiating content and services in the function of "complementary differences". cruisers (eg land excursions, guides, car, bicycle rental, etc.). The individual activities that are supposed to be carried out are related to defining the concept of marina / port development, with the necessary documentation such as environmental impact study, conceptual designs, feasibility studies, harmonization of spatial plans and others. An important topic of the tourism development strategy is the island's environmental responsibility system in tourism, and joint activities that are planned are the development of info programs to raise awareness of facilities and marinas on green practices (such as design, materials, waste management, energy, water and financial incentives). / relief). Through the elaboration of the sea conservation program, it is necessary to define the locations of fixed anchorages with the possibility of taking over waste, the locations of protection and revitalization of flowering plants and the establishment of the "peaceful navigation" corridor.

The island of Krk stands out with numerous bike paths separated from traffic. The development strategy envisages the elaboration of "Trails of the island of Krk" which would include thematization of trails (eg family wine, heritage, etc.), a unique marking system (eg visual identity, length and weight markings, info boards), a map of the entire system with tour suggestions (printed and electronic version, mobile applications, then inclusion in the European pedestrian path, etc. Further work is also expected on the separation of bicycle paths from motor traffic.

Regarding the strategic development of the port of Njivice, the process of its development is being implemented. Njivice is a tourist destination where 10,000 guests stay daily during the tourist months. The existing port is a very attractive location, which is the central place of all events, and is close to other tourist facilities. The project plans 100 new berths, and includes the reconstruction of the historic part of the port with the correction of the coast and the addition of piers, the extension of the main breakwater and the construction of a secondary breakwater. The planned value of the investment is around HRK 25 million HRK.

4.2 Targets, indicators and objectives of investment

The implementation of this investment in the island of Krk solves the problem of highly polluting maritime (ships) and coastal traffic (cars) and the limitations of mobility services offered on the island. The investment supports maritime and coastal transport operators and provides an incentive to the island of Krk in further planning and implementation of sustainable mobility. The investment itself will increase the supply of energy efficient mobility services, with an emphasis on electric mobility which will consequently lead to higher demand for electric boats and cars.

The investment consists of:

- installation of a photovoltaic plant in the parking lot of the administrative building with a battery, a station for charging electric vehicles and a system for renting electric bicycles and scooters in the city of Krk.
- installation of a charging station for electric vehicles and ships in Omišalj (Port Njivice)
- installation of a charging station for electric vehicles in Vrbnik

Users will be offered the following services:

- charging of electric ships and vehicles,
- rental of electric bicycles and scooters

This will ensure the provision of long-term innovative technologies, scenarios and models for sustainable energy efficient solutions for electric mobility and maritime and coastal mobility management skills, which will be applied during the pilot implementation and in the long term. With the implementation of the investment, the main stakeholders in the maritime and sector will continue to use them for the development of electric mobility of maritime and coastal transport.

The purpose of this investment is to improve the quality, safety and environmental sustainability of maritime and coastal transport services. It is achieved through the promotion of sustainable transport

and the removal of bottlenecks in critical network infrastructure through the development and improvement of environmentally friendly (including low noise) and low-carbon transport systems, including maritime and land transport, in order to promote sustainable regional and local electricity mobility.

Objectives of the investment in the electromobility sector:

- promoting more comfortable, quieter and cheaper driving of electric boats and vehicles,
- increasing awareness and knowledge about the benefits of using electric boats and vehicles,
- contribution to the reduction of harmful emissions of gases into the atmosphere and the reduction of noise,
- reduction of CO_2 emissions,
- developing a better maritime and coastal transport network and infrastructure,
- promoting the use of electric boats and vehicles in everyday life,
- use of IT solutions in electric mobility to improve the quality of life of residents and reduce the cost of living,
- improving energy efficiency,
- reducing electricity consumption while encouraging the use of renewable energy sources, which will consequently strengthen the local network,
- increasing the use of IT technologies in the control of energy consumption,
- increasing investments in renewable energy sources and development of electric mobility,
- improving technical and commercial skills related to renewable energy sources,
- developing models and examples of good practice from the European Union and through the use of EU funds

5. Investment Plans

FINANCIAL ANALYSIS

The financial analysis checks the financial returns of the project from the position of the entity responsible for the establishment of a plant for treatment / recycling of construction and / or large (bulky) municipal waste. The basic assumptions of financial analysis are fully set in accordance with the Guide to Cost-benefit Analysis of Investment Projects (Economic appraisal tool for Cohesion Policy 2014-2020), then the established financial postulates, the specificity of the project, the current state of project preparation and all relevant information at the national and EU level

ASSUMPTIONS OF FINANCIAL ANALYSIS

Financial analysis is performed by estimating cash flows and calculating net return indicators. The main purpose of financial analysis is to use project cash flow plans to calculate appropriate return indicators.

Emphasis is placed on two financial indicators: Financial Net Present Value (FNPV) and Financial Internal Rate of Return (FRR) which are conducted by analysis of return on investment cost, and returns on national capital of FNPV (C) and FRR (C) which are the ratio of investment cost and capital invested in the project.

The analysis is performed using the discontinuous cash flow (DCF) method. This methodologically means:

- that the analysis does not include depreciation, reserves or other accounting items that do not correspond to the actual cash flows of the period;
- Cash flow is determined according to an incremental approach, ie based on the difference in costs and benefits between the “with project” scenario and the “without project” scenario.
- when considering inflows and outflows of the appropriate methodology described in the Guide to the cost-benefit analysis of investment projects, transfers or grants (eg transfers from state or regional budgets or national health insurance) as well as other financial revenues (eg interest on bank deposits) are not included in operating income to calculate financial profitability because they cannot be directly attributed to the business of the project;
- the analysis was made based on 2020 prices. All projections within the feasibility study were made in HRK because the Croatian kuna is the official currency of the Republic of Croatia, and the project, as well as payments, are implemented in the territory of the Republic of Croatia. The abbreviation for kuna is "kn" in payment transactions in Croatia, while for linden it is "lp". According to the ISO 4217 standard, the code for the kuna in international traffic is "HRK", and the numerical code is "191".

- in this project, a reference financial discount rate of 4% is applied, which is considered a reference parameter for the long-term real opportunity cost of capital, in accordance with the recommendation of the European Commission, Article 19 (Discounted cash flow) of Commission Delegated Regulation (EU) no. 480/2014 for the programming period 2014-2020;
- **the reference period is 15 years,** and includes an investment period of 3 years and 12 years of operating operations, which is in line with the recommended range of the reference period (in the Cost-Benefit Analysis Guide) for investments in the Energy sector. Commissioning is assumed in 1/1/2023, when the business phase begins;
- in accordance with the Guide through the analysis of costs and benefits of investment projects, value added tax (VAT) is not included in investment costs since it is refundable to the User;
- according to the recommended methodology in the case of a project that generates net revenue (revenue generating projects) the missing funding methodology is recommended (funding gap)
- the value of all processes, works, design and assets is expressed in current real prices, ie in accordance with fixed prices that do not take into account the annual inflation rate in the following years of analysis.

COST ESTIMATION METHODS

When estimating investment costs, all costs necessary for the realization of the investment were taken into account. In addition to the amount of investment costs, their dynamics of occurrence was determined, and the implementation period is planned for 3 years. Estimated operating costs are calculated based on assumptions and projections, and form the starting point for this study.

All investments required for the operation of the project are included in the investment budget, as well as all maintenance costs to ensure the sustainability of project activities. In the stated period of time, no reconstruction is planned, considering that the funds for the reconstruction are accumulated by calculating the depreciation. The maintenance costs of the plant are projected through the classic maintenance costs expressed in the material operating costs of the company.

5.1 Investment details: list and description of marinas investments

INVESTMENT COSTS

Investment costs include costs of: (1) Investments in equipment; (2) Staff costs; (3) Expenses of external associates. Data on investment costs, quantities, unit costs and time of investment were obtained from

the Beneficiary, based on the received information offers, existing contracts and market research. All costs related to the activities of the project itself are considered eligible for EU funding.

Table 7. Deep sea investment

DEEP SEA-Troškovnik investicije								
R.br.		Jedinična mjera	Jed. cijena (KN)	Količina	Uk. iznos KN)	Uk. Iznos (€)	Iznos PDV	Uk. Iznos s PDV-om (KN)
	INVESTICIJA U OPREMU				1.091.978,93	145.000,00	272.994,73	1.509.973,66
1.	**Kombinirana punionica (lokacija Njivice)**				**55.000,00 kn**	**7.303,25 €**	**13.750,00 kn**	**76.053,25 kn**
	BRZA AC PUNIONICA ZA ELEKTRIČNA VOZILA 2xTYPE 2 komunikacija s EV - MOD3 ISTOVREMENO PUNJENJE DVA e-VOZILA	kom	45.000,00	1,00	45.000,00 kn	**5.975,39 €**	11.250,00 kn	62.225,39 kn
	Dodatak za ePlovila	kom	10.000,00	1,00	10.000,00 kn	**1.327,86 €**	2.500,00 kn	13.827,86 kn
2.	**Punionice za vozila (lokacija Vrbnik i Krk)**				**90.000,00 kn**	**11.950,78 €**	**22.500,00 kn**	**124.450,78 kn**
	BRZA AC PUNIONICA ZA ELEKTRIČNA VOZILA 2xTYPE 2 komunikacija s EV - MOD3 ISTOVREMENO PUNJENJE DVA e-VOZILA	kom	45.000,00	2,00	90.000,00 kn	**11.950,78 €**	22.500,00 kn	124.450,78 kn
3.	**Punionica za bicikle i romobile (lokacija Krk)**				**133.000,00 kn**	**17.660,60 kn**	**33.250,00 kn**	**183.910,60 kn**
	Električno postolje za 12 bicikala s automatskim sustavom zaključavanja i ugrađenim punjačima za bicikle - robusni anti-vandal materijal, otporno na vremenske neprilike	kom	7.000,00	12,00	84.000,00 kn	**11.154,06 €**	21.000,00 kn	116.154,06 kn
	E-panel i pilon sa 17" ekranom osjetljivim na dodir i 3G ruterom	kom	35.000,00	1,00	35.000,00 kn	**4.647,53 €**	8.750,00 kn	48.397,53 kn
	Programska podrška za upravljanje stanicama i naplatu usluge bike sharing sustava licenca za dodatnu stanicu- software na VPS-u u Data centru	kom	6.000,00	1,00	6.000,00 kn	**796,72 €**	1.500,00 kn	8.296,72 kn
	Oprema za video nadzor stanice	kom	3.000,00	1,00	3.000,00 kn	**398,36 €**	750,00 kn	4.148,36 kn
	Brending elemenata sustava – izrada naljepnica i obljepljivanje pilona i postolja	kom	1.000,00	1,00	1.000,00 kn	**132,79 €**	250,00 kn	1.382,79 kn
	Isporuka sustava na mjesto instalacije, radovi na parametriziranju sustava, montaža i instalacija te puštanje sustava u rad.	kom	4.000,00	1,00	4.000,00 kn	**531,15 €**	1.000,00 kn	5.531,15 kn
4.	**Bicikle i romobili**				**134.640,00 kn**	**17.878,37 €**	**33.660,00 kn**	**186.178,37 kn**
	Električna bicikla sa GPS sustavom za praćenje i zaključavanje izvan stanice	kom	18.960,00	4,00	75.840,00 kn	**10.070,52 €**	18.960,00 kn	104.870,52 kn
	Mehanička bicikla sa Nexus mjenjačem	kom	7.900,00	4,00	31.600,00 kn	**4.196,05 €**	7.900,00 kn	43.696,05 kn
	Segway Max sharing romobil opremaljen GPS praćenjem i modulom za najam	kom	6.800,00	4,00	27.200,00 kn	**3.611,79 €**	6.800,00 kn	37.611,79 kn
5.	**Nadstršnica s fotonaponom i baterije za skladištenje energije (lokacija Krk)**				**679.338,93 kn**	**90.207,00 €**	**169.834,73 kn**	**939.380,66 kn**
	Nadstršnica	komplet	175.563,93	1	175.563,93 kn	**23.312,51 €**	43.890,98 kn	242.767,42 kn
	Fotonaponski moduli	kom	1.062,50	120	127.500,00 kn	**16.930,27 €**	31.875,00 kn	176.305,27 kn
	Izmjenjivač (Inverter)	kom	21.875,00	2	43.750,00 kn	**5.809,41 €**	10.937,50 kn	60.496,91 kn
	Podkonstrukcija	komplet	36.250,00	1	36.250,00 kn	**4.813,51 €**	9.062,50 kn	50.126,01 kn
	Zaštitni ormar	komplet	18.125,00	1	18.125,00 kn	**2.406,75 €**	4.531,25 kn	25.063,00 kn
	Radovi	komplet	7.250,00	1	7.250,00 kn	**962,70 €**	1.812,50 kn	10.025,20 kn
	Mjerenje kvalitete el. energije, gl. Projekt	komplet	9.375,00	1	9.375,00 kn	**1.244,87 €**	2.343,75 kn	12.963,62 kn
	Baterijska banka	komplet	95.000,00	1	95.000,00 kn	**12.614,71 €**	23.750,00 kn	131.364,71 kn
	Zakup angažirane snage HEP	kom	29.700,00	3	89.100,00 kn	**11.831,27 €**	22.275,00 kn	123.206,27 kn
	Izmjenjivač (Inverter)	kom	20.625,00	3	61.875,00 kn	**8.216,16 €**	15.468,75 kn	85.559,91 kn
	Sustav za praćenje rada	komplet	15.550,00	1	15.550,00 kn	**2.064,83 €**	3.887,50 kn	21.502,33 kn
	TROŠKOVI OSOBLJA	Jedinična mjera	Jed. cijena (KN)	Količina	Uk. iznos KN)	Uk. Iznos (€)	Iznos PDV	Uk. Iznos s PDV-om (KN)
	Upravljanje projektom				**574.870,36 kn**	**76.334,99 €**	**- kn**	**651.205,35 kn**
	Troškovi osoblja	komplet	444.224,17	1	444.224,17 kn	**58.986,95 €**	- kn	503.211,12 kn
	Neizravni troškovi (udio 15% troškova osoblja)	komplet	66.633,63	1	66.633,63 kn	**8.848,04 €**	- kn	75.481,67 kn
	Putni troškovi I smještaj	komplet	64.012,56	1	64.012,56 kn	**8.500,00 €**	- kn	72.512,56 kn
	TROŠKOVI VANJSKIH USLUGA	Jedinična mjera	Jed. cijena (KN)	Količina	Uk. iznos KN)	Uk. Iznos (€)	Iznos PDV	Uk. Iznos s PDV-om (KN)
	Troškovi vanjskih usluga				**385.129,66 kn**	**51.140,00 €**	**96.282,42 kn**	**532.552,07 kn**
	Troškovi vanjskih usluga	komplet	385.129,66	1	385.129,66 kn	**51.140,00 €**	96.282,42 kn	532.552,07 kn
	UKUPNO PRIHVATLJIVI TROŠKOVI				2.051.978,94 kn	272.474,99 €	369.277,15 kn	2.693.731,08 kn

5.2 Description of assets used to support the investment plan

The Company has long-term and short-term assets as shown in the Balance Sheet. The last three years, ie the period from 2017-2019, were analysed.

Table 8. Balance sheet for 2017. – 2019.

	2017.	% prom. 17./16.	2018.	% prom. 18./17.	2019.	% prom. 19./18.
Long term assets	55.197.569	-1	66.334.079	20	86.554.876	30
Intangible assets	663.450	8	613.553	-8	733.579	20
Tangible assets	53.860.519	-1	65.046.926	21	85.049.407	31
Land	849.932	0	849.932	0	849.932	0
Building facilities	27.108.098	-8	33.151.700	22	32.294.322	-3
Plant and equipment	7.831.957	-11	7.128.772	-9	6.619.496	-7
Other tangible assets	18.070.532	17	23.916.522	32	45.285.657	89
Financial assets	673.600	0	673.600	0	771.890	15
Shares, stocks and other securities (long term)	0	n.s.	0	n.s.	0	n.s.
Loans, deposits, etc. (long term)	0	n.s.	0	n.s.	290	n.s.
Other long term financial assets	673.600	0	673.600	0	771.600	15
Receivables	0	n.s.	0	n.s.	0	n.s.
Defferend tax assets	0	n.s.	0	n.s.	0	n.s.
Short term assets	14.796.810	23	16.274.117	10	8.513.524	-48
Supplies	132.303	29	257.866	95	738.225	186
Raw materials	130.416	51	257.331	97	724.448	182
Production in progress	0	n.s.	0	n.s.	0	n.s.
Finished goods and merchandise	0	n.s.	0	n.s.	0	n.s.
Other supplies	1.887	-88	535	-72	13.777	2.475
Receivables	4.672.200	-3	4.568.282	-2	4.486.140	-2
Trade receivables	4.119.522	-12	4.296.776	4	4.087.679	-5
Other claims	552.678	345	271.506	-51	398.461	47
Financial assets	3.000.000	0	3.000.000	0	0	-100
Shares, stocks and other securities (short term)	0	n.s.	0	n.s.	0	n.s.
Loans, deposits, etc. (short term)	3.000.000	0	3.000.000	0	0	-100
Other short term financial assets	0	n.s.	0	n.s.	0	n.s.
Money	6.992.307	72	8.447.969	21	3.289.159	-61
Deffered exxpenses paid and accrued income	0	n.s.	7.893	n.s.	0	-100
Total assets	69.994.379	3	82.616.089	18	95.068.400	15
Capital and reserves	46.344.257	4	53.653.576	16	64.114.162	19
Share capital	40.908.400	0	40.908.400	0	40.908.400	0
Capital reserves	2.812.913	62	9.612.507	242	20.998.444	118

Profit reserves, revaluation reserves and fair value reserves	0	n.s.	0	n.s.	0	n.s.
Reatined earnings/losses carried forward	1.713.681	24	2.622.943	53	3.132.669	19
Profit/loss for the business year	909.263	173	509.726	-44	-925.351	-282
Minority (non controlling) interest	0	n.s.	0	n.s.	0	n.s.
Reservations	0	n.s.	0	n.s.	0	n.s.
Long term obligations	1.266.530	-34	4.970.183	292	5.885.703	18
Interest-bearing (financial) liabilities (long term)	1.266.530	-34	4.970.183	292	5.885.703	18
Trade payables (long term)	0	n.s.	0	n.s.	0	n.s.
Other long term liabilities	0	n.s.	0	n.s.	0	n.s.
Short term liabilities	5.254.507	25	4.240.284	-19	7.180.048	69
Interest-bearing (financial) liabilities (short term)	641.929	-33	1.794.670	180	1.956.086	9
Trade payables (short term)	3.155.761	74	991.394	-69	4.006.531	304
Obligations to employees	740.732	-4	879.622	19	773.099	-12
other short term liabilities	716.085	8	574.598	-20	444.332	-23
Deferred payment of expenses and income of the future period	17.129.085	-1	19.752.046	15	17.888.487	-9
Total liabilities	**69.994.379**	**3**	**82.616.089**	**18**	**95.068.400**	**15**

From the above analysis can be read an increase in tangible assets of 31% in 2019 compared to 2018, on the other hand intangible assets from the item of concession, patents, licenses, software, etc., increased by 20% in 2019 compared to 2018 and amounts to 733,579 HRK. The Company reduced the item of current assets from 16,274,117 HRK in 2018 to 8,513,524 HRK in 2018.

Long-term liabilities increased by 18% in 2019 compared to 2018 when they amounted to 4,970,183 HRK.

The company generated sales revenue in the amount of 34,668,255 HRK in 2019, which means an increase in sales revenue by 1% compared to the previous year.

In line with the increase in revenues, there was an increase in expenditures (excluding depreciation) by 7% in 2019 compared to 2018. The increase was most felt in the staff cost item. Financial expenses are reflected through items of expenses based on interest and exchange rate differences.

The following table analyzes the profit and loss account for the last three years from 2017-2019. year, given that the data for 2020 are under construction.

Table 9. Profit and loss account

PROFIT AND LOSS ACCOUNT	2017.	% prom. 17./16.	2018.	% prom. 18./17.	2019.	% prom. 19./18.
A) OPERATING INCOME	34.601.158	9	34.449.454	0	34.668.255	1
1 Sales revenue with entrepreneurs within the group	0	n.s.	0	n.s.	0	n.s.
2 Sales revenue (outside the group)	29.788.910	13	31.263.446	5	31.579.633	1
3 Other operating income	4.812.248	-11	3.186.008	-34	3.088.622	-3
B) OPERATING EXPENSES (WITHOUT DEPRECIATION)	25.884.912	2	26.436.764	2	28.366.957	7
I. Operating expenses	25.884.912	2	26.436.764	2	28.366.957	7
1 Increase / decrease in inventories	0	n.s.	0	n.s.	0	n.s.
2 Material costs and costs of goods sold	10.230.117	-7	10.244.835	0	11.002.367	7
3 Staff costs (gross)	12.110.363	4	13.167.700	9	14.450.575	10
4 Value adjustments and provisions	376.093	-44	285.504	-24	212.861	-25
5 Other costs and expenses	3.168.339	52	2.738.725	-14	2.701.154	-1
C) PROFIT BEFORE INTEREST, TAX AND DEPRECIATION (EBITDA)	8.716.246	35	8.012.690	-8	6.301.298	-21
1 Depreciation	7.535.525	22	7.315.814	-3	7.142.228	-2
D) PROFIT BEFORE INTEREST AND TAX (EBIT)	1.180.721	338	696.876	-41	-840.930	-221
E) NET RESULT OF FINANCIAL ACTIVITIES	93.475	-36	-62.927	-167	-84.421	-34
I. Financial revenue	186.145	-31	153.765	-17	157.945	3
II. Financial expenses	92.670	-25	216.692	134	242.366	12
F) NET SHARE IN RESULT OF COMPANIES RELATED TO PARTICIPATING INTERESTS	0	n.s.	0	n.s.	0	n.s.
G) NET SHARE IN RESULT OF JOINT VENTURES	0	n.s.	0	n.s.	0	n.s.
H) TOTAL INCOME	34.787.303	8	34.603.219	-1	34.826.200	1
I) TOTAL EXPENDITURES	33.513.107	6	33.969.270	1	35.751.551	5
J) PROFIT / LOSS BEFORE TAX	1.274.196	206	633.949	-50	-925.351	-246
I. Porez na dobit	364.933	337	124.222	-66	0	-100
K) NET PROFIT / LOSS	909.263	173	509.727	-44	-925.351	-282
N) PROFIT / LOSS OF TOTAL OPERATIONS BEFORE TAX	1.274.196	206	633.949	-50	-925.351	-246
I. Total business income tax	364.933	337	124.222	-66	0	-100
O) NET PROFIT / LOSS OF TOTAL OPERATIONS	909.263	173	509.727	-44	-925.351	-282

5.3 Investment requirements based on security selection process: investments options evaluated on the basis of cost benefit and multi-criteria analysis (CBA & MCA)

OPERATING REVENUES

Operating revenues are presented through projections of total operating revenues of the User. Representations were made for the situation "without the project" and the situation "with the project" in order to determine the impact of the project on the projection of future business revenues of the Beneficiary. The following is a table view of total operating income in the situation without and with the project. In the situation with the project, revenues from new services are also shown. Expressed revenues refer to revenues generated from charging at the locations envisaged in the project. The income from renting a bicycle at a unit price of 20 HRK / h is also included. Incremental operating income is also presented as a representation of the difference in the situation without project implementation and with project implementation. The incremental operating income for the observed period amounts to HRK 749,764.

Table 10. Display of operating revenues

OPERATING REVENUES			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Operating income																	
SITUATION WITHOUT THE PROJECT																	
Operating income			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total operating income	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SITUATION WITH THE PROJECT																	
Combined filling station (location Njivice)																	
Income from charging			0	0	0	6.563	6.891	7.235	7.597	7.977	8.376	8.794	9.234	9.696	10.181	10.690	11.224
Vehicle charging station (location Vrbnik)																	
Income from charging			0	0	0	3.938	4.134	4.341	4.558	4.786	5.025	5.277	5.540	5.817	6.108	6.414	6.734
Charging station for vehicles, bicycles and scooters (location Krk)																	
Income from charging cars			0	0	0	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500	39.500
Income from bicycle rental (20 HRK per h)			0	0	0	6.825	7.166	7.525	7.901	8.296	8.711	9.146	9.603	10.084	10.588	11.117	11.673
Canopy with photovoltaics and batteries for energy storage (location Krk)																	
Income						0	0	0	0	0	0	0	0	0	0	0	0
Total operating income	**749.764**		0	0	0	**56.825**	**57.691**	**58.601**	**59.556**	**60.559**	**61.612**	**62.717**	**63.878**	**65.097**	**66.377**	**67.721**	**69.132**
Incremental income	**749.764**		**0**	**0**	**0**	**56.825**	**57.691**	**58.601**	**59.556**	**60.559**	**61.612**	**62.717**	**63.878**	**65.097**	**66.377**	**67.721**	**69.132**
INCREMENTAL INCOME	749.764		0	0	0	56.825	57.691	58.601	59.556	60.559	61.612	62.717	63.878	65.097	66.377	67.721	69.132
Discounted cash flow	*537.659*		*0*	*0*	*0*	*50.517*	*49.315*	*48.166*	*47.068*	*46.020*	*45.019*	*44.064*	*43.154*	*42.286*	*41.459*	*40.671*	*39.922*

OPERATING COSTS

The material costs in the situation without and with the project are shown below. Operating expenses are planned for the projected period 2020-2034. Operating expenses are planned in accordance with the accounting assumptions and categories of Material costs, Costs of services (as an integral part of material costs), other costs, value adjustments, provisions, other operating expenses, and financial expenses.

Table 11. Operating costs

OPERATING COSTS			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Employee cost																	
SITUATION WITHOUT THE PROJECT																	
Employee cost																	
Total employee cost	0																
SITUATION WITH THE PROJECT																	
Current employees					0	0	0	0	0	0	0	0	0	0	0	0	0
Employee cost						1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590
Total employee cost	19.077		0	0	0	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590
Incremental employee cost	19.077		0	0	0	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590	1.590
Operating costs																	
SITUATION WITHOUT THE PROJECT																	
Combined filling station (location Njivice)																	
Electricity costs						0	0	0	0	0	0	0	0	0	0	0	0
Costs of preventive and corrective maintenance						0	0	0	0	0	0	0	0	0	0	0	0
Vehicle charging station (locations Vrbnik and Krk)																	
Electricity costs						0	0	0	0	0	0	0	0	0	0	0	0
Costs of preventive and corrective maintenance						0	0	0	0	0	0	0	0	0	0	0	0
Charging station for vehicles, bicycles and scooters (location Krk)																	
Electricity costs						0	0	0	0	0	0	0	0	0	0	0	0
Costs of preventive and corrective maintenance						0	0	0	0	0	0	0	0	0	0	0	0
Charging station for vehicles, bicycles and scooters (location Krk)																	
Costs						0	0	0	0	0	0	0	0	0	0	0	0
Other costs																	
Software maintenance costs and system operation						0	0	0	0	0	0	0	0	0	0	0	0
Costs of card companies (cca13%)						0	0	0	0	0	0	0	0	0	0	0	0
Total operating cost	0					0	0	0	0	0	0	0	0	0	0	0	0
SITUATION WITH THE PROJECT																	
Combined filling station (location Njivice)																	
Electricity costs						2.625	2.756	2.894	3.039	3.191	3.350	3.518	3.694	3.878	4.072	4.276	4.490
Costs of preventive and corrective maintenance						12.500	12.750	13.005	13.265	13.530	13.801	14.077	14.359	14.646	14.939	15.237	15.542
Vehicle charging station (locations Vrbnik and Krk)																	
Electricity costs						1.575	1.654	1.736	1.823	1.914	2.010	2.111	2.216	2.327	2.443	2.566	2.694
Costs of preventive and corrective maintenance						11.500	11.730	11.847	11.966	12.085	12.206	12.328	12.452	12.576	12.702	12.829	12.957
Charging station for vehicles, bicycles and scooters (location Krk)																	
Electricity costs						0	0	0	0	0	0	0	0	0	0	0	0
Costs of preventive and corrective maintenance						10.000	10.200	10.302	10.405	10.509	10.614	10.720	10.828	10.936	11.045	11.156	11.267
Canopy with photovoltaics and batteries for energy storage																	
Costs						0	0	0	0	0	0	0	0	0	0	0	0
Other costs																	
Software maintenance costs and system operation						9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000
Costs of card companies (cca13%)						7.387	7.500	7.618	7.742	7.873	8.010	8.153	8.304	8.463	8.629	8.804	8.987
Total other operating cost	715.133					54.587	55.590	56.403	57.240	58.103	58.991	59.907	60.852	61.826	62.830	63.867	64.937
Incremental other operating cost	715.133		0	0	0	54.587	55.590	56.403	57.240	58.103	58.991	59.907	60.852	61.826	62.830	63.867	64.937
Reinvestment costs																	
SITUATION WITHOUT THE PROJECT																	
Equipment refurbishment																	
Total other operating cost	0				0	0	0	0	0	0	0	0	0	0	0	0	0
SITUATION WITH THE PROJECT																	
Equipment refurbishment								0	0	0	0	0					
Total other operating cost	0				0	0	0	0	0	0	0	0	0	0	0	0	0
Incremental other operating cost	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INCREMENTAL OPERATING COST	734.210		0	0	0	56.177	57.180	57.993	58.830	59.692	60.581	61.497	62.441	63.415	64.420	65.457	66.527
Discounted cash flow	*527.155*		*0*	*0*	*0*	*49.941*	*48.877*	*47.666*	*46.494*	*45.361*	*44.266*	*43.207*	*42.183*	*41.193*	*40.237*	*39.312*	*38.418*

TIME HORIZON AND THE REST OF VALUE

The financial analysis was prepared on an annual basis for a project time horizon of 15 years including 3 years of investment phase (documentation preparation phase and implementation phase) and 12 years of operational phase of the project. Forecasts are expressed for a period appropriate to its economic life and are long enough to cover medium- and long-term effects.
The residual value (residual discounted value) amounts to HRK 87,586, and the discounted value of net future income for the remaining five years is calculated using the discounted method.

5.4 CLASSIFICATION OF INVESTMENTS PRIORITIES

Project investment forms a unique whole and it is not observed from the aspect of primary and secondary actions.
Planned months of investment implementation are shown in the table below:

Table 12. Investment implementation phase

			INVESTMENT PHASE		
Activity	**Total amount (HRK)**	**Total amount (EUR)**	**2020**	**2021**	**2022**
	2.051.979	**272.475**			
INVESTMENT IN EQUIPMENT	1.091.978,93	145.000,00	0,0	0,3	0,7
STAFF COSTS	574.870,36	76.334,99	0,1	0,4	0,5
EXTERNAL SERVICE COSTS	385.129,66	51.140,00	0,1	0,5	0,4
Total	**2.051.979**	**272.475**			

5.5 INVESTMENT FUNDING AVAILABLE AND INVESTOR POTENTIAL

EU GRANTS CALCULATIONS

In order to determine the method of calculating EU funding, it is necessary to define whether the project generates net revenue ("revenue generating projects"). In accordance with EU regulations, a project is considered a "revenue generating project" if the discounted revenues are higher than the discounted operating costs. Accordingly, the discounted project revenues are compared to the discounted project operating costs in the financial analysis, to determine whether the project generates net revenue. Given that the discounted project revenues are lower than the discounted operating expenditures, the share of EU co-financing “funding gap” is defined as 100% in accordance with the methodology described in the Guide through cost-benefit analysis of investment projects.

Table 13. Calculation of the financial gap

R.br.	Description	Undiscounted amount	Discounted amount
1.	Investment costs	**2.051.978,90**	**1.935.987,20**
2.	Residual value (at the end of the economic life of the project)	**87.575,90**	**50.572,90**
3.	Operating revenue - discounted		**537.659,40**
4.	Operating expenses - discounted		**527.154,80**
5.	Net revenue= (3) – (4) + (2)		**61.077,50**
6.	Financial gap rate % = [(1) – (5)]/1		**97,00%**
	CALCULATION OF THE CO - FINANCING RATE (if 6. < 100%)		
7.	Reported eligible costs	**2.051.978,90**	
8.	The amount of eligible costs by applying the financial gap rate = (7) x (6)	**1.990.419,53**	
9.	Maximum OPCC co-financing rate	**70,00%**	
10.	EU contribution (maximum grant amount) = (8) x (9)	**1.393.293,67**	
11.	Percentage of co-financing %= (10) / (7)	**68,00% -70,00%**	

The data shows that the amount of the co-financing rate is 68.00% -70.00%, depending on the current exchange rate differences and the final amount when purchasing equipment.

5.6 ROI

FINANCIAL SUSTAINABILITY ANALYSIS

Financial analysis is a tool used to accurately predict the funds for covering investment costs and it is used by the investor or project holder to determine the financial viability of the project over the project period. The financial viability of the project is confirmed if the cumulative net cash flow is positive throughout the reference period.

A positive cumulative net cash flow throughout the reference period confirms that the project is financially viable.

Table 14. Financial sustainability of the project

FINANCIAL SUSTAINABILITY	
EU contribution	1.436.385
National contribution	615.594
Total sources of funding	**2.051.979**
Operating income	749.764
Other income	0
Total income	**749.764**
Total investment costs	2.051.979
Total operating costs	734.210
Total outflows	**2.786.189**
TOTAL CASH FLOW	**15.554**
Discounted net cash flow	*10.505*
Cumulative total cash flow	**74.397**

ANALYSIS OF FINANCIAL RETURN ON INVESTMENT

When calculating the financial return on capital (FNPV / K and FRR / K) as the value of capital investment expenditures, we considered the total financial assets reduced by the EU grant. According to the methodology explained in the Guide through cost-benefit analysis of investment projects, FRR (C) is expected to be very low, or negative for investments to be financed from EU funds, while FRR (K) may be higher and in some cases positive.

The financial net present value of national capital, FNPV (K) is -519.719% HRK while the Financial rate of return on national capital FRR (K) is -13.79% as shown in the table below.

Table 15. Return on capital

	RETURN ON NATIONAL CAPITAL	
1	Operating revenue	824.741
2	Residual value	87.576
A	**Total income**	**837.340**
1	Total operating costs	734.210
2	Interest	0
3	Loan repayment	0
4	Private capital	0
5	National public contribution	615.594
B	**Total outflows**	**1.349.803**
	NET CASH FLOW	**-512.463**
	Discounted net cash flow	*-519.719*
FRR(K)		**-13,73%**
FNPV(K)		**-519.719**

ECONOMIC ANALYSIS

The purpose of the socio-economic cost-benefit analysis is to determine the economic viability of the project by calculating the additional benefits resulting from the project implementation. The project has various indirect economic, social, and environmental effects. Such investments can only be properly assessed when these effects are considered, as these effects can often be identified as decisive in relation to development.

Economic analysis assesses the project's contribution to the economic well-being of a region or country. The scope of the project should be viewed in a broader perspective, i.e. its beneficial effects on the whole society should be analysed, and not only on the infrastructure owner as in the financial analysis.

METODOLOGY AND ASSUMPTIONS

The purpose of economic analysis is to encourage investment in projects that promote the best use of national resources. It does not have to be the same as investing in projects with the highest financial returns. Financial returns are based on financial prices. Economic returns are based on economic prices. Differences in economic and financial prices have many roots, and the analysis of the above methodologically includes five steps:

- Conversion of market to economic prices
- Monetization of non-market influences

• Inclusion of additional indirect effects
• Discounting estimated costs and profits
• Calculation of economic indicators (economic net present value (ENPV), economic internal rate of return (ERR), and profit / cost ratio (B / C)

When market prices do not reflect the social opportunity costs of inputs and outputs, the procedure of their conversion into accounting / economic prices with the application of appropriate conversion factors is common.
Monetization of non-market influences includes economic analysis that valorise costs and gains that are not directly reflected in market prices. Social, environmental, employability and similar effects fall into this group. In these cases, non-market values need to be monetized by various techniques. CBA "money" has no financial implications, but it has socio-economic significance. Finally, investment projects often produce indirect social effects (positive and negative) that do not have to be recognized from the point of view of investors, but still are socially relevant. That is especially true for infrastructure projects that change business or life opportunities.
The total estimated future social benefits and costs are discounted to present value using a social discount rate (SDR) that reflects socially most favourable cost of capital, and therefore the net present value (NPV) is derived, which is an absolute measure of the economic benefits of the national economy.
A reference economic discount rate of 5% (EU recommended rate for cohesion countries) has been applied.

CONVERSION OF MARKET PRICES TO ECONOMIC PRICES

The goal of this phase is to determine the conversion factors for converting market prices into accounting prices. That way, in addition to the financial costs and benefits, the social costs and benefits of the project are considered. Current input and output prices cannot reflect their social value due to market distortions. It may happen that current prices resulting from imperfect markets and public sector pricing policies fail to reflect the opportunity cost of input. In some cases, this can be important for project appraisal and financial data, as indicators of well-being can be misleading. The calculation of the standard conversion factor for the distortion of input and output prices was carried out in accordance with the methodology prescribed in the Guide through the cost-benefit analysis of investment projects. Conversion factors as shown in the table below were used to convert prices from the financial analysis.

Table 16. Conversion factor and economic costs

			2020	2021	2022
ECONOMIC COSTS OF THE PROJECT	CONVERSION FACTOR				
Economic investment costs		1.572.599	96.307	597.560	878.732
INVESTMENT IN EQUIPMENT	0,80	873.583	0	301.236	572.348
STAFF COSTS	0,68	390.912	53.591	149.472	187.848
EXTERNAL SERVICE COSTS	0,80	308.104	42.715	146.852	118.536
	0,76	*1.462.447*	*96.307*	*569.105*	*797.036*
Economic operating costs		734.210			
Discounted operating costs		*307.976*			
Opportunity rental cost		0			
Discounted operating costs		*0*	*0*		*0*
TOTAL ECONOMIC COSTS		**2.306.808**	**96.307**	**597.560**	**878.732**
Discounted total economic costs		*1.950.019*	*96.307*	*569.105*	*797.036*

** For total investment, the average conversion factor CF=0,76*

Conversion factors allow the correction of market prices from distortions that take the value away from the value of long-run equilibrium (transfers, state aid, etc.). Conversion factors allow the calculation of social costs due to investment, running costs and equipment renewal (see financial analysis).

As market prices in Croatia do not reflect the social opportunity cost of inputs and outputs, the usual approach is to convert them into accounting prices using appropriate conversion factors.

DISTORTION OF PRICES OF MANUFACTURING ASSETS

Current prices arising from market prices and the shortcomings of market policy do not necessarily reflect the additional cost of expenditure. In some cases, this can be very significant for planned projects: financial data that does not reflect potential costs can be erroneous as an indicator of wellbeing growth. Therefore, it is necessary to estimate the prices of goods arising from the costs of their best possible use in relation to the planned project. Accounting prices are based on marginal prices used in international and domestic transactions. Given that contractors are planned to be selected through a public tender, and that the procurement of equipment is subject to open trade, it can be assumed that the price distortion of key inputs is small and can be excluded from this analysis. Price distortions in the operating process are also negligible and are not included in the analysis.

The economic costs determined for this project are:

1. Total investment costs
2. Operating costs

The economic revenues determined for this project are:

1. Direct benefits of the project:

- Benefits of selling services
- Benefits of saving emissions in Co2 traffic
- Benefits of saving Co2 emissions in electricity generation
- Benefits of urban improvement

FISCAL CORRECTIONS

Market prices include taxes and subsidies as well as other transfer payments that have an impact on relative prices. From a social point of view, direct and indirect taxes and other social transfers represent a distribution action and have no economic impact. As a result, taxes do not correlate directly with resource use and should not be included in project costs. Fiscal adjustments include adjustments for calculated VAT on input costs, and adjustments for taxes and contributions.
Connected to the above, we applied the following methods:
All prices of receipts and expenditures in the economic analysis are considered without VAT and other indirect taxes. When reporting labour costs, these costs are shown without direct taxes (i.e. taxes and surcharges).

QUANTIFICATIONS OF DIRECT BENEFITS OF THE PROJECT

The economic benefits and costs of a construction project can be divided into values and benefits for "users" - values of goods / services provided by the project to individual users and "non-users" - benefits for those who are not direct users of services but consider project implementation valuable. In this regard, the following benefits have been proposed:

- Benefits of selling services
- Benefits of saving emissions in Co2 traffic
- Benefits of saving Co2 emissions in electricity generation
- Benefits of urban improvement

Shown in the table below.

Table 17. Overview of the economic benefits of the project

ECONOMIC BENEFITS OF THE PROJECT			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Sales revenue																	
SITUATION WITHOUT THE PROJECT		**0**															
Operating revenue			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total benefit		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SITUATION WITH THE PROJECT		**749.764**															
Revenue from charging			0	0	0	56.825	57.691	58.601	59.556	60.559	61.612	62.717	63.878	65.097	66.377	67.721	69.132
Total benefit		**749.764**	**0**	**0**	**0**	**56.825**	**57.691**	**58.601**	**59.556**	**60.559**	**61.612**	**62.717**	**63.878**	**65.097**	**66.377**	**67.721**	**69.132**
Incremental benefit of sales revenue		**749.764**	**0**	**0**	**0**	**56.825**	**57.691**	**58.601**	**59.556**	**60.559**	**61.612**	**62.717**	**63.878**	**65.097**	**66.377**	**67.721**	**69.132**
The benefits of saving emissions in Co2 traffic																	
SITUATION WITHOUT THE PROJECT																	
Co2 emissions savings in transport			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total benefit						**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SITUATION WITH THE PROJECT																	
Co2 emissions savings in transport	0,5t per year					120.000	121.200	122.412	123.636	124.872	126.121	127.382	128.656	129.943	131.242	132.555	133.880
Total benefit						**120.000**	**121.200**	**122.412**	**123.636**	**124.872**	**126.121**	**127.382**	**128.656**	**129.943**	**131.242**	**132.555**	**133.880**
Incremental benefit of saving Co2 emissions in transport		**1.521.900**	**0**	**0**	**0**	**120.000**	**121.200**	**122.412**	**123.636**	**124.872**	**126.121**	**127.382**	**128.656**	**129.943**	**131.242**	**132.555**	**133.880**
Benefits of saving CO2 emissions in electricity generation																	
SITUATION WITHOUT THE PROJECT																	
Co2 emissions savings in the production of electricity			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total benefit						**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
SITUATION WITH THE PROJECT																	
Co2 emissions savings in the production of electricity	6t per year					19.800	19.998	20.198	20.400	20.604	20.810	21.018	21.228	21.441	21.655	21.872	22.090
Total benefit						**19.800**	**19.998**	**20.198**	**20.400**	**20.604**	**20.810**	**21.018**	**21.228**	**21.441**	**21.655**	**21.872**	**22.090**
Incremental benefit of Co2 emission savings in electricity generation		**251.114**	**0**	**0**	**0**	**19.800**	**19.998**	**20.198**	**20.400**	**20.604**	**20.810**	**21.018**	**21.228**	**21.441**	**21.655**	**21.872**	**22.090**
The benefits of urban improvement																	
SITUATION WITHOUT THE PROJECT																	
Property price per m2 in the area of the island of Krk	) 806HRK/M2		30.806	30.837	30.868	30.899	30.929	30.960	30.991	31.022	31.053	31.084	31.115	31.147	31.178	31.209	31.240
Increasing the average daily consumption of tourists			1.781.186.455	1.870.245.778	1.963.758.067	1.983.395.647	2.003.229.604	2.023.261.900	2.043.494.519	2.063.929.464	2.084.568.759	2.105.414.446	2.126.468.591	2.147.733.277	2.169.210.609	2.190.902.715	2.212.811.743
Total benefit		**30.770.076.911**	**1.781.217.261**	**1.870.276.615**	**1.963.788.934**	**1.983.426.546**	**2.003.260.533**	**2.023.292.860**	**2.043.525.510**	**2.063.960.486**	**2.084.599.812**	**2.105.445.531**	**2.126.499.706**	**2.147.764.423**	**2.169.241.787**	**2.190.933.924**	**2.212.842.983**
SITUATION WITH THE PROJECT																	
Property price per m2 in the area of the island of Krk			30.806	30.837	30.868	31.516	31.548	31.580	31.611	31.643	31.674	31.706	31.738	31.769	31.801	31.833	31.865
Increasing the average daily consumption of tourists			1.781.186.455	1.870.245.778	1.963.758.067	1.983.593.987	2.003.429.927	2.023.464.226	2.043.698.868	2.064.135.857	2.084.777.215	2.105.624.988	2.126.681.238	2.147.948.050	2.169.427.530	2.191.121.806	2.213.033.024
Total benefit		**30.772.599.810**	**1.781.217.261**	**1.870.276.615**	**1.963.788.934**	**1.983.625.503**	**2.003.461.475**	**2.023.495.806**	**2.043.730.479**	**2.064.167.500**	**2.084.808.890**	**2.105.656.694**	**2.126.712.975**	**2.147.979.819**	**2.169.459.332**	**2.191.153.639**	**2.213.064.889**
Incremental benefits of urban improvement		**2.522.899**	**0**	**0**	**0**	**198.958**	**200.942**	**202.945**	**204.969**	**207.013**	**209.078**	**211.163**	**213.269**	**215.396**	**217.545**	**219.714**	**221.906**

ECONOMIC RETURN ON INVESTMENT AND NET PRESENT VALUE

DISCOUNTING ESTIMATED COSTS AND BENEFITS

A reference economic discount rate of 5% was applied to reduce the estimated economic costs and benefits.

ECONOMIC NET PRESENT VALUE

ENSV is the most important and reliable indicator of social CBA and we use it as the main reference value to evaluate the economic impact of the project. The positive economic net present value confirms that the project creates new social value and is worth co-financing. The net present value, i.e. the total discounted profit is equal to the sum of the discounted annual net cash flows over the life of the project.

The economic NPV for this project amounts to HRK 1,408,602, and indicates that the project is useful from an economic point of view because it creates significant economic benefits for the project implementation area, and consequently the region and the state.

Economic rate of return

The economic rate of return on investment for this project is 17.63% and it is higher than the economic discount rate of 5% indicating that the project is economically beneficial and creates significant economic benefits for the region.

Benefit-cost ratio - The economic B / C ratio is 1.72 and indicates that the project creates significant economic benefits: per 1 HRK of economic costs, it generates 1.72 HRK of economic benefits.

The economic net present value, economic rate of return and the cost-benefit ratio are shown in the table below.

Table 18. Economic rate of return

Economic investment costs	**2.306.808**
TOTAL COSTS	**2.306.808**
Sales revenue	**749.764**
The benefits of saving emissions in Co2 traffic	**1.521.900**
Benefits of saving CO2 emissions in electricity generation	**251.114**
The benefits of urban improvement	**2.522.899**
TOTAL BENEFITS	**5.045.677**
NET ECONOMIC BENEFITS	**2.738.868**
Discounted economic cost	*1.950.019*
Discounted economic benefits	*3.358.621*
Discounted net economic benefit	*1.408.602*
ENPV	**1.408.602**
ERR	**17,63%**
B/C	**1,72**

5.7 INVESTMENT DECISION: RISKS RELATED TO THE INVESTMENT PLAN

QUANTITATIVE RISK ANALYSIS

The risk assessment process within this project includes the identification and assessment of issues or events that affect the implementation of project activities and the impact on the achievement of set objectives. Preliminary risk assessment in this study is based on two indicators:

Probability of occurrence of a certain risk - the impact of risk, i.e., the effect or consequences arising from the materialization of a particular risk.

Providing our own assessment of the probability and impact of the identified risk, we proposed measures that need to be taken to reduce the likelihood of a risky event, or to reduce the consequences of a risky event as well as a plan of activities we will take if a risky event does occur.

Risk impact assessment

Risk impact is defined as the perception of organizational sensitivity to the consequences of a risk event. In order to assess the impact of the risk, possible losses in case of a risk event occurring have been estimated.

Risk probability assessment

Risk probability assessment is an assessment of the chances that a certain risk will occur in the observed organizational process. In practical terms, the process of risk identification and risk assessment (based on risk impact assessment and risk probability assessment) reflects the overall risk of the outcome of the event. Within this analysis, special attention is paid only to risks that have a small or medium to high impact on the project due to their impact or probability of occurrence, while risks that have a negligible impact on the project are not further considered.

Probability (P) of the phenomenon is assigned to each event separately, according to the following classification:

A. Very unlikely (0-10% probability)

B. Unlikely (10-33% probability)

C. Fairly likely (33-66% probability)

D. Likely (66-90% probability)

E. Very likely (90-100% probability)

Each occurrence is assigned a Strength (S) of a threat based primarily on costs, but also social welfare graded from I (no effect) to VI (catastrophic):

I. No effect, even if no corrective action is taken.

II. Minimal impact on the project. However, corrective actions are needed to prevent negative effects.

III. Moderate performance, primarily in the form of adverse financial performance. Corrective actions can correct the problem.

IV. Critical effect. The phenomenon causes a high level of loss of social welfare, even the loss of the primary function of the project. Corrective actions, even to a significant extent, are not enough to completely avoid damage.

V. Catastrophic effect. Project failure that may result in severe or complete loss of project function.

4 risk levels are defined and shown in the table below - Low, Moderate, High, Unacceptable.

Probability (P)*	Possibility	Level of risk	Colour	Intensity (S)**	Level of risk
A	Very unlikely	Low		I	No effect
B	Unlikely	Moderate		II	Minor effect
C	About as likely as not	High		III	Moderate effect
D	Likely	Unacceptable		IV	Critical effect
E	Very likely			V	Catastrophic effect

Intensity/Probability	**I**	**II**	**III**	**IV**	**V**
A	**Low**	**Low**	**Low**	**Low**	**Moderate**
B	**Low**	**Low**	**Moderate**	**Moderate**	**High**
C	**Low**	**Moderate**	**Moderate**	**High**	**High**
D	**Low**	**Moderate**	**High**	**Unacceptable**	**Unacceptable**
E	**Moderate**	**High**	**Unacceptable**	**Unacceptable**	**Unacceptable**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
1	Delay in case of the works	Investment costs	Contractors do not respect the contract deadlines	Delay in planned outflows related to investment, as well as delay in achieving the planned benefit	Medium	Delay in planned outflows related to investment, as well as delay in achieving the planned benefit	C	III	**Moderate**	High requirements in terms of business, technical and financial capabilities of bidders Project implementation planning within real	**Low**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										time frames, regular monitoring of the schedule, planning of outdoor works depending on weather conditions	
										Bank warranties for quality	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										assurance of works and deadlines	
2	Significant increase in investment costs	Investment costs	Inadequate cost estimation	Costs higher than expected	Short	Higher costs of the project investment	B	II	**Low**	Preparation of quality project documentation and quality cost estimates	**Low**
			Contractor							Quality market	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
			requests for recognition of additional contingencies							research Bank warranties to ensure the quality of equipment and delivery deadlines	
3	Poor project management and failures to meet obligations under	Investment costs	Disorganization and non-functionality of the project team	Poor project management and failures to	Short	Higher costs of self-financing will furth	B	II	**Low**	Defining control points and objectives for each phase	**Low**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
	the Grant Agreement			meet obligations under the Grant Agreement		er burden the cash flow				of implementation	
			Impossibility of participation of individual members of the project team in the implementation due to external influen							Holding regular meetings to report orally and in writing to the project leader on the progress of implementation	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
			ces (e.g. sick leave)								
			Project team members have no experience in implementing EU-funded projects							Assembling a project team with a sufficient number of members who have the qualifications, knowledge and skills neede	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										d to implement the proposed project	
										Contracting external experts to manage the project with EU co-financed funds, ensuring quality and	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										timely implementation of the proposed project	
4	The slowness of the bureaucracy	Not applicable	Administration is not efficient - approval of various permits, consents, certificates	Post-project sustainability is not ensured	Medium	Not applicable	B	II	**Low**	The influence of the User and the partner on the acceleration of solving	**Low**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										administrative problems	
										Predict deadlines required for various permits and approvals	
										Good knowledge of legal and construction requirements	

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
5	The courier is not able to deliver the goods requested in accordance with the technical specifications on time	Not applicable	Executors do not respect contractual deadlines	Delay in achieving the planned benefits	Medium	Delay in achieving the planned benefits	C	III	**Moderate**	High requirements in terms of business, technical and financial capabilities of bidders Bank warranties to ensure the quality of equipment	**Low**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
										and delivery deadlines	
6	Inability to finance operating costs	Not applicable	Inadequately defined management structure (User and external experts do not perform their roles well)	Costs increase	Medium	Not applicable	C	III	**Moderate**	Optimal and professional management of activities and operating expenses without jeopardizing net cash flow	**Low**

ORD. NO.	Unfavourable event	Variables	Causes	Effect	Timing	Effect on cash flows	Probability (P)	Intensity (J)	Level of risk	Prevention and / or mitigation measures	Residual risk
			Poorly planned operating income and expenses							Pay close attention to qualified employees who will manage costs and plan revenues	

As can be seen in the tables above, the key risks are related to the construction, equipping, project management and operational phases of the project implementation. In the construction phase, the key risks are related to poor performance, breaking deadlines, and increasing investment costs. Given that these risks have a high impact on the project it is necessary to take appropriate recommended actions to avoid the possibility of these events and minimize the damage if these events do occur. Preparation of quality project documentation, ensuring the achievement of high-quality contractors through the procurement procedure (high business, financial and technical capacity of bidders), quality supervision of

works, quality insurance in the form of bank warranties for the quality of work performed and deadlines will reduce risks connected to construction to a minimum. In the operational phase, the key risks are related to the inability of financing operating costs. This will be eliminated by selecting professional staff, good planning of operating costs and revenues.

Risk consolidation and determination of acceptable level of risk

As already explained, both internal and external factors of the organization are considered in risk management. In risk consolidation phase, an acceptable level of risk has been identified following a list of risk responses, deadlines for mitigation activities and identification of responsible persons. In general, low-impact risk and low probability of occurrence are not considered in more detail, while high-performance, high-probability risks require priority and a clear plan of action.

Risk response

Implementing risk responses means adopting appropriate measures to mitigate the likelihood and impact of a risk event in the direction of zero (0). It is recommended to develop a Risk Management Plan as part of the project Management Plan, which should include the following:

- ✓ Detailed description of considered risks
- ✓ Detailed description of procedures / measures to be taken
- ✓ Persons in charge of implementing activities / measures
- ✓ Deadlines for each phase of the project and deadline for implementation
- ✓ Resources needed to implement the plan
- ✓ Description of how the implementation of the plan will be monitored

Risk prevention

It is very common for project promoters and cost estimators (designers) to be overly optimistic, resulting in frequent cost overruns and / or reduced revenues. Inadequate project planning and management, non-standard technologies, changes in the scope and ambitions of the project, and unplanned events often call into question the success of the project. In order to reduce the tendency of "excessive optimism", the costs, benefits and duration of the project were analysed and estimated in detail, and compared with similar projects in the country, with adjustments related to the specifics of the project.

5.8 STRUCTURE AND ORGANIZATION OF MANAGEMENT

PROJECT TEAM

Since Ponikve eko otok Krk d.o.o. has qualified staff who can work on certain tasks of the project team there will be no need for additional employment.

management structure – project team

For the needs of the implementation of the project "DEEP-SEA", the project team will consist of employees of the company Ponikve eko otok Krk d.o.o. The persons in the project team will have specific, but also mutually complementary roles in the implementation phase of this project. The Role section of the table below, entitled Project Team, prescribes specific roles and responsibilities for each individual member of the project team.

Table 19. Project team

PROJECT MANAGER - Dejan Kosić	
FUNCTION	During the implementation phase of the project, the manager will be responsible for achieving and controlling the results and objectives of the entire project as well as coordination and cooperation with the project team, project management, planning and coordination of project implementation, individual elements, and project activities. Furthermore, Project manager will communicate with the implementing body, contractors, and associates and, if necessary, other competent institutions. He will also work on the preparation of mandatory quarterly reports to intermediary bodies.
COMPETENCY	Organizational, financial, and legal competence over the implementation of the project in order to achieve the purpose of the project and achieve project objectives and indicators. Dejan Kosić will be engaged in the work of the project team as project manager for 40% of working hours.

PROJECT COORDINATOR – Marin Pavlić	
FUNCTION	During the project implementation phase, the project coordinator will be in charge of operational implementation of the project, monitoring the status of the project in relation to planned activities, collecting information on project implementation, preparing status documentation of project activities for the project manager, storing administrative documentation, cooperating with other project team members, coordinating all project stakeholders and providing logistical support to project members to coordinate meetings. Participation in the implementation of procurement, review and informing the project manager about the completed procurement. Project coordinator also performs professional tasks of collecting, arranging, and recording technical documentation during the implementation phase of this project.
COMPETENCY	Administrative assistance and monitoring of the operational implementation of the project and timely reporting to the project manager and other members of the project team on all current events of the project. Marin Pavlić will be engaged in the work of the project team as project coordinator for 70% of working hours.
TECHNICAL EXPERT – Ivan Brala	
FUNCTION	Participation and consulting related to the development of technical specifications required for the purchase of electric bicycles, scooters and other equipment needed for the construction of a charging station for electric vehicles and vessels as well as photovoltaic plant and a system for renting electric bicycles and scooters. Participation in the technical implementation of procurement. Participation in the supervision of the installation of equipment, commissioning of equipment, maintenance, control, and technical assistance to users. Technical expert works in the field daily and controls the correctness of the system, especially bicycles, their redistribution etc.

COMPETENCY	Technical tasks of implementation and implementation of project activities. Ivan Brala will be hired for 80% of the working time as a technical expert.

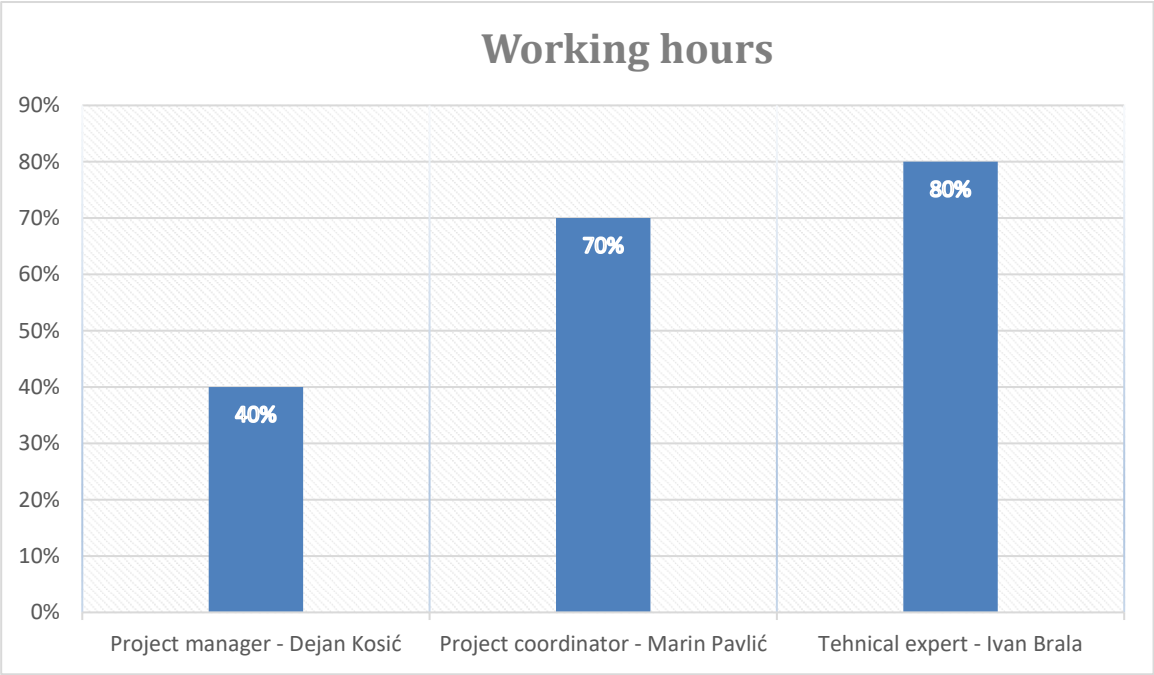
ORGANIZATIONAL STRUCTURE FOR DECISION MAKING

The project team will be assembled of the most competent employees of the company Ponikve eko otok Krk d.o.o. The methodology for establishing a project team is based on the necessary competencies for the implementation of project activities, monitoring of reporting and payments, and acquired knowledge and experience. The persons in the project team have specific, but also mutually complementary roles in the project implementation phase, as described in chapter 2.13.1.

The project team consists of three members:

- PROJECT MANAGER - Dejan Kosić
- PROJECT COORDINATOR - Marin Pavlić
- TECHNICAL EXPERT - Ivan Brala

Graph 2. Working hours of the project team



Decision-making process:

The implementation of the project itself will be subject to constant control and evaluation by the project team. Project control with emphasis on control over the implementation of planned activities will be the basis for decision making. The final decision will be made by the project manager in cooperation with the project coordinator and the authorized representatives of the Beneficiary.

Daily project management:

All members of the project team will attend project meetings and mutually monitor the progress of the project and evaluate the results achieved. Project activities will be implemented in accordance with the planned time course.

Internal communications:

Internal communications will be carried out primarily via e-mail to enable monitoring of the project and efficient resolution of any problems arising in the process.

External communications:

External communications will be conducted primarily via e-mail and telephone network to enable project monitoring and efficient resolution of any problems in the process.

5.9 COMMUNICATION AND NETWORKING

Communication through the Deep Sea project will be carried out as part of a work package that includes promotion and visibility, and in accordance with the Interreg guidelines. Networking opportunities allow project partners to learn from each other, discuss common issues, and get feedback on their work. In addition to communication and networking with official partners in the project, other interested stakeholders and associates in the implementation of the project will be involved in the process. During project implementation, it is important to monitor changes in the participants' environment to ensure continuous alignment and improvement. Presenting the importance and goals of this project should be complementary to the policies of quality, environmental protection, and energy efficiency of the company Ponikve, as well as their other projects. It is necessary to have a communication plan that aims to present the objectives of the project, especially in terms of investments, and what are the possibilities and results. It is also necessary to develop a communication campaign, using different tools to raise awareness of the target groups about investments that are part of new technologies, and at the same time they need to be educated about them.

The target groups are:

- General public
- Potential users
- Decision makers
- Transmitters of information
- Bodies in the management, control, and monitoring system

It is important to develop a participatory process of key stakeholders in the project.
Suggested communication activities are:

- Creating content for a website
- Development of a mobile application
- Advertising on social networks
- Development and distribution of Newsletter
- Media advertising and outdoor advertising

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2 PILOT Porto San Rocco, Muggia; Marina Lepanto, Monfalcone; Ocean Marine, Monfalcone – Adriatic Italian Coast

Document: Public/Confidential			
Responsible partner: ARIES **Involved partners: All**			
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Executive Summary

DEEPSEA project wants to support Marinas Operators (MOs) and Public Authorities (PAs) in planning and implementing sustainable mobility options to tackle the problems of predominant single-modality land transport (cars), highly polluting maritime transport (motor boats with endothermic engines) and limited integrations of mobility services offered in nautical sector. The DEEPSEA project objective is in fact to improve current marinas mobility services and turn them into low-carbon or zero emission, environmentally friendly and energy-efficient systems.

The document is focused on the development of investment plans for the marinas to achieve improved coastal, inland and maritime transport and mobility services. Five investments plans will be developed, one for each pilot site, each focused on pilot site's vision and strategy, and related baseline energy consumption. Each investment plan will guide the site responsible institution for the definition of the action to be developed and implemented in terms of equipment and/or new services. The investment plans coordinated by ARIES will define two model:

- For PAs responsible for the site where marina is located;
- For marinas operators.

The two models will match different types of Pas and investments and private sectors, both including socio-economic KPIs to monitor the investment process and measures of the related outputs.

1. Introduction

The Activity 3.4. Investment, part of Work Package 3 "Nautical ports framework analysis and investment plans" of the DEEP-SEA project aims at helping and supporting Venezia Giulia marinas in the development of maritime transport, with the main objective of achieving sustainable tourism and develop energy efficiency measures.
Public ports and private marinas along the Adriatic coast represent one of the most important centres and nodes for the mobility flows and network, as well as areas characterized by elevated C02 emissions, noise pollution, traffic congestions and infrastructures developments.
In the Venezia Giulia territories, three sites have been identified for the development of a investment plan that will cover the entire territory in which these sites are localized and that will be characterized by the installation of new infrastructures and e-mobility services:

- Porto San Rocco, Muggia;
- Marina Lepanto, Monfalcone;
- Ocean Marine, Monfalcone.

The document will represent an overview of the current marinas and ports internal environment, including a general description of the marina, the institution, the interaction between stakeholders. An analysis of the current mobility services, traffic volumes and energy consumption baseline will follow, supported by the indication of targets to achieve and their indicators. The document will move towards the description of the assets used to support the investment plan and the classification of investment priorities, the evaluation of investments options based on cost benefits and multi-criteria analysis, the description of investment funding available and potential investor, the possible risks. Finally, a description of the structure and governance organization and networking will be provided.

2. Methodology

This document will capitalize on the results from the analysis carried out in DEEPSEA WP3, i.e.: 3.1 Analysis of best solutions integrating energy efficiency in sustainable coastal and nautical

mobility, 3.2 Analysis of marinas management and investments model, 3.3 AS-IS analysis on current mobility services and related energy consumption. Based on these, specific investment plans are here elaborated for each project pilot site thanks also to specific meetings and working tables with marinas' managers and stakeholders and site surveys carried out during the project. The investment plans are finally fine-tuned thanks to pilot implementation and potentially transferred to marinas and relevant stakeholders outside the DEEP-SEA partnership and pilot areas for potential replication and uptake.

3. Description of DEEP-SEA pilot site and State of art

3.1 Description of the Institution, the site, the interaction with the other stakeholders

Marinas diffused along the Adriatic coast are strongly characterized by a significant number of transport flows and multiple mobility systems, both in the coastal areas and in the inner lands. 3 sites have been identified in the territory of Venezia Giulia, one of the Italian pilot areas where new installations will be done. Sites have been selected after a series of site-visits and meeting with the responsibles of the marinas. These sites are:

- Porto San Rocco, Muggia;
- Ocean Marine, Monfalcone;

- Marina Lepanto, Monfalcone.

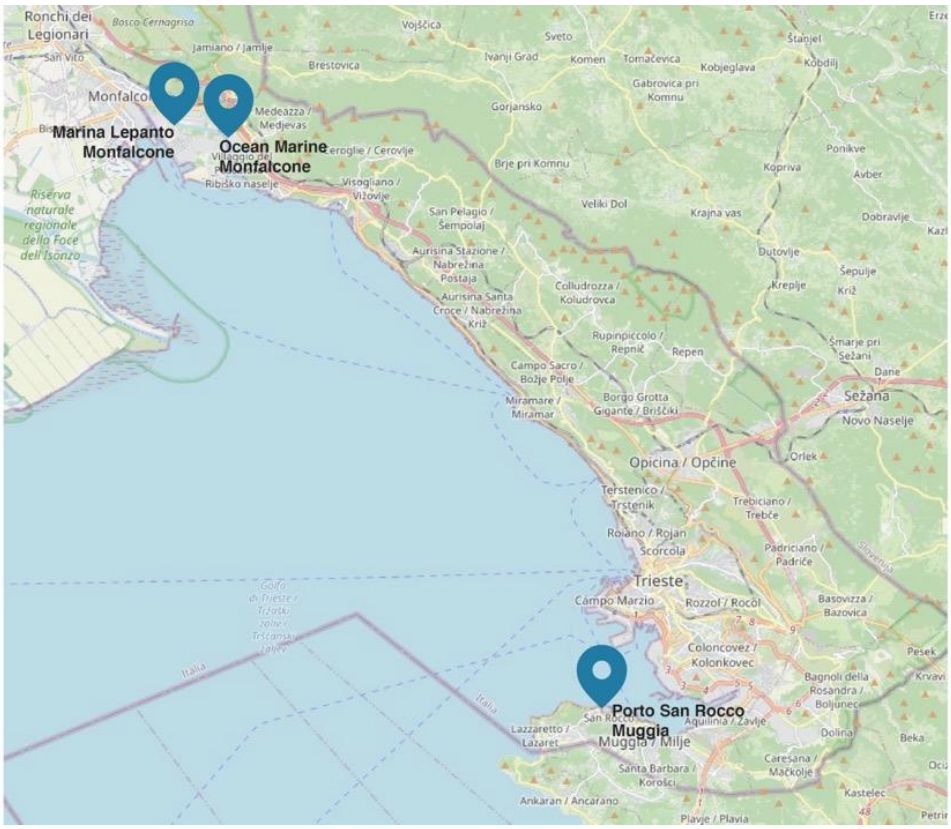

Figure 1: pilot marinas territorial localization

Porto San Rocco, Muggia

The Marina is located in the city of Muggia, a town of 12,875 inhabitants in the Southeastern part of Venezia Giulia, close to the Slovenian border and 3 km from the A4 Venezia – Trieste (Muggia exit) and 60 km far from the Ronchi de Legionari Airport. It is classified as a "Departing Hub" (where visitors/passengers use to start their journey without stopping there) and as a "Touristic Marina" (access point to tourist sites where cruisers arrive for visiting the coast and the inland). The marina has 546 moorings on floating or fixed docks for boats from 8 to 60 meters. The marina offers h24 assistance and security, Wi-Fi, WC and showers, car parking, scuba diving service, laundry, ice maker, sailing schools for beginners, swimming pool, beauty center, bar and restaurants, commercial and shopping area.

Marina Lepanto, Monfalcone

The Marina Lepanto is located in Monfalcone, an Italian municipality with almost 30,000 inhabitants in the Eastern side of Friuli Venezia Giulia region, close to Trieste Grado and Lignano. The marina is classified as a "Transit Marina" (mainly used for fuel supply or documents provision without passengers staying or visiting). The marina offers 220 moorings for boats with a maximum length of 25 meters. The marinas offer also complementary touristic services, such as: swimming pool, restaurants, bars, fitness area, Wi-Fi, park, conference room, WC and showers, car parking, meeting rooms, commercial markets, security services.

Ocean Marine, Monfalcone

The Ocean Marine is located in Monfalcone, close to Marina Lepanto, above mentioned. Ocean Marine is 6 km from the A4 Venezia Trieste (Trieste-Lisert exit) and 10 km far from the Ronchi de Legionari Airport, and it is also reachable by boat through the Foci del Timavo Canal.The marina can host 185 boats with a maximum length of 23 meters. Services provided by the marina are: towpath, water, boat assistance and repairing, indoor and outdoor storage, divers, shower, bar, parking, garbage storage and management, swimming pool, weather forecast office.

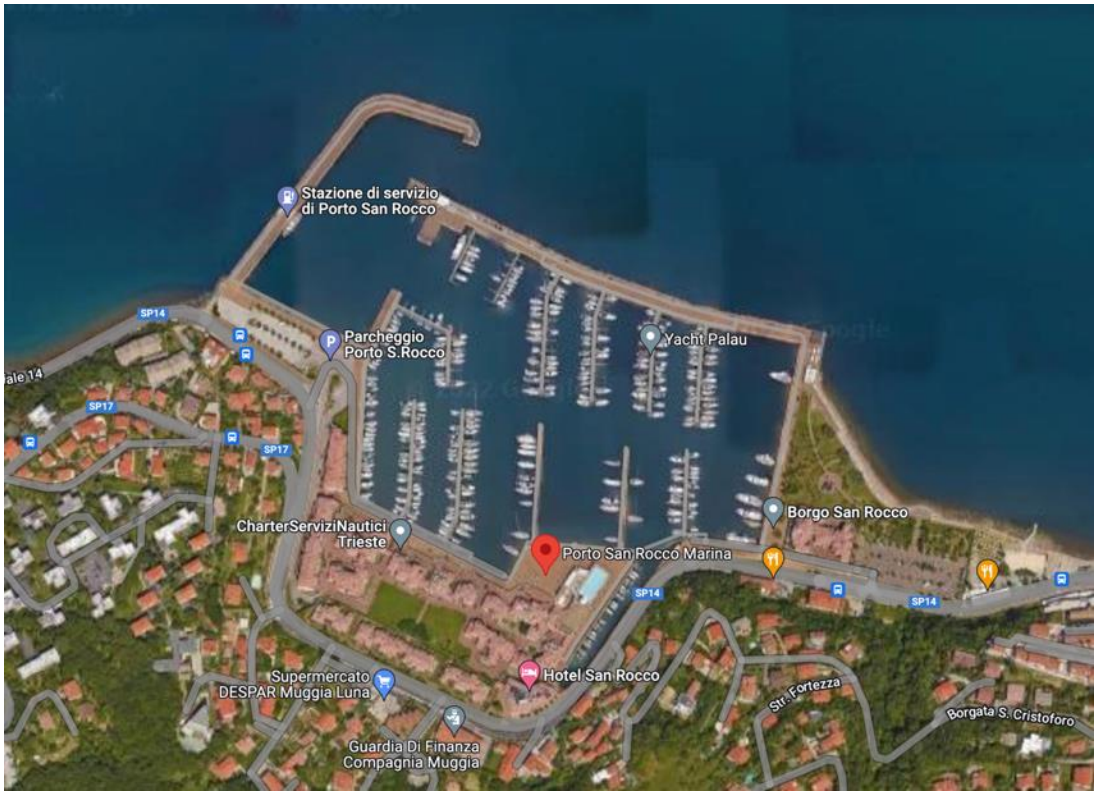

Figure 2: Porto San Rocco, Muggia

Figure 3: Marina Lepanto and Ocean Marine, Monfalcone

3.2 Current management models

The table below summarizes the main selected:

	Porto San Rocco	Marina Lepanto	Ocean Marine
Typology of marina	Departing Hub (where users use to start their journey without stopping there) and a Touristic Marina (access point to tourist sites where cruisers arrive for visiting).	Transit Marina (mainly used for fuel supply or documents provision without staying or visiting).	
Public – private marina			
Number of employees			
Sectors/offices			
Main activities performed (vedi			

descrizione testuale sopra)			

Table 1: features of the marinas

Figure 4: Porto San Rocco planimetry

3.3 Analysis of current mobility services – ONGOING in Act. 3.3 -

The table below summarizes the mobility services currently present in the three marinas selected and in the surrounding territories:

	Porto San Rocco	**Marina Lepanto**	**Ocean Marine**
Bike sharing	YES (during summer season)	NO	NO
Car sharing	NO	NO	NO
ECS for e-cars	NO	NO	NO
ECS for e-boats	NO	NO	NO
Other mobility services (bus, train, etc)	Train station (2,7 Km) Bus stations Taxi service ECS for e-cars (5,4 km)	Taxi service Train station (4,0 km) Bus stations ECS for e-cars (4,0 km)	
Mobility services present outside the marina	Bike renting Muggia Car renting Muggia	Car renting in Monfalcone Bike sharing in Monfalocne (Interreg Inter Bike II) Bike renting Monfalcone (Go Bike Tour)	

Table 2: current mobility servicea in the marinas

3.4 Traffic volumes and energy consumption baseline – ONGOING in Act. 3.3

Porto San Rocco, Muggia

All the moorings are available with electric supply, with a rated power of 16-32 kW (each one). Around 818 boats per year use the marina, and passengers come mainly from Italy (66%) and Austria (15%), reaching the marina mainly by private car (82%) or boat (15%).

Marina Lepanto, Monfalcone

210 moorings are available with electric supply, with a rated power of 220kW (each one). Around 250 boats per year and 50000 passengers per year use the marina (60% from Italy, 20% from Germany, 15% from Austria, 5% from Slovenia), coming to the marina mainly (90%) by private car.

4.Strategy of new development

4.1 Strategic vision on tourism, accessibility and mobility

Description of the marina's vision on these issues considering:

- *Global level: general contest where the specific marina is operating/acting:*
- *specific context of the site/area/marina*

The Adriatic Sea is a body of water that separates the Italian Peninsula from the Balkans. It stretches from the Strait of Otranto to the northwest and the Po Valley, touching the coasts of Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro and Slovenia. Along its coasts, soma important infrastructures have been developed, such as the A14 Adriatica, SS 309 Romea and the SS 16 Adriatica, linking the most important and developed urban areas. The most important ports are located in Trieste, Venezia, Ravenna, Ancona, Ortona, Bari, Brindisi in Italy; Capodistria in Slovenia; Pola, Fiume, Zara, Sebeneico, Spalato, Ragusa in Croatia; Antivari in Montenegro; Durazzo and Valona in Albania.

Countries bordering the Adriatic Sea are well-known as touristic destinations, and its ports handles more than a million tons of cargo per year (port of Trieste is the largest Adriatic cargo port in Italy). This means that the Adriatic Sea has an important role in the touristic and commercial economic flows, and due to the Covid-19, the touristic

sector and linked activities were subject to the hardest side-effects of the pandemic. Luckily, in the last period, ENIT (Italian national tourism agency) has confirmed new trends of growth, and this offers important opportunities to invest in the tourism and mobility sector through innovation and new technologies. The Blue Economy in Italy is made of ports and ships carrying goods and passengers. Nonetheless, this extensive sector includes all the 'maritime' tourism that in Italy represents about 70% of the total flow of tourism in the country that has direct repercussions on the hospitality. Looking beyond the COVID crisis, a recovery is expected and increasing volumes of tourists especially towards small marinas and related services, compared to cruises, favored by higher safety and environmental performances. This should also support the small naval electric nautical mobility and shared inland e-mobility solutions. Into the Nautical sector a common vision and a widespread idea seem to be moving towards a circular economy model, considering environmental, economic and social aspects in a well- integrated system, to speak about marinas as energetic HUBs. HUB as emblematic element and concept for sustainable mobility structured around correct communications, long term planning, flows of DATA, knowledge and SHs engagement, able also to be a spatial and conceptual link between sea and the inland.

A considerable role is played in this context by the Regional Energy Plan (PER) of Friuli Venezia Giulia. The plan, which completes the actions and economic-financial vision of Regional Law 3/2015 "Relaunching Business", allows the Region, in compliance with European, national and regional guidelines, to ensure a proper correlation between energy produced, its use in an efficient and effective manner and the territorial and environmental capacity to consume that energy. The main objectives of the EPR are in fact:

- To increase energy efficiency;
- To promote sustainable mobility;
- To encourage responsible use of regional resources;
- To raise public awareness of environmental sustainability;
- To develop draft guidelines for granting financial incentives for the use of renewable sources;
- To reduce greenhouse gas emissions;
- To develop cross-border infrastructure.

Under a general and territorial vision, the main objective is to develop energy efficiency measures to reduce energy consumption, create a network of low-carbon marinas and invest in infrastructures and e-mobility services. In the Venezia Giulia territory, the startup of 1 e-car sharing services, the installation of 6 e-charging stations (22kWh) for e-vehicles and e-boats with interoperable system, the installation of 3 racks with electric and muscular bicycle for sharing and of 1 micro grid system answers to the specific territorial needs and opportunity of developed that come out from the site visits, meeting and the questionnaires.

4.2 Targets, indicators and objectives of investment

- *indication of targets the marina wants to achieve and their indicators (mobility sustainability, energy efficiency, etc.);*
- *indication in case of new services offered; if available with pricing*
- *identification of investment objectives in the sector of energy-efficient Mobility; (synthesis of 3.3.1 and from SWOT of 3.1);*

The Marinas involved in the pilot sites will be characterized by new infrastructures and new e-mobility services, in particular:

- Startup of 1 e-car sharing services for the coastal area of Venezia Giulia (provinces of Trieste and Gorizia), connected with the main transport infrastructure nodes (airport, railway station, bus station).
- Installation of 6 e-charging stations (22kWh) for e-vehicles and e-boats with interoperable system;
- Installation of 3 racks with electric and muscular bicycle for sharing;
- Installation of 1 micro grid system for e-vehicles and e-boats, ECS powered by a photovoltaic system and integrated part of a micro grid which enables the smart use of energy.

Users will be offered the following services:

- charging of electric ships and vehicles;
- rental of electric bicycles and scooters

According to the installations describe above, three main objectives could be identified, that are describe in the following chart:

- Increase marina's energy efficiency: increase of the knowledge about the benefits of using electric boats and vehicles; use of ICT solutions in electric mobility to improve the quality of life of residents and reduce the cost of living;
- Increase marina's mobility: promotion of more comfortable, quieter and cheaper driving of electric boats and vehicles; development of better maritime and coastal transport network and infrastructure;

- Increase marina's sustainability: reduction of emission of gases and CO2 in the atmosphere; encouragement to the use of renewable energy sources and investment in this sector;

Investment objective	**Increase marina's energy efficiency**
Indicators	- Increase of energy consumption from renewable sources and energy productivity of the marina; - Reduction of CO2 emissions per year; - Installation of emission monitoring system.
Investment objective	**Increase marina's mobility**
Indicators	- 1 e-car sharing services; - 6 e-charging stations (22kWh) for e-vehicles and e-boats with interoperable system; - 3 racks with electric and muscular bicycle for sharing; - Increased number of customers using e-mobility services. - Increase the infrastructural networks of existing mobility flows (cycle paths) and proposed ones.
Investment objective	**Increase marina's sustainability**
Indicators	- 1 micro grid installation; - Increase of energy produced using photovoltaic system; - Increase of e-charging station occupancy; - Increase of photovoltaic self-consumption energy.

Table 3: Investment objectives

The investment plan, supported by the guidelines for sustainable energy efficient solutions for electric mobility and maritime and coastal mobility management skills will ensure the provision of long-term innovative technologies, scenarios and models to be applied during the pilot implementation and in the long term, in order to guarantee to the main stakeholders in the maritime and sector to continue to use them for the development of electric mobility of maritime and coastal transport.

5.Investment Plans

5.1. Investment details: list and description of marinas investments

The installation of new e-mobility services will be the most important action that will characterize the pilot areas of Venezia Giulia, in terms of innovation, sustainability and energy efficiency.

Action 1 (A1): E-charging stations for e-cars and e-boats

The choice of the location of electric columns for hybrid use, both for electric cars and electric boats has been structured around a strategic assessment that has taken into account two main elements:

- The presence of relevant infrastructure nodes within which to define the location of the electric columns;
- The identification and selection of potential stakeholders interested in the installation and management of electric columns.

The possibility of connecting the tissues of the territory and creating synergies between the coastal and inland areas of the territory through an articulated and diversified mobility represents an opportunity to encourage the installation of electric charging stations, both for electric cars and electric boats. Within a context and a society in which awareness and knowledge about the future of transport and its ecological and environmental impact in terms of energy and emissions is increasingly growing and a topic of debate, the opportunity for port and marinas to have electric charging stations becomes a starting point for the transition towards a process of greater environmental and economic sustainability and at the same time a tool for tourist attraction and economic remuneration.

Action 2 (A2): E-mobility & sharing services

The strategy for the location of bike sharing bays has been defined and structured around the potential presence of a bicycle network, in order to outline the possibilities for creating a soft mobility system that can offer a local and transnational use of the area and create a network of flows. The two main locations selected (Marina Hannibal in Monfalcone, Porto San Rocco in Muggia) present an interconnection with two important bicycle systems: the Monfalcone-Grado Bikeway interconnected to the "Alpe Adria" Cross-Border Bikeway (Salzburg-Villach AT Aquileia-

Grado IT) in the case of Marina Hannibal in Monfalcone, the Muggia-Lazzaretto Bikeway interconnected to the "Parenzana" Cross-Border Bikeway (Trieste IT - Parenzo CRO).
The installation of bike sharing bays along mobility systems that create a transnational connection underlines the importance and the benefits of new infrastructure models and their complementary elements, such as blue and green infrastructure. The theme of cycle ways and green infrastructures, closely connected to the theme of "greenways", represents today an absolute centrality of territorial planning linked to soft mobility, to the recovery of historical paths, to the recovery of unused infrastructures and to the reconnection of territories with a high historical, cultural and environmental value. The enhancement and strengthening of bicycle networks with the installation of bike sharing bays becomes consequently a strategic element able to increase the transition flows along these networks, to offer an alternative and a tool for sustainable mobility, to allow the marinas involved to address the issue of the predominance of land transport (cars), to reduce consumption and emissions and to create a network of diversified mobility.

Action 3 (A3): Micro grid system

The best location has been identified at Darsena San Marco in Grado, as there is already a photovoltaic plant that could be upgraded, with more significant energy production for the same investment. As alternatives Porto San Rocco (Muggia) or Monfalcone, where both Marina Lepanto and Hannibal have expressed interest.
The choice of micro-grid location within marinas where there is already a photovoltaic system that could be implemented also allows to take advantage of the benefits from this technology, related to a free and essentially infinite source, characterized by high reliability and durability, a modular technology, easily expandable and applicable in existing buildings and under construction, an absence of noise, emissions and pollutants. This type of implementations allows to integrate the actions of producers (owners of photovoltaic systems), consumers and operators in order to provide electricity in a sustainable and efficient way.

5.2. Description of assets used to support investment plan

The investments determined by the project, together with the locations and expected procurement amounts are as follows:

Investment	Location	Amount (€) without VAT
6 ECS	???	
3 bike racks	???	
1 car sharing system	???	
Microgrid	???	
	Total	
	VAT (22%)	
	Total	

Table 4: investment, location and expenditures

5.3. Investment requirements based on security selection process: investments options evaluated on the basis of cost benefit and multi-criteria analysis (CBA & MCA)

5.3.1 Multi-criteria decision analysis (MCA)

MCA tool provides decision-makers considering a different area of impacts of certain actions. In this analysis, the impact area includes the environment, economy, mobility (technical aspect), and society. For each area of impacts, criteria have been developed with indicators for estimation of impacts if the action would be implemented.

For the purpose of the project, the actions are related to the assets mentioned in chapter 5.1., specifically:

- A1: Electric charging stations (ECS) for e-cars and e-boats
- A2: E-mobility & sharing services
- A3: Micro-grid system

However, any new action, with the purpose to improve or develop energy efficiency and mobility services in a Marina, may be added and evaluated through the tool, according to the interest of Marina. The purpose of the tool is rather to show the opportunity and direction of the impacts than to choose the only one action with the best score. The most valuable result is achieved when a what-if scenario is performed against different weighting values according to the strategy and objectives of the Marina operator.

Criteria explanation and indicators

The used criteria for evaluation and comparison of proper actions are divided into four criteria groups or impact areas: environmental, economic, technical, and social. The criteria, within each group, are shown in the table below, along with the description and preference function. The rating for each criterion is in the interval from one to five, one being the lowest, and five being the highest value.

Table 5 – Criteria description and preference function

Criteria group	Criteria	Description	Preference function
Environmental	**GHG emission reduction**	Criterion reflects on the potential of CO2 emissions reduction as a result of the implementation of a specific action. It analyses the difference in the emissions level before and after the action.	Higher is better
	Noise reduction	Criteria reflect on the reduction of noise as the result of the action.	Higher is better
	Spatial impact	Criteria express the impact of the action on land usage, layout occupancy requirement, space limitation, conflict with other activities, and similar issues that may complicate the implementation of the action.	Lower is better
	Reduction in energy consumption	Criterion considers the reduction in energy consumption as the result of the action, mostly as the result of the implementation of the new source of energy or savings resulting from the same.	Higher is better
Economic	**Investment and operation cost levels**	Criterion considers the overall costs required for the construction and implementation of a specific action. It focuses on cost levels to be estimated according to the expectation and complexity of the investment.	Lower is better
	Cost effectiveness	Cost effectiveness is evaluated according to the relationship between monetary inputs and the expected outcome with respect to the specific objectives.	Higher is better
	Seasonal dependency	This criterion measures the seasonal dependency of the action. It is generally better than the benefits are equally distributed through the year and not limited to the seasonal period.	Lower is better
	Development of business activities	Criteria express the possibility of the expansion of economic activities in the nearby zone as the result of the action. The action may contribute more or less to the surroundings and may trigger some business activities with benefit to marina stakeholders.	Higher is better
	Profitability levels	This is the estimation of the profitability levels resulting from the action, or to what extent the action may result in an increment of the profit.	Higher is better
	Funding opportunities	This criterion aims at considering the potential to support the action with a feasible source of funding. If the indicator is low, then the action may have financial constraints.	Higher is better

Criteria group	Criteria	Description	Preference function
Technical	**Mobility benefit**	This criterion measures the benefits of improved mobility resulting from the action.	Higher is better
	Quality of services benefit	Different impacts on service quality may result from the implementation of the action.	Higher is better
	Technical feasibility	Technical feasibility considers the technical aspects of the action, where it is assumed that the feasibility is in co-relation with the complexity of the investment, less complex action means higher technical feasibility.	Higher is better
	Implementability	Criterion refers to the capacity of the stakeholders involved in the implementation of the action. It considers potential difficulties, barriers, or conflicts that may occur during the implementation of the action.	Higher is better
Social	**Contribution to local/regional development**	Criterion focuses on the effect on local and regional socioeconomic life activities. It aims at considering the change of dynamics in the mean of increasing potential for socioeconomic growth increase in the future.	Higher is better
	Stakeholder acceptance	Criterion reflects the overview of opinions related to the energy efficient systems and e-services by the local stakeholders and expectations from the action.	Higher is better
	Social consciousness	This criterion measures the opportunity to change the social awareness toward the energy efficiency and e-services resulting from the action.	Higher is better
	Enforceability	Criterion focuses on the legal basis for enforcement of the implemented action. It aims to evaluate whether the action is supported by an existing legal framework, whether there is an authority responsible for implementing the action. The lack of a legal framework may negatively affect the implementation or may postpone the implementation of the action.	Higher is better

Weighting factors for each criterion

Weighting is the process of comparing different criteria and criteria groups and assigning them the value of importance – weight following development strategy, business priorities or strategic objectives. Impact areas are weighted in relation to each other to get the relative importance of the group. The relative importance of the criteria group corresponds to the site strategy objectives, also the criteria have weighted each other within the respective impact area. The sum for all criteria weights belonging to the same criteria group should be equal to 1 (or 100). The following assigned weights are applied for both following scenarios which are more described in the next chapter.

Table 6 – Assignment of weights to each criterion.

CRITERIA GROUP	CRITERION	Value (%)
Environmental	Greenhouse gas emission reduction	50
	Noise reduction	10
	Spatial impact	10
	Reduction in energy consumption	30
		100
Economic	Investment and operation cost levels	10
	Cost effectiveness	20
	Seasonal dependency	20
	Development of business activities	10
	Profitability levels	20
	Funding opportunities	20
		100
Technical	Mobility benefit	30
	Quality of service benefit	40
	Technical feasibility	20
	Implementability	10
		100
Social	Contribution to local/regional development	10
	Stakeholder's acceptance	20
	Social consciousness	30
	Enforceability	40
		100

Evaluation and scenario set-up

This analysis contains two different scenarios that are assigned with different weighting factors i.e. whose purpose is to accomplish different strategic objectives and development strategy. In the first scenario, the focus is on economic impacts, given that Marinas are privately owned and generating revenue is one of their main priorities. On the other hand, in Scenario 2, the largest weight factor is environmental, given the fact that Marinas strive to become "green ports" through their activities. The term "green port" relates to sustainability in the context of the maritime industry. In general, this term means the production of the long-term strategy for a

sustainable and climate-friendly environment. This concept means the change from reactive to proactive approach with a focus on long-term vision.

Table 7 – Evaluation of scenarios.

Scenarios	Criteria group				
	Environmental impacts	Economic impacts	Technical impacts	Social impacts	
Scenario 1	30%	40%	20%	10%	100%
Scenario 2	40%	20%	15%	25%	100%

Results of MCA

The following tables show the results of the Multi-criteria decision analysis for each activity. In both scenarios, the best feasible action is E-mobility and sharing services (A2), while the least preferred action is Microgrid system (A3).

Table 8 - Multi-criteria decision analysis (Scenario 1).

Criteria group	Criterion	Weighting factor	A1	A2	A3	A1	A2	A3
Environmental impacts	Greenhouse gas emission reduction	0.15	4	5	4	0.6	0.75	0.6
	Noise reduction	0.03	2	2	2	0.06	0.06	0.06
	Spatial impact	0.03	2	2	2	0.06	0.06	0.06
	Reduction in energy consumption	0.09	3	3	4	0.27	0.27	0.36
Economic impacts	Investment and operation cost levels	0.04	2	2	3	0.08	0.08	0.12
	Cost effectiveness	0.08	5	4	4	0.4	0.4	0.4
	Seasonal dependency	0.08	4	3	1	0.32	0.24	0.08
	Development of business activities	0.04	2	3	2	0.08	0.12	0.08
	Profitability levels	0.08	5	5	4	0.4	0.4	0.32
	Funding opportunities	0.08	4	4	4	0.32	0.32	0.32
Technical impacts	Mobility benefit	0.06	4	5	1	0.24	0.3	0.06
	Quality of service benefit	0.08	4	4	2	0.32	0.32	0.16

Criteria group	Criterion	Weighting factor	A1	A2	A3	A1	A2	A3
	Technical feasibility	0.04	3	3	4	0.12	0.12	0.16
	Implementability	0.02	4	4	4	0.08	0.08	0.08
Social impacts	Contribution to local/regional development	0.01	2	2	2	0.02	0.02	0.02
	Stakeholder's acceptance	0.02	3	4	3	0.06	0.08	0.06
	Social consciousness	0.03	3	3	3	0.09	0.09	0.09
	Enforceability	0.04	4	4	4	0.16	0.16	0.16
Total						**3.68**	**3.87**	**3.19**

Table 9 - Multi-criteria decision analysis (Scenario 2).

Criteria group	Criteria	Weighting factor	A1	A2	A3	A1	A2	A3
Environmental impacts	Greenhouse gas emission reduction	0.2	4	5	4	0.8	1	0.8
	Noise reduction	0.04	2	2	2	0.08	0.08	0.08
	Spatial impact	0.04	2	2	2	0.08	0.08	0.08
	Reduction in energy consumption	0.12	3	3	4	0.36	0.36	0.48
Economic impacts	Investment and operation cost levels	0.02	2	2	3	0.04	0.04	0.06
	Cost effectiveness	0.04	5	4	4	0.2	0.16	0.16
	Seasonal dependency	0.04	4	3	1	0.16	0.12	0.04
	Development of business activities	0.02	2	3	2	0.04	0.06	0.04
	Profitability levels	0.04	5	5	4	0.2	0.2	0.16
	Funding opportunities	0.04	4	4	4	0.16	0.16	0.16
Technical impacts	Mobility benefit	0.045	4	5	1	0.18	0.23	0.05
	Quality of service benefit	0.06	4	4	2	0.24	0.24	0.12
	Technical feasibility	0.03	3	3	4	0.9	0.9	0.12

Criteria group	Criteria	Weighting factor	A1	A2	A3	A1	A2	A3
	Implementability	0.015	4	4	4	0.06	0.06	0.06
Social impacts	Contribution to local/regional development	0.025	2	2	2	0.05	0.05	0.05
	Stakeholder's acceptance	0.05	3	4	3	0.15	0.2	0.15
	Social consciousness	0.075	3	3	3	0.23	0.23	0.23
	Enforceability	0.1	4	4	4	0.4	0.4	0.4
Total						**4.33**	**4.56**	**3.23**

5.4. Classification of investments priorities

Investments will be realized through a public procurement procedure, which is in progress and the planned completion of all the works is due by October 2022. The analysis of the current mobility services in the marinas and in the surrounding territories points out the focus and the need to invest on energy resources, environment protection, and sustainable mobility. Sustainable mobility solutions must be designed to contribute positively to the communities they serve while respecting their environmental, social, and economic objectives. For this reason, obtaining e-bikes, e-boats, and e-vehicles is seen as a priority by the three marinas involved.

The Marinas prioritize the investments made in energy saving, microgrid systems, and an e-charger for vehicles and boats, which will be connected to a microgrid-based photovoltaic station. Microgrid systems facilitate remote applications and allow access to pollution-free energy.

From the abovementioned, it is clear that Trieste Marinas are willing to become ''green ports'' in order to advance environmental excellence, and focus on a long-term vision towards a more sustainable and climate-friendly development of the ports' infrastructure.

5.5. Investment funding available and investor potential

The investment aims to achieve Specific objective 4.1. of Priority Axis (Maritime transport) within the DEEP-SEA project for the improvement of quality, safety, and environmental sustainability of

marine and coastal transport services and nodes by promoting multimodality in the Programme area. Initial investments will be financed from the Interreg VA Italy Croatia 2014-2020 program. Due to the opportunity created by the DEEP-SEA project, that brings together new nautical and shipbuilding entrepreneurs, marina and port managers, hotel managers and other businessmen, further investments could be expected to be financed by the stakeholders themselves or by opportunities for further investment from additional projects and through the space that political and institutional authorities can create.

5.6. Investment decision: risks related to the investment plan

5.6.1. Demand risk

Market risks refer to changes in demand and sales prices. These risks appear in situations where real demand or interest in purchasing services deviates from the expected and planned. Demand risk is usually defined as the probability that the demand for delivered services will be lower than expected. This is important because both financial performance and economic performance depend on product demand. A potential risk is that not enough people will use the new services offered by the three Marinas in Trieste, which include bike rental. The same problem can occur with charging stations for electric boats and cars - namely, there are not many e-boats in Trieste, nor e-cars. Thus, these charging stations will most likely depend mainly on tourists' usage. Seasonality and dependence on tourism present a risk nevertheless, but especially now due to the situation caused by the Covid-19 pandemic.
To ensure adequate demand for these services, it is necessary to constantly work on product promotion with an emphasis on the environmental sustainability of all services and on positioning the Marinas as "green ports".

5.6.2. Human resource risk

Human resources play an important role in managing the full work potential for project installations. To adequately perform, employers need to be both motivated and well educated regarding the new technologies and equipment that will be used. In this perspective, the Marinas should think about providing seminars and workshops led by ecology/energy experts on the topics of environmental protection, sustainable nautical tourism and sustainable energy in order to raise their awareness and knowledge upon energy efficiency in the maritime sector. The

Marinas might also offer environmental education activities to both its users and staff, which can include promoting the aims of various marina quality programmes, such as the Blue Flag programme, thus raising awareness on the aquatic environment, provide training in environmental matters and best practice methods to the staff, marina suppliers, and other tourist services operating in the area. Also, the employees' personal environmental awareness can lead to greater efficiency and greater effort when presenting Marinas' new products and services, which further reduces this risk.

5.6.3. Marketing risk

Marketing risk refers to the failure of the sale compared to the planned. Action that can be done to prevent this risk is to set effective sales practices, in particular, to do good promotion of all new products. The Marinas will aim to stimulate and facilitate ports' users in adopting green practices, create guidelines, handbooks and hold workshops/events, which promote adopting new, green technologies and practices while raising awareness on environmental protection and sustainable development.

The ports' stakeholders, as well as future or potential ports' users, will also be informed through social media, public events, promotional materials, and other online communication tools on Marina's new services as well as on the importance of changing their behaviour towards a more sustainable one. A special emphasis will also be put on promoting the Green port concept.

The introduction of charging stations for the environmentally sustainable transport system and well-designed product promotion would contribute to a reduction of this risk.

5.6.4. Supplier risk

Supplier risk is the potential that a supplier will fail to deliver to their commitments to the Company. Projects and business processes that heavily rely on suppliers may face significant risk. In some cases, businesses choose to mitigate these risks by diversifying their suppliers. Furthermore, this risk also implies legal risk, more specifically the risk of non-compliance. It presents the potential for losses and legal penalties due to failure to comply with laws or regulations. In many cases, businesses that fully intend to comply with the law still have compliance risks due to the possibility of management failure. To prevent this risk, the Marinas should practice a selection of quality and credible suppliers. In order to ensure compliance, the

Marinas need to negotiate penalties and contractual penalties for non-compliance with the Agreement.

5.7. Structure and governance organisation

5.8. Communication & Networking

In parallel to the installations and the technical aspects related to infrastructures and e-mobility services, what is necessary is the development of the project outputs and the diffusion of the benefits and opportunities that these investments offer.

To achieve the change in behavior of all stakeholders in the port business, the Marinas will use promotional and communication activities as well as networking, encouraging e.g. the shift towards sustainable mobility (e-cars, e-bikes, and e-boats) and sustainable nautical tourism as well as emphasizing the importance of sustainable energy. The Marinas will encourage the participation of local stakeholders and will promote sustainable recreation and tourism.

Below a summary of the Communication and Networking tools that the DEEP-SEA project will use to disseminate project knowledge and outputs/results:

Work Package	Activity	Description
Work Package 2 Communication	Activity 2.1 Start up activities	Communication Strategy Project website Kick off meeting Adriatic Marina business and policy stakeholder list
	Activity 2.2 Media Relations	Kick off Press Releases Mid Press Releases Final Press Releases Press Conference
	Activity 2.3 publications	3 publications on EU paper magazines Project newsletters
	Activity 2.4 public events	Mid term conference Final Conference High Level Conference Partner Meeting and Steering Group
	Activity 2.5 targeted events	Local meeting organized by PPs involving observers and non PP stakeholders
	Activity 2.6 Digital activities including social media and multimedia	Twitter and Facebook accounts to regularly updates on project events, activities, results and other relevant info for general public. Social Media will promote links to project websites in order to

		deliver more detailed information. LinkedIn account will be also created in order to reach more specialized PA and other stakeholders and to promote debate on energy efficient mobility for passengers. Furthermore, PPs will deliver a "short movie", uploaded and diffused on YouTube.
	Activity 2.7 Promotional materials	Cross bordering flyer folders/brochure Cross border poster Cross border Roll up USB
WP5 Guidelines for the energy efficient mobility in the Adriatic marinas and its transferability	Activity 5.1 Guidelines for Elaboration of intervention and investment plans related to mobility services	The Guidelines will represent a standard model for all MOs and PAs responsible for accessibility to sustainable inland, coastal and maritime mobility services of passengers and tourists.
	Activity 5.2 DEEP-SEA ICT Application and Services CARD	The App will present a map of the ESC and sharing services; it will enable users to book e-mooring, ESC parking places or the e-sharing vehicles. The App will also monitor end-users behaviors and utilization (with aggregated info for privacy reasons), and will provide data for the investments improvements and assistance to users. The App will also inform (push approach) the user about new services during high and low touristic seasons, and will establish a community with local tourist's operators.
	Activity 5.3 Adriatic marina mobility Memorandum of Understanding	The MoU will support the strategic implementation of the DEEP-SEA findings in regional and local policies related to passengers and touristic mobility. The MoU will be signed by the PAs involved in the project and other PAs not directly included in the project partnership
	Activity 5.4 Cross-border Network and transferability	The network, coordinated by ARIES with the contribution of all PPs, will represent a community of PAs, MOs and other Decision Makers, investors, infrastructure and public service provider, SMEs, sectoral agencies and end-users.

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3 PILOT Municipality of Malinska – Dubašnica – PORT OF PORAT _ ISLAND OF KRK

Document: Public/Confidential			
Responsible partner: Municipality of Malinska-Dubašnica **Involved partners: All**			
Version	**Status**	**Date**	**Author**
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1. Introduction

2. Methodology

This document will capitalise results from the analysis carried out in DEEP SEA WP3, i.e.: 3.1 Analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility, 3.2 Analysis of marinas management and investments model, 3.3 AS IS analysis on current mobility services and related energy consumption. Based on these, specific investment plans are here elaborated for each project pilot site thanks also to specific meetings and working tables with marinas' managers and stakeholders and site surveys carried out during the project. The investment plans are finally fine-tuned thanks to pilot implementation and finally transferred to marinas and relevant stakeholders outside DEEP SEA partnership and pilot areas for potential replication and uptake.

3. Description of DEEP-SEA pilot site and State of art

3.1. Description of the Institution, the site, the interaction with other stakeholders

Malinska - Dubašnica municipality is located on Island Krk's northwestern side. The municipality consists of 21 settlements which are all located in a strip about 3km in the land between the capes of Ćuf and Pelova. More than two-thirds of the population resides in the thin belt within one kilometre from shore and all located between Haludovo tourist resort in the north and Porat port in the south.

The port of Porat is a port open to public transport of local importance, the area of which is determined by the Ordinance on Order in the Ports of the County Port Authority of Krk. It is owned and governed by Krk county port authority.

The port of Porat consists of two parts. Communal part for mooring of 42 boats up to 12 m long and a nautical part of the port for mooring 120 yachts and boats. The port has an area for raising and lowering vessels with a stretch, and secured places for the supply of electricity and drinking water, as well as one tank for solid waste collection and one tank for liquid waste collection. The port of Porat has 40 parking spaces and 2 parking spaces. Near the port, there are beaches, as well as numerous catering and cultural facilities.

Municipality of Malinska - Dubašnica 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 KD Dubašnica and elementary school. Municipality of Malinska - Dubašnica acts through a single administration department integrating spatial planning, marine domain management, construction and utility services and environmental protection. Department is divided into sections and employs a total of 15 employees. Strong cooperation with Tourist-Board of Malinska has established through organization structure and on the operational level.

The municipality cooperates with the municipalities of the island of Krk and the city of Krk, the cities and municipalities of the Primorje-Gorski Kotar County and the Republic of Croatia, and the County of Primorje-Gorski Kotar to achieve common interests in improving economic and social development. The municipality performs activities of local importance that directly meet the needs of citizens, and which are not assigned to state bodies by the Constitution or the law. Municipality and Porth Authority work together to develop and improve ports pertaining tin their respective area.

Port boasts excellent transport accessibility. It is connected to the mainland via main gateway the Krk bridge (15 km) and included in the highway systems of Croatia as well as European countries. Distance to airport Krk is just 12 km from Malinska. Island is reachable from the majority of European cities within 2 hrs flight to airport Rijeka. Even though it is open year-round airport records incoming flights seasonally – between April and October.

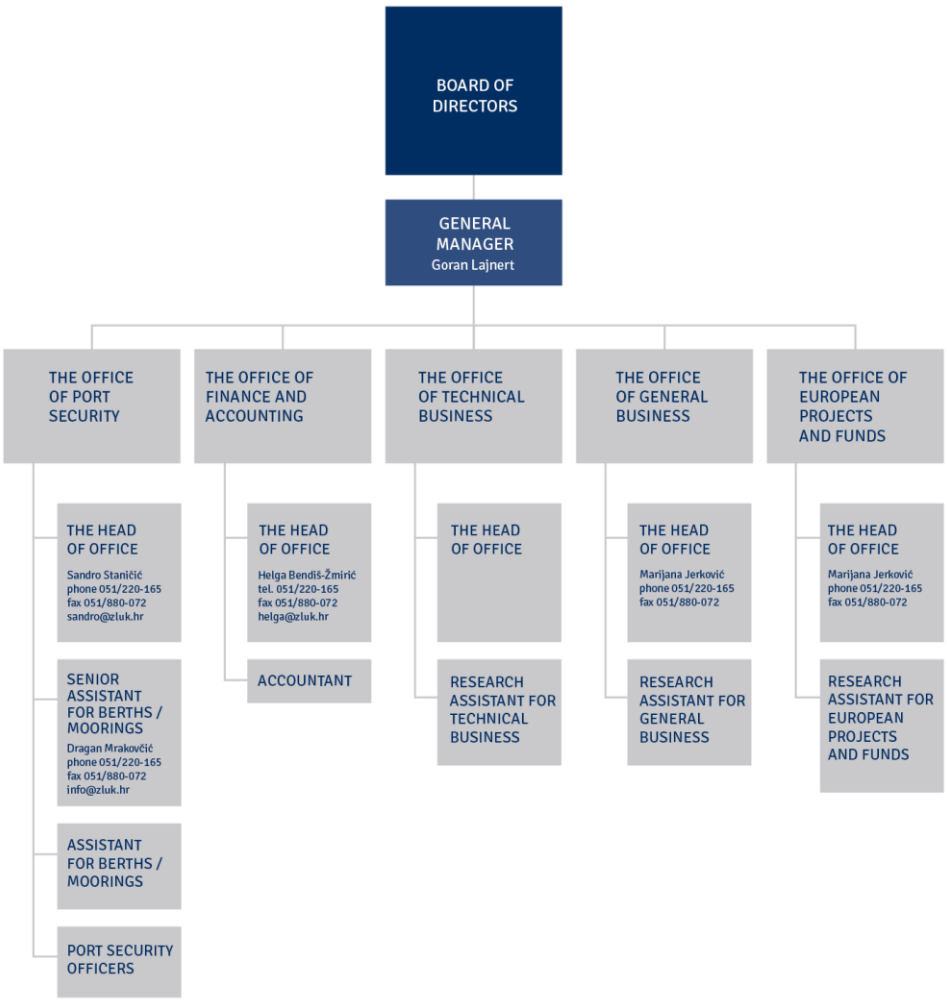
Since Island Krk is the biggest island in Croatia and more than 1000 inhabitants live in Malinska – Dubašnica Municipality port offers all commodities of modern life to its visitors ranging from supermarkets, restaurants, pharmacies, banks, post, laundromat, gas station, electric car charging station etc.

3.2. Current management models

Port of Porat is state-owned port as the majority of Croatian ports are. It is managed by the Krk County Port Authority. The Krk County Port Authority manages ports of county relevance: Baška, Krk, Malinska, Omišalj, Punat, Šilo, Surbova (Baška passenger port), Valbiska (passenger port) and port Vrbnik; and 21 smaller ports of local relevance.

The County Port Authority of Krk is a non-profit legal entity which is subject to organizational regulations. The Regulations on the accountancy of non-profit organizations, the Ordinance on accounting and the financial plan of non-profit organizations apply to its financial business.

Graph 1: County Port Authority of Krk Internal organisation graph



Source: https://www.zluk.hr/en/internal-structure (14/7/2020)

The following services are within the scope of the business of the County Port Authority:

- responsibility for the construction, maintenance, administration, protection and development of the maritime good
- the construction and maintenance of the ports' substructure

- the professional surveillance of the construction, administration and protection of the ports' area (the ports' substructure and superstructure)
- to secure permanent and undisturbed maritime traffic, technical and technological unity and the safety of traffic
- to secure services of general interest or services other economic subjects have no economic interest in the coordination and surveillance of the work of authorized persons of the concessions who conduct economic business in the ports' area
- making decisions about the foundation and administration of a free zone in the ports' area in accordance with the documents which regulate free zones
- other business regulated by the law

On basis of Article 60. of the Act on Maritime Domain and Seaports the revenues of the Port Authority are:

- port fees
- fees from the concessions on port business
- resources from the budget of the founders
- other revenues

3.3. Analysis of current mobility services – ONGOING in Act. 3.3 -

Port of Porat currently does not offer any mobility services. Closest mobility solution is located at Markat parking lot. There is a charging station for two cars with 2 charging slots for 22kW (32A) fast chargers. However, as this location is 3km away from the port it is not useful for boaters or .port visitors. The goal of pilot actions is to enable port users to have it accessible at the site to encourage users and visitors to use clean, renewable energy sourced solutions as the first choice option. The charging station has been established together with one of the biggest telecom operators in Croatia – T-Com to enable contactless payments, measure energy consumption and it allows roaming. It allows reservation and through an app developed for these stations is part of the network of 40.000 stations across Europe-

The area of the island is 405,8 km^2 and across the island, there are a total of 12 charging stations for a total of 24 cars at various locations for charging cars and 8 charging stations for

up to 80 e-bicycles. Island started installing these charging stations in 2016[1]. These charging stations are not necessarily located at ports where boaters can use them. In line with islands 'Krk - CO2 neutral island' strategy islands government plans to add more charging stations powered by micro-grid solution installed at locations to enable both residents and visitors to use clean, renewable energy daily. But also to encourage residents to switch from traditional energy sources to clean renewable energy.

3.4. Traffic volumes and energy consumption baseline – ONGOING in Act. 3.3

Port of Porat can be described as a departing hub as the vast majority of visitors and guest use it as the starting point of their journey – either by taking their boat or chartering a boat. Port is visited by average 60 passengers daily and the majority of visits happen during summer months as the island has an increase in the number of visitors over summer months (May – September) when most of the foreign visitors visit this port. Majority of port passenger passengers are foreign nationals and predominantly arrive from Slovenia (40%), Germany (20%), Austria (20%) and Italy (10%). Only a minor number of 10% of passengers are Croatian nationals. All of them arrive by car and half of them drive more than 300km to reach the port.

Port offers charging stations at the disposal to boaters which is powered by electricity from the regular island's electric grid of nominal voltage of 420 kV and of single contract nominal power of 20kW which supplies 9 moorings with electric power (classic marine plug-in). During 2019. approx. 13.000 kWh was consumed and 100% of it was absorbed by boats/yachts.

4. Strategy of new development

4.1. Strategic vision on tourism, accessibility and mobility

Description of the marina's vision on these issues considering:

- *Global level: general contest where the specific marina is operating/acting:*
- *specific context of the site/area/marina*

[1] https://www.grad-krk.hr/punionice-za-elektricna-vozila-doprinos-odrzivom-razvoju-otoka-krka (accessed 16/7/2020)

The Adriatic Sea is the most indented section of the Mediterranean Sea on the continent of Europe. In its present shape, it was formed by the rising of the sea level by 96 metres following the last ice age in the Pleistocene period, when valleys and basins were submerged, and the dry land emerged as elongated islands, separated by sea channels. The Croatian Adriatic coastline is 1,777 km long and occupies most of the eastern Adriatic shoreline. The natural beauty and picturesqueness of the Croatian coastline is accentuated by the mild Mediterranean climate, with between 2,400 and 2,800 hours of sunshine per year, which makes it one of the sunniest coastlines in Europe.

There are 718 islands and islets, 289 rocks and 78 reefs along the coastline, so Croatia may justly be called the 'land of a thousand islands'. Although the islands amount to only 5.8% of the total surface area of the country, their importance for the geographical identity of the country is much greater.

Islands Krk and Cres are the two biggest islands and have the same surface area of 405,8km^2. Strategy for the development of tourism on the island of Krk represents a common island platform for coordination of local self-government units, tourist boards, various public sector institutions, economic entities and other stakeholders involved in tourism development. The strategy strives for the sustainable development of the Island through increasing the quality of life of the local population, preserving the natural and cultural heritage and growing competitiveness of tourism. Island's governments are also implementing Smart Island Krk project which aims to reduce CO2 emission. The project goal is to empower public authorities to develop, implement and finance sustainable energy policies and actions by creating the conditions for a smart integration between SEAPs (Sustainable Energy Action Plans) and SUMPs (Sustainable Urban Mobility Plans) resulting in ultimately island becoming first zero-emission and fully energy independent Island in the Mediterranean.

The economic structure of the Island is diversified and includes tourism, industry, construction, transport, shipbuilding and agriculture. As all activities, except industry, are focused on tourist demand, the island's economy is still predominantly related to tourism. Island is one of most developed in Croatia and one od few which records increase in the number of inhabitants since 1970.

Croatia has 167 nautical ports on the Croatian coast, as follows: 78 marinas (of which 17 land marinas), 75 anchorages, 9 moorings and 5 boat storages. The total water surface area was

4 349 270 m2 and there were 18 179 moorings.[2]

4.2. Targets, indicators and objectives of investment

- *indication of targets the marina wants to achieve and their indicators (mobility sustainability, energy efficiency, etc.);*
- *indication in case of new services offered; if available with pricing*
- *identification of investment objectives in the sector of energy-efficient Mobility; (synthesis of 3.3.1 and from SWOT of 3.1);*

Sustainable development is the leading paradigm of the late twentieth and early twenty-first centuries. It arises as a kind of reaction to the fact that human activities harm natural processes and social content, although they take place intending to develop the economy and society in general. Sustainable development is a key concept based on the planned future development of the Municipality of Malinska - Dubašnica. This concept should become a syntagm that connects the goals of better economic growth and development and improving the quality of the environment and people's living conditions.

Instead of a policy of quantities, quantitative growth, the especially further unsustainable building of rental property and secondary accommodation, the development of the Municipality of Malinska - Dubašnica should be based on the high quality of the environment and, in general, high quality of life.

Along with tourist development strategy, the Island of Krk is implementing another strategy. As mentioned in previous chapters, the island aims to become the first carbon-neutral and energy self-sufficient island in the Mediterranean thanks to 'Island with zero CO2 emissions' strategy. The strategy consists of clear guidelines and steps on how to accomplish that. It includes installing between 250 and 500 solar panels with power up to 5 kW on the island, whose total power would be up to one MW, by the end of 2030. The strategy is also encouraging further energy transition towards renewable energy sources. All seven local governments on the island have agreed and are actively promoting and implementing the strategy towards renewable energy sources to become energy independent island. Through

[2] Nautical Tourism, Capacity and Turnover of port First Releases, 2019, Croatian Bureau of Statistics, Zagreb, 15th May2020, p.1 (https://www.dzs.hr/Hrv_Eng/publication/2019/04-03-04_01_2019.htm accessed 17/7/2020)

the activities, citizens interested in investing in solar panels will be advised on how to do it most efficiently.

The strategy has set goals to be accomplished by 2030:

- Become entirely energy independent and carbon neutral island
- Reduce energy consumption by replacing regular public lightning with smart LED lightning (equipped with sensors and software support operated by Ponikve doo, with the option of remote operation, while the system also monitors electricity consumption)
- encourage residents and their guests to replace their electrical appliances with energy-efficient (A+ and A++) appliances through the appliance exchange programme
- Implement Smart island solution through complete synergy of ICT solutions in the domain of the Internet of Things aimed at improving the efficiency of management in the city, increasing the quality of life of citizens and achieving significant savings
- encourage at least 35% of users to use vehicles supplied with electricity from renewable sources
- Reduce usage of cars on small distance (local driving) with internal combustion by 50%
- Along with above encourage mobility by bicycles instead of cars
- Encourage switching to electric-powered boats to at least 20% boats in the port

To help with implementing these goals local governments have founded companies such as 'Smart Island Krk', 'Otok Krk Energija' along with companies already existing such as Ponikve and Eko Otok Krk who will all together with governments work towards the ultimate goal – to become energy sufficient and CO2 neutral by 2030.

Malinska -Dubašnica Municipality had developed 6 top priorities (goals) to work on in upcoming years to implement these principles of sustainable steady growth and enable further development while following the principles of sustainable development and increasing the range and quality of the Municipality as destination and increase recognition on the global market. In line with above-mentioned principles, Malinska-Dubašnica Municipality intends to implement new green mobility solutions: bike-sharing system with e-bikes charging station, charging solution for cars and boats which would be charged via micro-grid solution (photovoltaic powerplant installed at the roof of the kindergarten) and establish car sharing system within Municipality area.

5. Investment Plans

5.1. Investment details: list and description of marinas investments

1. construction and commissioning of a charging station for electric cars and vessels, which will be a micro-grid system, connected to the electric power system and equipped with a photovoltaic module for the production of electricity;
2. construction and commissioning of a photovoltaic power plant, power 50 kW (micro-grid system) on the roof of the kindergarten in Malinska, which is connected to the power system;
3. construction and commissioning of a bike-sharing system for the reception of 4 classic and reception and charging of 4 electric bicycles located next to the kindergarten;
4. establishment of a car sharing system in the Municipality;

5.2. Description of assets used to support the investment plan

The investments determined by the project, together with the locations and expected procurement amounts are as follows:

Investment	**Location**	**Amount (HRK), without VAT**
Bicycles (electric and ordinary)	Kindergarten in Malinska	72.540,00
Charging station for electric cars and electric boats	Port of Porat	226.663,25
Charging station for electric cars	Kindergarten in Malinska	280.750,00
Solar power plant	Kindergarten in Malinska	384.982,50
	Total	**964.935,75**
	VAT (25%)	241.233,94
	Total	**1.206.169,69**

Investments are supported by locations that are given at no extra charge and the Municipality and companies that will manage the investments will provide support in the form of management and maintenance of equipment at no additional charge that would spill over to end users.

5.3. Investment requirements based on security selection process: investments options evaluated on the basis of cost benefit and multi-criteria analysis (CBA & MCA)

Economic analysis assesses the project's contribution to the general social welfare, not just the project's contribution to infrastructure owners and managers.

Increasing the communal standard contributes to increasing satisfaction among the residents of the local community, islanders and visitors who use the results of the investment, and the place becomes a more pleasant and attractive environment for housing, which retains the island population. The proposed solution also shows optimal economic indicators and fits into local, national and European development plans and strategies.

The investments follows the principles of sustainable steady growth and enable further development while following the principles of sustainable development and increasing the range and quality of the Municipality as destination and increase recognition on the global market.

Significant benefits of project implementation are also the effects of pollution reduction on the environment. Usually, for the purposes of economic analysis, a calculation is used based on the characteristics of the transport volume (vehicles km, passengers km, tons) and certain external costs.
Monetization of changes in environmental impact is carried out on the basis of:

- Determined changes of vehicles km by type of vehicle, and tons km of harmful substances and greenhouse gases
- Unit noise costs expressed in HRK / vehicle km by vehicle type and area
- Unit costs of major pollutants expressed in HRK / tonne
- Unit cost for greenhouse gas CO2 expressed in EUR / tonne

Unit noise costs in the Republic of Croatia are determined by vehicle type and area. For the Project, the assumption is that passenger cars would be predominantly used as an alternative means of transportation. The average new light passenger car in the EU emits an average of 130 g/ km of CO2, while for other major pollutants there is no single relevant data that can be used, but it is mostly significantly higher than the above. At the level of the Republic of Croatia, the data probably differ, and it is assumed that they are higher with regard to the age of the vehicle fleet.
The cost of CO2 emissions can be determined based on the following data:

Pollutant	Unit cost 2010 in EUR / tonne CO2	Annual supplement 2011 - 2030 in EUR 2
CO2	25,00	1,00

Source: Excel annex for Ricardo-AEA et al (2013) "Update of the Handbook on external costs of transport", European Commission - DG MOVE

From the above, it is reasonable to assume that the implementation of the project will have significant positive environmental impacts that can be calculated quantitatively, and are based mainly on reduced use of petrol-powered means of transport in favor of electic ones and also in favour of public transport (car sharing system, bike-sharing system) which contributes to reduction of noise and the emissions of harmful gases.

Investments are self-sustainable, with minimal maintenance costs and as such represent the optimal solution in terms of economic profitability.

5.4. Classification of investments priorities

Investments will be realized through a public procurement procedure which is in progress and the planned completion of all the works is by the end of 2021, which is also the end of the period of the project.
There are no investments of higher priority, but it is advisable to plan that the investment on the location of the kindergarten is realized as a unique project due to the related functionality.

5.5. Investment funding available and investor potential

Initial investments will be financed from the Interreg VA Italy Croatia 2014-2020 program. However, as the project brings together new nautical and shipbuilding entrepreneurs, marina

and port managers, hotel managers and other businessmen, further investments are expected to be financed by the stakeholders themselves. Opportunities for further investment are expected from additional projects and through the space that political and institutional authorities can create.

The investment potential is assessed as significant, as the Croatian economy is significantly dependent on tourism and logistics, and the demands of customers is increasingly moving towards green and sustainable. For this reason, it is expected that national and local policies will increasingly turn to these goals and more significantly encourage the implementation of projects, which will be a comparative advantage.

5.6. ROI

Return on investment (ROI) is a performance measure used to evaluate the efficiency or profitability of an investment or compare the efficiency of a number of different investments. ROI tries to directly measure the amount of return on a particular investment, relative to the investment's cost.

To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment. The result is expressed as a percentage or a ratio.

Since the investment is planned in such a way that revenues cover the expected operating costs, which are planned in the amount of HRK 2.500,00 and mostly include electricity and maintenance costs, there is no surplus (profit) and the return on investment is practically zero.

But the investment achieves many social benefits, which are primarily related to reducing energy consumption, the use of renewable energy sources and reducing pollution. Those achievements increase the quality of life of citizens and provide significant savings.

5.7. Investment decision: risks related to the investment plan

Risks related to an investment plan can be divided as:

- potential off-warranty errors or malfunctions
- the equipment being alienated or destroyed.
- Users not taking advantage of improvements

The municipality is collaborating with various associations and companies such as 'Eko Krk', 'KD Ponikve' and 'KD Dubašnica' to ensure meeting goals of sustainability implementation in daily lives. As the owner of KD Dubašnica Municipality plans to hire KD Dubašnica and Ponikve to provide monitoring and servicing of new equipment and mobility solutions once installed to ensure minimal downtime.

Another potential risk towards reaching the full potential of the plan is the risk of consumers (residents and their guests) non utilizing renewable sources in the port. Malinska-Dubašnica Municipality aims to minimize this risk through active education and promotion of project through leaflets, web and social media campaign and users education on its goals and benefits for all involved.

5.8. Structure and governance organisation

Once project piot goals are implemented Municipality plans to:

- Bicycles – will be sourced to KD Ponikve through long term lease
- Solar panels and micro-grid - will be governed through Municipality with help of Smart Island doo and Oto Krk Energija doo and through regular maintenance
- Charging Station will be governed by the municipality and maintenance will be provided by the Krk port authority

Smart and energy renewable solutions which are part of pilots proposed by the Municipality of Malinska-Dubašnica will be free of charge for users.

5.9. Communication & Networking

During the project, Municipality of Malinska Dubašnica will establish a regular line of communication of project goals and project progress via web, social media, through campaigns and events that will be held either on its own or together with various companies and associations that promote ecology, sustainability, green ecology and tourism.

Planned Communication release strategy

Type	Target group	Release Dynamics
Leaflet	Port visitors,	1 x year
Press release	General public, visitors, residents	Every 6 months

Web news	General public, visitors, residents	4 x year
Social Network	General public	minimum 4 x year

Municipality of Malinska-Dubašnica plans to ensure project support through an intensive communication campaign. The plan is to release leaflets to visitors and least once a year, press release at least twice a year. To ensure project's promotion Municipality also plans to keep informed general public, residents and visitors through Web campaign Social Media campaign and by starting Facebook ad Linked-in pages, together with already existing pages of companies and governments working towards the carbon-neutral island where project and all news that happen during the course of the project along with education and promotion of new solutions will be promoted and accentuated.

4 PILOT - MARTINIS MARCHI MARINA - MASLINICA BAY, ISLAND OF ŠOLTA IN CENTRAL DALMATIA

Document: Public/Confidential			
Responsible partner: H.L. Dvorac d.o.o **Involved partners: All**			
Version	**Status**	**Date**	**Author**
1.0	Final	06/03/2020	H.L. Dvorac d.o.o.

Executive Summary

Development of Energy Efficiency Planning and Services for the Mobility of Adriatic MARINAs i.e. DEEP-SEA Project aims to address the problem of the predominant use of one means of transport, highly polluting maritime transport and the limited integration of the mobility services offered in the blue economy sector.

The specific activity "Investment plans for energy-efficient mobility at each pilot site", within the Project, involves the development of investment plans that will define two models. The first model for public authorities, responsible for the area where the marinas are located, and the second for the marina operators themselves.

The plans will serve as a basis for launching a cross-border network to replicate the positive effects of the sustainable mobility services developed within this Project. Each investment plan will be a guide to the institutions responsible for the pilot areas in defining the actions to be developed and implemented concerning equipment and/or new services. This particular Plan is for the pilot site Martinis Marchi Marina which is located in Croatia. Marina's investment plan contains a description of the Marina pilot site and State of art. Furthermore, the strategy of new development with targets and objectives of the investment is also given, as well as a description of assets. Additionally, four investment actions are assessed based on Multi-criteria decision analysis and Cost-benefit analysis. From all the above, the Investment plan arises, which contains the following: investment funding available and investor potential, ROI, investment decisions, i.e., risks related to the investment plan, structure and governance organization, and communication & networking.

1. Introduction

Act 3.4. Investment plan is part of nautical ports framework analysis and investment plans aggregated within Work Package 3 of the DEEP-SEA project. The program will contribute to unlocking the "potential for blue growth" by investing in research and investment in the blue economy sectors. It will also help the development of maritime transport with the aim of achieving sustainable tourism and better spatial distribution of visitor movements in the Adriatic region.

Nautical marinas along the Adriatic coast and islands are the main tourist centres for incoming and outgoing mobility flows. Marinas stretch across the Adriatic coast, bringing a significant number of different types of mobility and transport flows inside and outside the marinas themselves, which have a markedly negative impact on the environment, such as CO2 emissions, noise pollution, and traffic congestion. As a member of the Project, Martinis Marchi Marina, aims to achieve the project's objectives, reduce negative impacts on the environment and gain "green port" status by developing, promoting, and implementing transport services with low or no negative effects. That will be accomplished by installing electric vehicle charging stations (ECS), procuring electric car, electric bicycles and rental software for electric vehicles, and by implementing the microgrid system. Such services are rarely offered in nautical marinas, which mostly offer services that pollute the environment. By offering more systematic, integrated and multimodule transport services, the challenge of reducing the environmental impact of transport activities in the Marina can be effectively addressed.

This document represents an overview of the current Martinis Marchi Marina internal environment that includes a description of the Marina, interactions with other stakeholders and analysis of current mobility services. The state of the art of the Marina served as the basis to create a new development strategy, more specifically, to identify the targets, indicators, and objectives of the investment. The last part of the document is the investment plan that contains a list and description of Marina's investments, i.e., actions. Furthermore, both, Multi-criteria decision analysis and Cost-benefit analysis had been conducted to compare actions that are meant to achieve the set objectives. In order to evaluate the forecasted profitability

on the project investment, in chapter ROI (Return on investment), Marina's estimated revenues and expenses are presented in the ten years operational period that refers to the period from 2021 to 2030, taking into account that the investment is to be realized in the first year. As the final part of the investment plan, risks, structure and governance, and communication and networking had been analysed.

2. Methodology

This document will capitalize on the results from the analysis carried out in DEEP-SEA WP3, i.e.: 3.1 Analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility, 3.2 Analysis of marinas management and investments model, 3.3 AS-IS analysis on current mobility services and related energy consumption. Based on these, specific investment plans are here elaborated for each project pilot site thanks also to specific meetings and working tables with marinas' managers and stakeholders and site surveys carried out during the project. The investment plans are finally fine-tuned thanks to pilot implementation and finally transferred to marinas and relevant stakeholders outside the DEEP-SEA partnership and pilot areas for potential replication and uptake.

3. Description of DEEP-SEA pilot site and State of art

3.1. Description of the Institution, the site, the interaction with other stakeholders

Martinis Marchi Marina pilot site is privately owned by a limited liability company H.L. Dvorac d.o.o.. It is located in a small Maslinica Bay on the west side of the Island of Šolta in Central Dalmatia. The Marina's main business activity includes nautical tourism with short-term (transit) sea berth arrangement (10 to 35 m). The Marina has 50 berths, marked and illuminated, equipped with an electricity connection, a 220 V power supply, as well as water supply for each berth. An online berth booking service is available as well. The Marina has a reception, sanitary facility, as well as a food and beverage service. Among other services, the Marina also provides Wi-Fi internet access, a boat rental service, a parking area for boat owners, video surveillance, and a waste disposal corner. Placed less than 15 km from the Island's ferry port - Port of Rogač, 30 km of the main Split ferry port, bus and train terminal, and 30 km from the motorway A1 - The Marina is well connected to the main traffic nodes. The airport Resnik, as the second-largest airport in Croatia, is within a range of 20 km via sea. The main activity in the surrounding area is tourism, including diving activities, restaurants,

cocktail bars, grocery stores, and souvenir shops. Regarding the collaboration with stakeholders, Marina mainly collaborates with the Croatian Employer's Association and the Croatian Chamber of Commerce via round tables, workshops, and meetings.

3.2. Current management models

The Marina is privately owned and performs commercial activities which represent its major source of income. The Marina's key field of work is nautical tourism with short term berths arrangement.

The internal organization of the Marina is divided into four departments: Captain, Sailors, Maintenance, and Reception. The marina has 14 employees which are provided with continuous education via seminars and language courses. At the moment the Marina lacks energy and ecology experts. Even though Marina's energy consumption is monitored and an energy report is being published for each year, neither an Energy plan nor an Energy management system are being implemented at the moment. Accordingly, no Energy efficiency control system is present.

3.3. Analysis of current mobility services

The Marina currently offers boat rental (MY Luxury charter) as part of their mobility service. The Heritage Hotel, situated near the Marina, owns a car that can be rented to both Hotel and Marina guests. Both vehicles are fuelled by conventional fossil fuels. Regarding other transportation modes, a bus station is located in the nearby area - with a bus line that runs across the whole island, as well as a taxi service. According to the conducted survey, about 90% of the guests are completely satisfied with the boat rental service. Additionally, 66% of the guests would be interested in e-bike rental and e-scooter sharing services, especially those visiting the bay for a half-day or one-day sailing trip.

3.4. Traffic volumes and energy consumption baseline

The Marina is accessed mostly via private or chartered boats/yachts. Usually, the chartered boats are rented for one plus week or during the weekend. The average distance travelled (return included) is 234 kilometres. Most of the vessels that arrive at the Marina are 12 to 15 meters long sailing boats with an inboard diesel engine or gasoline inboard 4stroke engine. The average consumption of the surveyed sailing boats is 6,4 litres per hour, while motorboats use about 60 litres per hour. The daily average of motor navigation is 3.3 hours for all the

surveyed vessels. Each boat has roughly six passengers on board. When taken into consideration that the Marina has 50 berths which are full during the peak season, it is safe to conclude that approximately 300 people visit the Marina daily. The Marina is visited as part of the itinerary that includes Maslinica bay or the Island of Šolta in general, and about 96% of the guests are completely satisfied with the services currently offered regarding electricity and water supply. Nevertheless, one guest would prefer better electricity and one guest would prefer a fuel station.

4. Strategy of new development

4.1. Strategic vision on tourism, accessibility, and mobility

Martinis Marchi Marina is a modern and sustainable marina that provides innovative e-solutions and sustainable mobility services, promotes energy efficiency, sustainable tourism, and green port status, all based on its own unique local characteristics, thus making it widely recognizable in the field of nautical tourism.

4.2. Targets, indicators, and objectives of investment

Upon the investment's implementation, the Marina will offer the following new services:

- 1 ECS for e-vehicles and 1 ECS for e-boats
- 1 e-car for rent
- 1 rack with electric bicycles for sharing system and purchase of at least 6 e-bikes including a charging system for e-bikes and a rental software
- 1 Microgrid system.

The following table shows the investment objectives along with the targets and their indicators. Moreover, all the presented targets with indicators are subject to change. Additionally, due to the current absence of e-infrastructure and e-services, the initial values of certain target indicators are set as zero, so an increase of 100% is expected. Other targets with indicators are estimated yearly, by the end of the operational period i.e., 2030, or by the time the investment is finalized.

Table 11. Investment objectives

Investment objective 1	To increase marina's energy efficiency
Targets with indicators	• 100% increased energy consumption from renewable sources • At least 4% increased energy productivity of the marina by 2030

	• On average 14,000 tons per year of CO2 emission reduction due to the use of solar energy • Installed 50 energy efficient LED lights for docks illumination • Installed 1 counting mechanism for monitoring energy consumption
Investment objective 2	**To increase marina's smart mobility**
Targets with indicators	• 1 charging station for e-vehicles and e-boats installed • 1 e-car acquired • 6 e-bikes acquired • 6 e-bike charging stands installed • E-sharing services will be used 100% of the time until 2030 • Increased number of customers using the e-sharing services by 100% until 2025 • Increased number of customers using e-charging station by 100% until 2025
Investment objective 3	**To increase marina's self-sustainability**
Targets with indicators	• 1 Microgrid system installed • At least 720 hours per year of e-charging station occupancy until 2025, after which approximately 1,440 hours per year • Roughly 18 000 kWh per year of energy produced using the photovoltaic system • 8% share of renewable energy in final energy consumption yearly • Increased photovoltaic self-consumption energy by 100%

5. Investment Plans

5.1. Investment details: list and description of marinas investments

The Marina plans to expand its business in the following years by introducing new content, which will contribute to positioning both the Marina itself and its services as environmentally sustainable. The planned investment is mostly related to the procurement of equipment that will require electrical and construction work. All the new content (charging stations for e-vehicles and others) will be charged with a photovoltaic solar panel, i.e., through a microgrid system.

The initial investment is EUR 100,000 which includes four actions that are briefly described below.

Action 1 (A1): Electric charging stations (ECS) for boats/vessels

Action 1 refers to the installation of the electric charging station for boats/vessels. This action comprises necessary equipment procurement, construction works and electrical installation.

The equipment procurement includes the purchase of a freestanding charging device for boats. More specifically, charging device with two connection points and rated power 2x22 kW (3-phase, 400 V/ 32 A/50 Hz, with connection version type 2). Moreover, A1 includes the purchase of kit with equipment for monitoring. Required construction works include preparatory works and excavation of the cable duct for laying power cables. A1 also implies final activities in the form of operating tests of charging station and training of the users.

Action 2 (A2): Electric charging stations (ECS) for cars

Action 2 refers to the installation of the electric charging station for cars. The action comprises necessary equipment procurement, construction works and electrical installation. The equipment procurement includes the purchase of freestanding charging device for cars. More specifically, charging device with two connection points and rated power 2x22 kW (3-phase, 400 V/32 A/50 Hz, with connection version type 2). Moreover, A2 includes the purchase of kit with equipment and software for monitoring devices. Required construction works include preparatory works, excavation of the cable duct for laying power cables and marking parking places for parking of electric cars along with sign installation. A2's final activities refer to operating tests of the charging station and training of the users.

Action 3 (A3): E-mobility & sharing services

Action 3 includes both infrastructural works and the purchase of the electric car and six electric bicycles for renting. Infrastructural work implies the installation of the system for charging six electric bicycles, preparatory construction works and excavation of the cable duct for laying power cables. Also, A3 includes the purchase of software for rental purposes. Final activities, within the action, include setting up and parameterizing the e-bike system, connecting to a local LAN, establishing software control over the operation of the station, etc.

Action 4 (A4): Microgrid system

The procurement in this action refers to 42 photovoltaic (single crystal) panels equipped with connecting cables (1600x990x40 mm with rated power min. 320 Wp). Like every microgrid system, this one includes the purchase of inverters, battery inverters, as well as a battery system for storing excess energy. Complete with a communication device with the IP protocol for monitoring the power plant operation and its visualization via a computer, as well as the appropriate software. Construction works include preparatory work, excavations, finishing work and purchase of small building material and supplies. Final activities, in A4, refer to the

implementation of controls, measurements, and testing according to the control plan from the project.

5.2. Description of assets used to support the investment plan

The following table represents the review of financial indicators for H.L. Dvorac d.o.o., that owns the Martinis Marchi Marina, for the period of three years (2017 - 2019). Financial indicators include liquidity ratios, leverage ratios, activity ratios, economic and profitability ratios.

Table 12. Financial indicators

Financial indicators	Year		
Liquidity ratios	**2017**	**2018**	**2019**
Liquidity current ratio	0.39	0.72	0.42
Liquidity cash ratio	0.07	0.21	0.10
Financial stability ratio	1.02	1.01	1.02
Leverage ratios	**2017**	**2018**	**2019**
Debt ratio	0.27	0.25	0.25
Self-financing ratio	0.73	0.75	0.75
Debt to equity ratio	0.38	0.33	0.34
Activity ratios	**2017**	**2018**	**2019**
Total assets turnover ratio	0.23	0.25	0.27
Current assets turnover ratio	20.02	14.73	19.54
Long-term assets turnover ratio	0.23	0.25	0.27
Receivable Turnover Ratio	33.26	30.78	37.56
Days sales in receivables ratio	10.97	11.86	9.72
Economic ratios	**2017**	**2018**	**2019**
Total activity effectiveness	101.98%	103.92%	92.84%
Main business activity effectiveness	1.02	1.03	0.93
Financial activity effectiveness	1.92	2.52	0.07
Profitability ratios	**2017**	**2018**	**2019**
Net profit margin	0.02	0.04	-0.08
Return on assets (ROA)	0.00	0.01	-0.02

Liquidity ratios

In order to further elaborate the assets used to support the Investment plant, the Company's liquidly ratios were analysed. Current, and cash liquidity ratio along with financial stability ratio stand out as good financial indicators. During the monitored three years, the values of these indicators are below the tolerable level. In other words, the ability of a company to cover its short-term liabilities is reduced, and short-term assets must be financed from part of the long-term sources.

Leverage ratios

The value of the debt ratio indicator should be lower than 50%, and in the case of Martinis Marchi, it does not exceed 27% in any of the observed years. The desirable value of the self-financing ratio is a minimum of 50%, and in all three observed years, the value is over 70%, which means that a large part of the assets is financed from the capital. The upper limit of the debt-to-equity ratio is 2:1, whereas in this specific case, during the three years observed, the debt amounts to over 30% of equity. In other words, the Company successfully covers its liabilities.

Activity ratios

The total assets turnover ratio indicates the entrepreneur's activity with the optimal value of over 1. In this case, the value is lower than 1 in all three years. The value of the current asset turnover ratio and long-term asset turnover ratio is desired to be as high as possible. For Martinis Marchi, the current assets turnover ratio is 18.1 on average. The last two indicators are receivable turnover ratio and days sales in receivables ratio. Both indicate the agility of the company to collect receivables from customers' credit sales.

Economic ratios

Economic ratios include three indicators, namely, the total activity effectiveness, main business activity effectiveness, and financial activity effectiveness. These indicators relate revenues and expenditures, i.e., show how much revenue is generated per unit of expenditures. If the value of these indicators is less than 1, the company incurs a loss. For all three indicators in the first two years, the values of the indicators are higher than 1.

Profitability ratios

In the first two observed years, the company averagely generated 0.3 price unit of net profit over one price unit of total income. As aforementioned, in the last year, the company incurs a loss. So, the value of the net profit margin in 2019 is negative. Return on assets indicates the profit that the entity generates from one price unit of the equity, i.e., assets. This indicator

follows the same methodology as the net profit margin. Therefore, in the first two years, it has a positive value, whereas, in the last year a negative value.

5.3. Investment requirements based on security selection process: investments actions evaluated on the basis of Multi-criteria analysis and Cost-benefit analysis (MCA & CBA)

5.3.1. Multi-criteria decision analysis (MCA)

MCA tool provides decision-makers considering a different area of impacts of certain actions. In this analysis, the impact area includes the environment, economy, mobility (technical aspect), and society. For each area of impacts, criteria have been developed with indicators for estimation of impacts if the action would be implemented.
For the purpose of the project, the actions are considering according to mentioned in chapter 5.1., specifically:

- A1: Electric charging stations (ECS) for boats/vessels
- A2: Electric charging stations (ECS) for cars
- A3: E-mobility & sharing services
- A4: Microgrid system

However, any new action, with the purpose to improve or develop energy efficiency and mobility services in a Marina, may be added and evaluated through the tool, according to the interest of Marina. The purpose of the tool is rather to show the opportunity and direction of the impacts than to choose the only one action with the best score. The most valuable result is achieved when a what-if scenario is performed against different weighting values according to the strategy and objectives of the Marina operator.

Criteria explanation and indicators

The used criteria for evaluation and comparison of proper actions are divided into four criteria groups or impact areas: environmental, economic, technical, and social. The criteria, within each group, are shown in the table below, along with the description and preference function. The rating for each criterion is in the interval from one to five, one being the lowest, and five being the highest value.

Table 13. Criteria description and preference function

Criteria group	Criteria	Description	Preference function
Environmental	**GHG emission reduction**	Criterion reflects on the potential of CO2 emissions reduction as a result of the implementation of a specific action. It analyses the difference in the emissions level before and after the action.	Higher is better
	Noise reduction	Criteria reflect on the reduction of noise as the result of the action.	Higher is better
	Spatial impact	Criteria express the impact of the action on land usage, layout occupancy requirement, space limitation, conflict with other activities, and similar issues that may complicate the implementation of the action.	Lower is better
	Reduction in energy consumption	Criterion considers the reduction in energy consumption as the result of the action, mostly as the result of the implementation of the new source of energy or savings resulting from the same.	Higher is better
Economic	**Investment and operation cost levels**	Criterion considers the overall costs required for the construction and implementation of a specific action. It focuses on cost levels to be estimated according to the expectation and complexity of the investment.	Lower is better
	Cost effectiveness	Cost effectiveness is evaluated according to the relationship between monetary inputs and the expected outcome with respect to the specific objectives.	Higher is better
	Seasonal dependency	This criterion measures the seasonal dependency of the action. It is generally better than the benefits are equally distributed through the year and not limited to the seasonal period.	Lower is better
	Development of business activities	Criteria express the possibility of the expansion of economic activities in the nearby zone as the result of the action. The action may contribute more or less to the surroundings and may trigger some business activities with benefit to marina stakeholders.	Higher is better
	Profitability levels	This is the estimation of the profitability levels resulting from the action, or to what extent the action may result in an increment of the profit.	Higher is better
	Funding opportunities	This criterion aims at considering the potential to support the action with a feasible source of funding. If the indicator is low, then the action may have financial constraints.	Higher is better
Technical	**Mobility benefit**	This criterion measures the benefits of improved mobility resulting from the action.	Higher is better
	Quality of services benefit	Different impacts on service quality may result from the implementation of the action.	Higher is better
	Technical feasibility	Technical feasibility considers the technical aspects of the action, where it is assumed that the feasibility is in co-relation with the complexity of the investment, less complex action means higher technical feasibility.	Higher is better

Criteria group	Criteria	Description	Preference function
	Implementability	Criterion refers to the capacity of the stakeholders involved in the implementation of the action. It considers potential difficulties, barriers, or conflicts that may occur during the implementation of the action.	Higher is better
Social	**Contribution to local/regional development**	Criterion focuses on the effect on local and regional socioeconomic life activities. It aims at considering the change of dynamics in the mean of increasing potential for socioeconomic growth increase in the future.	Higher is better
	Stakeholder acceptance	Criterion reflects the overview of opinions related to the energy efficient systems and e-services by the local stakeholders and expectations from the action.	Higher is better
	Social consciousness	This criterion measures the opportunity to change the social awareness toward the energy efficiency and e-services resulting from the action.	Higher is better
	Enforceability	Criterion focuses on the legal basis for enforcement of the implemented action. It aims to evaluate whether the action is supported by an existing legal framework, whether there is an authority responsible for implementing the action. The lack of a legal framework may negatively affect the implementation or may postpone the implementation of the action.	Higher is better

Weighting factors for each criterion

Weighting is the process of comparing different criteria and criteria groups and assigning them the value of importance – weight following development strategy, business priorities or strategic objectives. Impact areas are weighted in relation to each other to get the relative importance of the group. The relative importance of the criteria group corresponds to the site strategy objectives, also the criteria have weighted each other within the respective impact area. The sum for all criteria weights belonging to the same criteria group should be equal to 1 (or 100). The following assigned weights are applied for both following scenarios which are more described in the next chapter.

Table 14. Assignment of weights to each criterion

CRITERIA GROUP	CRITERION	Value (%)
Environmental	Greenhouse gas emission reduction	50
	Noise reduction	10
	Spatial impact	10
	Reduction in energy consumption	30
		100
Economic	Investment and operation cost levels	10

CRITERIA GROUP	CRITERION	Value (%)
	Cost effectiveness	20
	Seasonal dependency	20
	Development of business activities	10
	Profitability levels	20
	Funding opportunities	20
		100
Technical	Mobility benefit	30
	Quality of service benefit	40
	Technical feasibility	20
	Implementability	10
		100
Social	Contribution to local/regional development	10
	Stakeholder's acceptance	20
	Social consciousness	30
	Enforceability	40
		100

Evaluation and scenario set-up

This analysis contains two different scenarios that are assigned with different weighting factors i.e. whose purpose is to accomplish different strategic objectives and development strategy. In the first scenario, the focus is on economic impacts, given that Marina is privately owned and generating revenue is one of its main priorities. On the other hand, in Scenario 2, the largest weight factor is environmental, given the fact that Marina strives to become a "green port" through its activities. The term "green port" relates to sustainability in the context of the maritime industry. In general, this term means the production of the long-term strategy for a sustainable and climate-friendly environment. This concept means the change from reactive to proactive approach with a focus on long-term vision.

Table 15. Evaluation of scenarios

Scenarios	Criteria group				
	Environmental impacts	Economic impacts	Technical impacts	Social impacts	
Scenario 1	30%	40%	20%	10%	100%
Scenario 2	40%	20%	15%	25%	100%

Results of MCA

The following tables show the results of the Multi-criteria decision analysis for each activity. In both scenarios, the best feasible action is E-mobility and sharing services (A3), while the least preferred action is Microgrid system (A4).

Table 16. Multi-criteria decision analysis (Scenario 1)

Criteria group	Criterion	Weighting factor	Ratings for each criterion				Results			
			A1	A2	A3	A4	A1	A2	A3	A4
Environmental impacts	Greenhouse gas emission reduction	0.15	4	4	5	4	0.6	0.6	0.75	0.6
	Noise reduction	0.03	2	2	2	2	0.06	0.06	0.06	0.06
	Spatial impact	0.03	2	2	2	2	0.06	0.06	0.06	0.06
	Reduction in energy consumption	0.09	3	3	3	4	0.27	0.27	0.27	0.36

Criteria group	Criterion	Weighting factor	Ratings for each criterion				Results			
			A1	A2	A3	A4	A1	A2	A3	A4
Economic impacts	Investment and operation cost levels	0.04	2	3	2	3	0.08	0.12	0.08	0.12
	Cost effectiveness	0.08	5	4	4	4	0.4	0.32	0.4	0.4
	Seasonal dependency	0.08	4	3	3	1	0.32	0.24	0.24	0.08
	Development of business activities	0.04	2	2	3	2	0.08	0.08	0.12	0.08
	Profitability levels	0.08	5	4	5	4	0.4	0.32	0.4	0.32
	Funding opportunities	0.08	4	4	4	4	0.32	0.32	0.32	0.32
Technical impacts	Mobility benefit	0.06	4	4	5	1	0.24	0.24	0.3	0.06
	Quality of service benefit	0.08	4	4	4	2	0.32	0.32	0.32	0.16
	Technical feasibility	0.04	3	3	3	4	0.12	0.12	0.12	0.16
	Implementability	0.02	4	4	4	4	0.08	0.08	0.08	0.08
Social impacts	Contribution to local/regional development	0.01	2	2	2	2	0.02	0.02	0.02	0.02
	Stakeholder's acceptance	0.02	3	4	4	3	0.06	0.08	0.08	0.06
	Social consciousness	0.03	3	3	3	3	0.09	0.09	0.09	0.09
	Enforceability	0.04	4	4	4	4	0.16	0.16	0.16	0.16
							3.68	**3.5**	**3.87**	**3.19**

Table 17. Multi-criteria decision analysis (Scenario 2)

Criteria group	Criteria	Weighting factor	Ratings for each criterion				Results			
			A1	A2	A3	A4	A1	A2	A3	A4
Environmental impacts	Greenhouse gas emission reduction	0.2	4	4	5	4	0.8	0.8	1	0.8
	Noise reduction	0.04	2	2	2	2	0.08	0.08	0.08	0.08
	Spatial impact	0.04	2	2	2	2	0.08	0.08	0.08	0.08
	Reduction in energy consumption	0.12	3	3	3	4	0.36	0.36	0.36	0.48
Economic impacts	Investment and operation cost levels	0.02	2	3	2	3	0.04	0.06	0.04	0.06
	Cost effectiveness	0.04	5	4	4	4	0.2	0.16	0.16	0.16
	Seasonal dependency	0.04	4	3	3	1	0.16	0.12	0.12	0.04
	Development of business activities	0.02	2	2	3	2	0.04	0.04	0.06	0.04
	Profitability levels	0.04	5	4	5	4	0.2	0.16	0.2	0.16
	Funding opportunities	0.04	4	4	4	4	0.16	0.16	0.16	0.16
Technical impacts	Mobility benefit	0.045	4	4	5	1	0.18	0.18	0.23	0.05
	Quality of service benefit	0.06	4	4	4	2	0.24	0.24	0.24	0.12
	Technical feasibility	0.03	3	3	3	4	0.9	0.9	0.9	0.12
	Implementability	0.015	4	4	4	4	0.06	0.06	0.06	0.06
Social impacts	Contribution to local/regional development	0.025	2	2	2	2	0.05	0.05	0.05	0.05
	Stakeholder's acceptance	0.05	3	4	4	3	0.15	0.2	0.2	0.15
	Social consciousness	0.075	3	3	3	3	0.23	0.23	0.23	0.23
	Enforceability	0.1	4	4	4	4	0.4	0.4	0.4	0.4
							4.33	**4.28**	**4.56**	**3.23**

5.3.2. Graphical representation of MCA results - PROMETHEE-GAIA

The result of the evaluation process based on the multi-criteria analysis (PROMETHEE) are preference flows of the pairwise comparison of the actions. Computation technic measures positive preference flow (Phi+). In other words, how much action 1 is better than action 2. At

the same time, negative preference flow (Phi-) is measured, or how much action 2 is better than action 1. The negative preference measures the weaknesses of the action that will be implemented, which means that smaller Phi- is preferred.

Ranking

For graphical presentation of the results, the Partial ranking diagram (Figure 5. left) is used. It consists of two different rankings on the set of action, showing positive and negative preference flow based on the pairwise comparison. The partial ranking is the intersection of these two rankings.

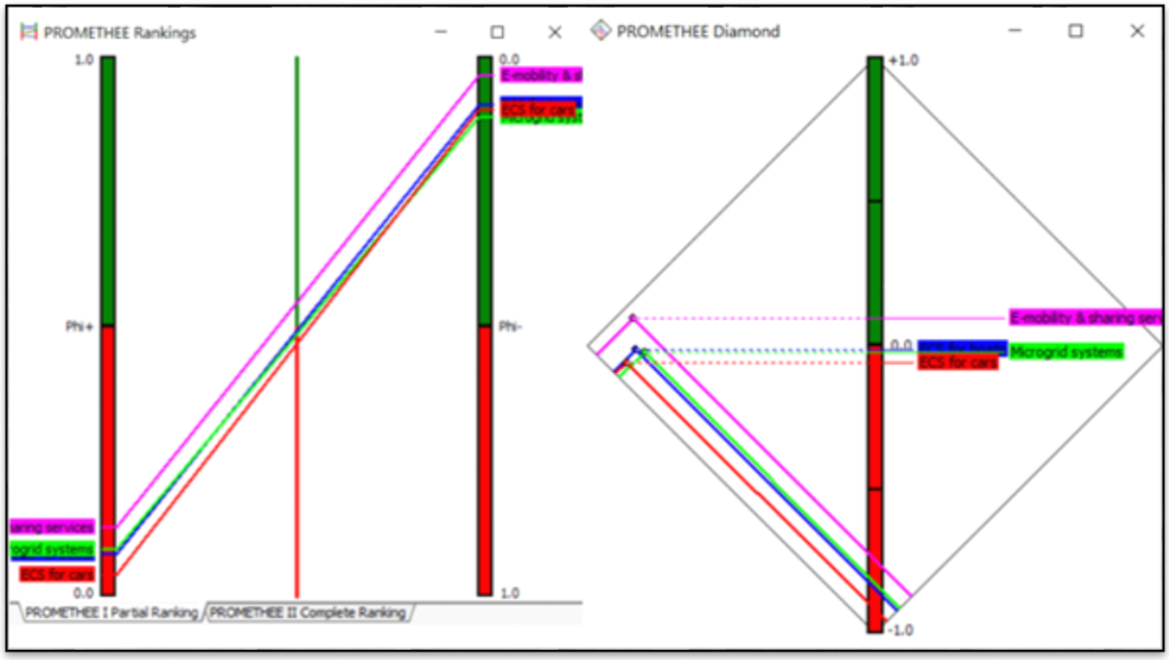


Figure 5. Ranking of the actions - Martinis Marchi Marina

The PROMETHEE diamond (Figure 5. right), is another view of the result presentation. Each action is represented by the point positioned somewhere on the plane. The vertical scale shows the Phi net flow (the difference between Phi+ and Phi-) for the particular action. Positive scores increase from the left to the top corner (or from bottom to the right corner)

while Negative scores increase from the left to the bottom corner. Intersecting of the action lines means incomparability at a certain level.

From both views, it can be concluded that the E-mobility and sharing services is the best feasible action for the Martinis Marchi Marina. On the partial ranking diagram, there are conflicts between ECS for boats, ECS for cars and Microgrid system while the diamond diagram shows slight preference towards action ECS for boats followed by microgrid system whereas Action 2 is the least feasible action.

Walking weights

Rankings between action and weighting distribution between measurable criteria are shown in the figure below. Walking weights option allows changing the weights of the criteria and therefore the simulation of different scenarios to see the impacts on the results. The upper part shows the ranking chart whereas the lower part shows the weighting bars of the criteria.

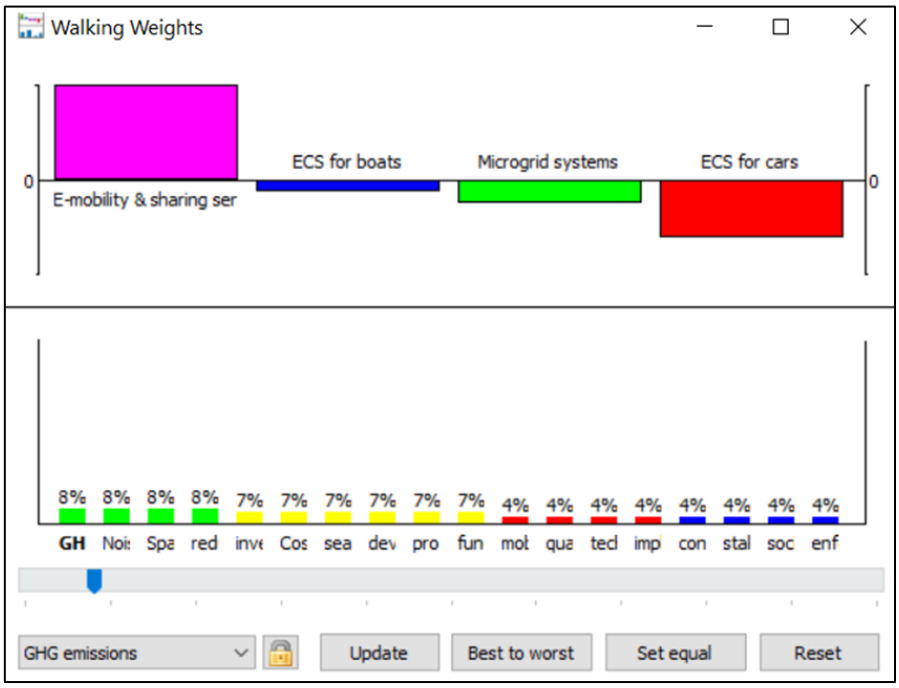


Figure 6. Walking weights

GAIA plain

In this diagram, actions are presented by the points, while the criteria are presented by axes. Positions of the actions show their similarity. If the points are close to each other, that means that the actions have similar profiles, on the other hand, if the points are far away from each other, that means that actions have different characteristics. The results show a quite difference between action profiles. Only ECS for boats (A1) and E-mobility and sharing services (A3) show similarity.

The criteria are presented by the axes, and those close to each other have similar preferences. Conflicting criteria have the opposite direction of their axes. On the picture below, the line is constructed for the criterion GHG emission, whose preference function is "higher is better". Position of the orthogonal projection of the action on the reference line shows the estimated impact of the action. Therefore, it may be concluded, that this criterion will have the lowest impact on the action microgrid system, and the strongest on the action ECS for cars.

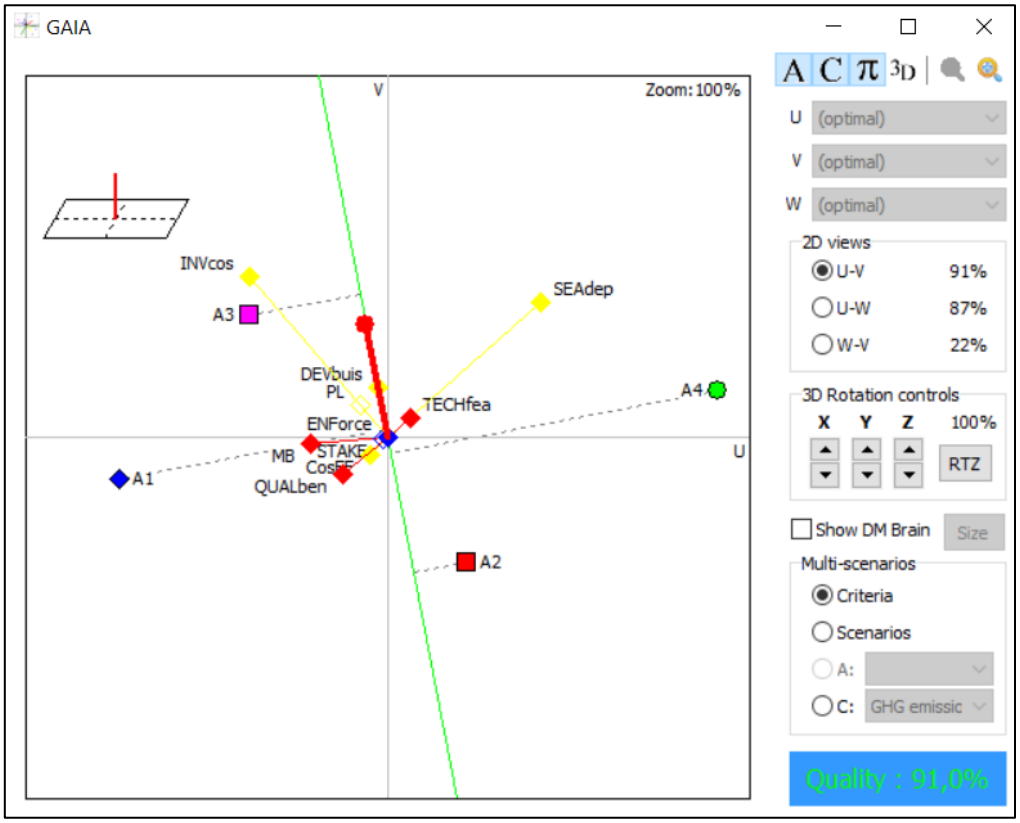


Figure 7. GAIA plain result of the actions

The following charts show the GAIA web diagrams for each action that will be implemented in the Martinis Marchi Marina along with the impacts of criteria and criteria groups on those actions.

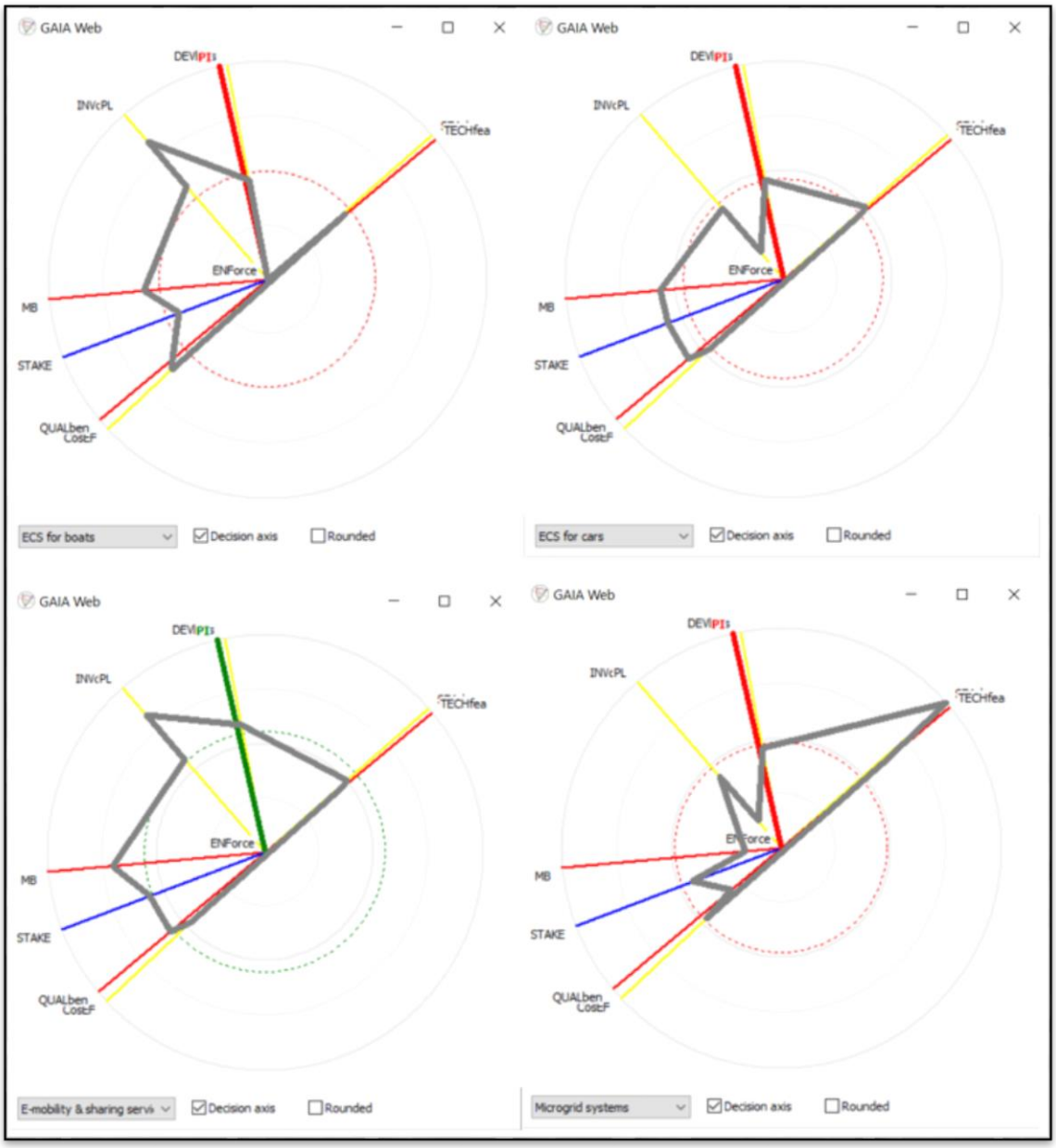


Figure 8. Spider diagrams for each action

The spider diagram shows a graphical representation of GAIA uni-criterion net flow scores for each action. The radial distance corresponds to the net flow score, which means that the positive impact is displayed towards the edge and the negative towards the centre.
For actions ECS for boats and E-mobility and sharing services, profitability levels (PL) is recognized as the criterion with the highest positive impact, while the stakeholder's acceptance (STAKE) as the subject of concern. On the other hand, for the actions, ECS for cars and Microgrid systems, enforceability (ENForce) is recognized as the subject of concern while the highest positive impact for
the action ECS for cars has the criterion mobility benefit (MB) or criterion of seasonal dependency (SEAdep) for the Microgrid system.

5.3.3. Cost-benefit analysis (CBA)

A simplified cost-benefit analysis has been conducted for comparing actions in which rough financial and economic flow estimates were used to calculate financial and economic performance indicators.
In accordance with the *Guide to cost-benefit analysis of investment projects*, the simplified analysis did not include the conversion of market prices into economic ones. Also, according to the aforementioned *Guide*, the financial discount rate of 4% and the economical rate of 5% are used, while the analysis' operational period is set to ten years. Moreover, assumed revenues and expenses are the same for all ten years.
A simplified CBA has been carried out for each activity as well as for the investment in general. The total investment amounts to EUR 100,000 and it refers to abovementioned four activities (ECS for boats, ECS for cars, E-mobility and sharing services and Microgrid system).
As a potential result of the investment, four benefits were observed: CO2 emission reduction, mobility benefit, increased efficiency for consumption, and increased availability of ECS.
The first benefit - **reduction in CO2 emissions** was calculated based on the cost of 1 ton of emitted CO2 set at EUR 25. The price of EUR 25 is taken from 2006 and was adjusted to 2019 using the harmonized consumer price index from Eurostat, while the annual price increase of EUR 1 starting in 2011, was also included. Thus, the price of one ton of emitted CO2 in 2019 was set at EUR 42.49. The above calculation is in accordance with the CBA guide.
The second activity is **mobility benefit** that refers to the assessment of end-user health benefits, who will use an active mode of transportation i.e., cycling instead of cars and scooters. The benefit is evaluated using *Health economic assessment tools (HEAT) for walking, and for cycling* developed by the *World health organization*. The purpose of the tool is to

calculate the unit price (EUR/year/1 person). This calculation is based on several factors: First, it is a single case scenario estimated on a Split city level. Secondly, the value is calculated for one year, specifically the first year of the operational period (2021), and it implies the benefit of two-minute cycling for one person. The obtained value of 60.5 EUR/year is for the year of 2010. Therefore, the harmonized consumer price index is used for the calculation of prices in the following years. Based on the aforementioned, the unit price for 2020 is 57.5 EUR per year. The total amount of mobility benefit is estimated by multiplying the aforementioned unit price by the predicted number of people that used this service in the first year (2021). The analysis leads to a conclusion that this benefit will impact the action E-mobility and sharing services.

The third benefit is the **increase of efficiency for consumption**. This benefit is valued through the reduction of energy costs due to the installation of devices for the production of their own energy from renewable energy sources and procurement. The only activity that will directly affect the reduction of energy consumption is the Microgrid system. This system will produce a certain amount of energy and thus reduce energy consumption from non-renewable energy sources. The benefit is calculated by multiplying the price of electricity by the estimated amount of solar energy produced.

The last benefit is the **increased availability of ECS**, which refers to the increased availability of charging services for electric cars and boats. It is quantified based on the estimated willingness to pay for that service and the estimated number of users in 2021. According to the conference paper *Quantifying consumers' willingness to pay for electric vehicle charging*, the average price of one hour charging with power 22kW on the city level is EUR 9.58. The benefit is calculated by multiplying that amount by average eight-hour charging duration and estimated number of users. The table below shows all abovementioned benefits, costs, and revenues.

Table 18. Cost-benefit analysis

	Action 1	Action 2	Action 3	Action 4
Financial Analysis				
Investment costs	**5,000**	**5,000**	**65,000**	**25,000**
Operating costs per annum	**9,648**	**9,648**	**9,648**	**12,668**
Cost of F&B	1,338	1,338	1,338	1,338
Rent and Utilities	50	50	50	50
Repair/Maintenance	4,520	4,520	4,520	9,040
Electricity cost	1,500	1,500	1,500	0
Sales and marketing	2,240	2,240	2,240	2,240

Total costs	**14,648**	**14,648**	**74,648**	**37,668**
FNPV of total cost	**65,208**	**73,785**	**131,477**	**114,607**
Operating revenues	**12,612**	**8,800**	**31,874**	**6,320**
Hotel	1,874	1,249	2,499	625
F&B	4,507	3,004	6,009	1,502
Marina	4,372	2,915	5,829	1,457
Martinis Marchi Charter	679	452	905	226
E-bike rental	0	0	12,312	0
E-car rental	0	0	4,320	0
E-charging stations	1,180	1,180	0	0
Energy savings	0	0	0	2,510
FNPV of total revenues	**11,661**	**8,136**	**29,469**	**5,843**
Total FNPV	**-53,547**	**-65,649**	**-102,008**	**-108,763**
Economic Analysis				
ENPV of total cost	**61,738**	**70,073**	**127,215**	**109,564**
CO2 emission reduction	23,452	23,452	195	604,782
Mobility benefit	0	0	21,824	0
Increase of efficiency for consumption	0	0	0	2,510
Increased availability of ECS	9,197	9,197	0	0
Total benefits	**32,649**	**32,649**	**22,019**	**607,292**
ENPV of total benefits	**221,012**	**221,012**	**149,056**	**4,110,975**
Total ENPV	**159,273**	**150,939**	**21,840**	**4,001,411**
B/C ratio	**3.58**	**3.15**	**1.17**	**37.52**

Financial Net Present Value (FNPV) compares investment costs with net revenues and measures the ability of project net revenues to cover investment costs regardless of the funding sources and methods. When this value is negative, the generated revenue will not cover expenses. Thus, it is shown that the Project is not financially sustainable and needs EU funding. In this case, all four actions have negative values, out of which A4 has the highest one.

The B/C ratio is the present value of the project's benefits divided by the present value of the project's costs. If this ratio is higher than 1, the project is suitable because the benefits, measured by the inflow's present value, are higher than costs, measured by outflow's present value. Taking the abovementioned into consideration all B/C ratios are higher than 1. The highest value has A4 with the B/C ratio of 37.52.

5.4. Classification of investments priorities

The analysis of investment needs and priorities of marinas points out the focus on sustainability issues as an energy resource, environment protection, and sustainable mobility.

Sustainable mobility solutions must be designed to contribute positively to the communities they serve while respecting their environmental, social, and economic objectives. For this reason, obtaining more e-bikes, e-boats, and e-vehicles was seen as a priority by Marina Martinis Marchi. The Marina prioritizes the investments made in energy saving, microgrid systems, and an e-charger for vehicles and boats, which will be connected to a microgrid-based photovoltaic station. Microgrid systems facilitate remote applications and allow access to pollution-free energy.

From the abovementioned, it is clear that Marina Martinis Marchi is decisive to become a ''green port'' in order to advance environmental excellence. Specifically, the Company which owns the Marina is focused on a long-term vision towards a more sustainable and climate-friendly development of the port's infrastructure. The Company has also expressed that their wish is to improve the Marina's infrastructure and provide users with more services as well as to raise their quality even more.

5.5. Investment funding available and investor potential

The Company will invest total of EUR 100,000. The investment will be mostly (85%) financed by European Structural and Investment Fund (ESIF), more specifically European Regional Development Fund (ERDF). The investment aims to achieve Specific objective 4.1. of Priority Axis (Maritime transport) within the DEEP-SEA project. This specific objective addresses: the improvement of quality, safety, and environmental sustainability of marine and coastal transport services and nodes by promoting multimodality in the Programme area. The rest of the amount (15%), as well as VAT (recoverable), will finance the Marina itself. Moreover, the Company meets the project-specific capability criteria: performing of professional activity, economic and financial capabilities, and technical and professional conditions. That implies that the rest of the investment will successfully finance from its sources.

5.6. ROI

In order to evaluate the forecasted profitability on the project investment, in this chapter, Marina's estimated revenues and costs are presented, whereas only the revenues and costs of the investment were included in the assessment. Based on the aforementioned data, depreciation, cash flow, net present value, and, lastly, return on investment are presented.

5.6.1. The Marina's total revenues

Table 19 shows the total revenues in the ten years operational period that refers to period from 2021 to 2030, taking into account that the investment is to be realized in the first year. Total revenues in the operational period are projected to grow in the first five years, after which they stabilize and remain the same until the end of the period. Marina's total revenues include the following: the hotel, F&B, the Marina and Charter, e-bike rental, e-car rental, and e-charging stations. All of these will be briefly presented below.

Hotel revenues

Heritage Hotel consisting of seven luxury and spacious suites: three standard suites, a superior, a deluxe, a family deluxe, and a royal suite. According to the Company's data, in 2017, 2018, and 2019 the largest number of bookings and the highest revenues are generated in the period from June to September.

Due to the new content offered by the Marina and the promotion of the Green port concept, the number of overnight stays is expected to increase not only due to the investment but also

due to the increased marketing activities that will take place. Future Hotel revenues were estimated based on the hotel's average occupancy in 2017, 2018, and 2019. Based on the aforementioned, hotel revenues in 2021 are expected to be 2% higher than they were in 2019. It is assumed that in the first five years they will grow by 2% annually, and after they will grow by 3% every year.

F&B revenues

The Company owns an open-air Mediterranean restaurant. Revenues from food and beverages are historically the highest revenues of the Company. Due to the increased number of visitors to the hotel and Marina higher revenues are expected in this category. Revenues from food and beverages are closely related to the hotel revenues, i.e., they are highest when the hotel was the busiest. Therefore, the assumed growth of these revenues follows the expected growth rates used for hotel revenues, i.e., food and beverage revenues are expected to grow at an annual rate of 2% for the first five years. In 2025, an increase of 3% in revenues compared to the previous year (2024) was estimated, whereas the same trend continues throughout the following years.

Marina and Charter revenues

Martinis Marchi offers a modern marina located right next to the Hotel and Restaurant. The Marina includes 50 berths for ships up to a length of 40 meters, along with several berths for larger boats.

The Marina has 50 berths equipped with moorings, as well as electricity and water. The new breakwater offers safe protection against wind and waves, for motor yachts and sailing boats up to 35m in length, and even longer ships on the outside of the breakwater.

The Martinis Marchi Marina won the International Cemex Builder Award for the best infrastructure and urbanism in 2012.

During the season, the average price of the berths is EUR 351, while out of the season-average price is EUR 227 (the price also varies according to the size of the vessels). Marina and Charter revenues were estimated by multiplying the average rental price of berths by the expected occupancy of berths. A growth rate of 2% is expected in the first four years and a growth at a rate of 3% is expected in fifth year and then it stays fixed until the end of the operational period.

The Company owns a luxury yacht Martinis Marchi 1- Sunseeker Superhawk 50. It is ideal for cruising the Adriatic, for a quick tour and exploration of the central Dalmatian islands, but

also transfers throughout Dalmatia. As people are interested in the new content offered by the Marina, an increase is estimated in this category of revenues as well. A growth rate of 2% is expected in the first four years and a growth of 3% in the next six years.

Revenues from sharing services (e-bike rental)

It is planned to set up a charging system for six electric bicycles in the Martinis Marchi Marina. The electric bicycles will have a rear-wheel drive, will be equipped with a basket and advertising space on the basket and rear wheel, with an off-station locking system and a module for monitoring the position of the bicycle. The power of the electric motor in bicycles will be a maximum of 250 W, with a maximum speed of 25 km/h.

Revenues from renting e-bikes were estimated by observing the prices of all-day e-bike rentals in 23 EU countries (estimation is based on prices in the three biggest cities in each country), such as Austria (EUR 50), Denmark (EUR 40), Bulgaria (EUR 10), Italy (EUR 50), and others. Therefore, the average rental price of all 23 countries is EUR 38. Revenues from renting e-bikes are estimated by multiplying by average price and the expected occupancy. It is assumed that the bicycles will be rented 30% of the time during the season, for the first three years, and then 50% in the next six years. The assumption is based on the growing awareness on environmental sustainability, as well as the presumed growth of interest in the Marina and its facilities due to the introduction of new services.

Revenues from sharing services (e-car rental)

The purchase of one electric car for renting is also included in investment, which would additionally increase revenue from sharing services. The average daily rental price for an electric vehicle of power of 100 kWh and similar vehicles is EUR 80, which is based on a rental pricelist in Split-Dalmatia County. Revenues from sharing services were estimated by multiplying the average price and expected use of service. It is assumed that during the first three years the electric car will be rented 30% of the time, during the season. Whereas, in the following years (after 2024), the car will be rented 50% of the time during the season. This is based on the assumption of growing attendance of the Marina and the general need for rental services on the island.

Revenues from e-charging stations

It is planned to set up charging stations for e-boats and e-cars in the Marina. It will be a free-standing device for charging electric vehicles/vessels with two connection points and rated power 2x22 kW.

In this category, both ECS for cars and boats were taken into account. It was assumed that in the first four years, there would be seven consumers weekly, while in the following six years, there would be 10 consumers weekly. Moreover, it was assumed that the average battery capacity of electric vehicles/vessels is 100 kWh, with an average price of electricity of EUR 0.14 based on the national average price of electricity in Croatia in the first half of 2020. Given all of the above, the estimated revenue from the e-charging stations is about 2,350 EUR annually in beginning and it will increase to EUR 3,360 by 2030.

Energy savings

The investment also includes action which refers to the installation of the microgrid system. The installation will include 42 monocrystal photovoltaics with the power of 320 Wp, a 3-phase inverter, a battery converter, and a battery storage system. The photovoltaic will be installed under an angle of 10°. It was estimated that the system will produce approximately 18,000 kWh per year. If the price of electric energy is the same as for the charging stations (EUR 0.14), this installation will bring energy savings of roughly 2,500 EUR per year. All listed revenues are presented in the table below.

Table 19. Total revenues of Martinis Marchi (2021 – 2030)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Hotel	6,247	6,372	6,500	6,630	6,829	6,829	6,829	6,829	6,829	6,829
F&B	15,022	15,322	15,629	15,941	16,419	16,419	16,419	16,419	16,419	16,419
Marina	14,573	14,864	15,162	15,465	15,929	15,929	15,929	15,929	15,929	15,929
Charter	2,262	2,307	2,354	2,401	2,473	2,473	2,473	2,473	2,473	2,473
E-bike rental	12,312	12,312	12,312	12,312	20,520	20,520	20,520	20,520	20,520	20,520
E-car rental	4,320	4,320	4,320	4,320	7,200	7,200	7,200	7,200	7,200	7,200
E-charging stations	2,352	2,352	2,352	2,352	3,360	3,360	3,360	3,360	3,360	3,360
Energy savings	2,510	2,510	2,510	2,510	2,510	2,510	2,510	2,510	2,510	2,510
TOTAL REVENUE	**59,598**	**60,360**	**61,138**	**61,930**	**75,240**	**75,240**	**75,240**	**75,240**	**75,240**	**75,240**

5.6.2. The Marina's total costs

The following table (Table 20) shows the total costs of the Martinis Marchi. Total costs consist of F&B expenses, Rent and utilities, Repair/maintenance, Electricity costs and Management and administrative overheads (Marketing costs).

F&B expenses

Since the revenues from F&B are expected to grow in the following ten years, thus the increase of the material expenses in this category is assumed. The average share, based on the expenditures for F&B in food and beverage revenues over the three-year period (2017 - 2019), is 35%. These expenses were estimated by multiplying the average share with expected F&B revenues.

Rent and utilities

The rent and utilities cost often refer to the utility fee and the water fee. These costs may also include the costs of telephone and cleaning services, gas, and garbage collection. The estimation was obtained based on the previous amounts of these costs. Due to the simplified approach, only fixed items of these costs were observed and stay the same for all ten years.

Repair/maintenance costs

Costs of repair and maintenance in 2021 refer to the cost of maintaining the system for photovoltaic panels of EUR 21,840, the cost of maintaining e-bikes of EUR 249, and the cost of maintaining of e-car of EUR 512. Maintenance costs for an e-bike are about 42 EUR per bike. The costs for maintenance of e-car includes renewal of car registration and garage service and these prices are estimated by the average prices of these services in Croatia.
The photovoltaic panels to be installed belong to the group of medium-sized panels. The fixed maintenance costs of this group of panels are EUR 10,400 and the variable are EUR 11,400. It is assumed that the maintenance of the panel will remain at the same level in the operational period, after which a slight increase in maintenance costs is expected.

Electricity costs

Considering that new services installed (A1, A2 and A3) will consume more energy, the additional electricity cost is observed as a separate category. Cost is estimated by the rated power of both electric charging stations (44 kW) with expected occupancy and average electricity price. It is assumed that in the first four years occupancy is 720 hours during the season and in the next six years 1440 hours.

Management and administrative overheads

Also, there is an increase in the cost of Management and administrative overheads, more precisely marketing costs. Since the Company is introducing new services which contribute to the reduction of air and water pollution, money will be invested in marketing and promotion of these services. In the first year (in which the largest investments in the promotion are assumed) the marketing expenses are 15% of the estimated revenues. For the rest of the operational period, marketing expenses are 10% of the estimated revenues. These percentages are given based on recommendations from the existing studies on marketing expenses and budgeting in the first years of investment.

Table 20. Total costs of Martinis Marchi (2021 – 2030)

Expenses	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cost of F&B	5,352	5,459	5,568	5,680	5,850	5,850	5,850	8,036	8,036	8,036
Rent and Utilities	198	198	198	198	198	198	198	198	198	198
Repair/Maintenance	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601
Electricity costs	4,435	4,435	4,435	4,435	4,435	8,870	8,870	8,870	8,870	8,870
Marketing costs	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601
TOTAL COSTS	**41,526**	**38,729**	**38,916**	**39,107**	**40,608**	**45,044**	**45,044**	**47,229**	**47,229**	**47,229**

Depreciation calculation

Table 21 shows the depreciation calculation of an investment. The investment amounts to EUR 100,000 and includes the installation of a charging stand for six e-bicycles, the installation of a charging station for both e-boats and e-cars, and the purchase of six e-bicycles and one e-car. Moreover, it involves the installation of 42 solar panels and all the equipment needed for their installation and operation. With the applied legal rates of asset write-off, a complete write-off of the investment is expected in 2023.

Table 21. Depreciation calculation (2020 – 2023)

	Cost value	Annual write-off rate	Year				The rest of the value
			2020	2021	2022	2023	
Investment	100,000	25%	25,000	25,000	25,000	25,000	0
TOTAL	**100,000**	**-**	**25,000**	**25,000**	**25,000**	**25,000**	**0**

5.6.3. Financial flow

The financial flow of the project was also calculated. In the financial flow of the project, net receipts, which show the ability to cover liabilities from income as well as the company's earnings, are observed. Additionally, the cumulative net receipts show that the total investment in the project will return over the life of the project.

Table 22. Financial flow

Description	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
A RECEIPTS	**100,000**	**59,598**	**60,360**	**61,138**	**61,930**	**75,240**	**75,240**	**75,240**	**75,240**	**75,240**	**75,240**
1.Total revenues	0	59,598	60,360	61,138	61,930	75,240	75,240	75,240	75,240	75,240	75,240
2. Sources of funding	100,000	-	-	-	-	-	-	-	-	-	-
2.1. Own resources	15,000	-	-	-	-	-	-	-	-	-	-
2.2. Grants	85,000	-	-	-	-	-	-	-	-	-	-
B EXPENSES	**100,000**	**41,526**	**38,056**	**38,361**	**43,672**	**47,535**	**51,083**	**51,083**	**52,831**	**52,831**	**52,831**
1.Total investments	100,000	-	-	-	-	-	-	-	-	-	-
2. Operating expenses	0	41,526	38,729	38,916	39,107	40,608	45,044	45,044	47,229	47,229	47,229
2.1. Material costs	0	5,352	5,459	5,568	5,680	5,850	5,850	5,850	8,036	8,036	8,036
2.3. Other external costs	0	27,234	27,234	27,234	27,234	27,234	31,669	31,669	31,669	31,669	31,669
2.4. Management and administrative overheads	0	8,940	6,036	6,114	6,193	7,524	7,524	7,524	7,524	7,524	7,524
3.Income tax expense	0	0	-674	-556	4,565	6,926	6,039	6,039	5,602	5,602	5,602
C NET RECEIPTS	**0**	**18,072**	**22,305**	**22,777**	**18,259**	**27,705**	**24,157**	**24,157**	**22,408**	**22,408**	**22,408**
D CUMULATIVE NET RECEIPTS	**0**	**18,072**	**40,377**	**63,154**	**81,412**	**109,117**	**133,274**	**157,431**	**179,839**	**202,247**	**224,655**

5.6.4. Net present value

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyse the profitability of a projected investment or project. Future cash flows are discounted at the default interest rate, which may be the cost of capital or the required rate of return. In this analysis, discounting was performed according to the required yield rate of 4%. Table 23 shows the discounted net cash flow, based on which net cash flow, net present value, relative net present value, and internal rate of return were calculated.

Table 23. Net cash flow and discounted net cash flow

Year	Net cash flow	Discount factor 4%	Discounted net cash flow
1	-100,000	0.96154	-96,154
2	18,072	0.92456	16,709
3	22,305	0.88900	19,829
4	22,777	0.85480	19,470
5	18,259	0.82193	15,007
6	27,705	0.79031	21,896
7	24,157	0.75992	18,357
8	24,157	0.73069	17,651
9	22,408	0.70259	15,744
10	22,408	0.67556	15,138
11	22,408	0.64958	14,556

The total net present value (NPV) is equal to the sum of the present values of cash flows and amounts to EUR 78,202. The relative net present value is 0.78, which means that the project brings 0.78 units of net present value per unit of invested capital and can be assessed as profitable. The internal rate of return (IRR) is defined as the discount rate that produces zero NPV and amounts to 13%.

Table 24. Net present value (NPV)

Net present value (NPV)	78,202
Relative net present value	0.78
Internal rate of return	13%

5.6.5. Return on investment

The return-on-investment method is used to calculate the year in which the Company will pay off the investment, i.e., will cover the investment from cash flows. The calculation is made based on net cash flow receipts. The year in which the cumulative cash flow assumes a positive value is a year in which the investment is covered by the Company's earnings. The return on investment is shown in Table 25, which shows that the cumulative net cash flows became positive in the sixth year, which means the payback period is six years.

Table 25. The payback period of an investment

Year	Net cash flow	Cumulative net cash flow
1	-100,000	-100,000
2	18,072	-81,928
3	22,305	-59,623
4	22,777	-36,846
5	18,259	-18,588
6	**27,705**	**9,117**
7	24,157	33,274
8	24,157	57,431
9	22,408	79,839
10	22,408	102,247
11	22,408	124,655

5.7. Investment decision: risks related to the investment plan

5.7.1. Demand risk

Market risks refer to changes in demand and sales prices. These risks appear in situations where real demand or interest in purchasing services deviates from the expected and planned. Demand risk is usually defined as the probability that the demand for delivered services will be lower than expected. This is important because both financial performance and economic performance depend on product demand. A potential risk is that not enough people will use the new services offered by Martinis Marchi, which include e-bike and e-car rental. The same problem can occur with charging stations for electric boats and cars - namely, there are not many e-boats in Croatia, nor e-cars. Thus, these charging stations will most likely depend mainly on tourists. Seasonality and dependence on tourism present a risk nevertheless, but especially now due to the situation caused by the Coronavirus disease 2019 (COVID-19).

To ensure adequate demand for these services, it is necessary to constantly work on product promotion with an emphasis on the environmental sustainability of all services and on positioning Martinis Marchi as a “green port”.

5.7.2. Human resource risk

Human resources play an important role in managing the full work potential for project installations. To adequately perform, employers need to be both motivated and well educated regarding the new technologies and equipment which will be used. Currently, the Marina provides seminars and language courses for its employees and also plans to broaden the aforementioned with seminars and workshops led by ecology/energy experts on the topics of environmental protection, sustainable nautical tourism and sustainable energy in order to raise their knowledge. The Marina will also offer environmental education activities to both its users and staff, which can include promoting the aims of various marina quality programmes, such as the Blue Flag programme, it will raise awareness on the aquatic environment, provide training in environmental matters and best practice methods to the staff, marina suppliers, and other tourist services operating in the area. Also, the employees' personal environmental awareness can lead to greater efficiency and greater effort when presenting Martinis Marchi's new products and services, which further reduces this risk.

5.7.3. Marketing risk

Marketing risk refers to the failure of the sale compared to the planned. Action that can be done to prevent this risk is to set effective sales practices, in particular, to do good promotion of all new products. The Marina will aim to stimulate and facilitate port users in adopting green practices, create guidelines, handbooks and hold workshops/events, which promote adopting new, green technologies and practices while raising awareness on environmental protection and sustainable development.

The port stakeholders, as well as future or potential port users, will also be informed through social media, public events, promotional materials, and other online communication tools on Marina's new services as well as on the importance of changing their behaviour towards a more sustainable one. During the project implementation, an ICT application will be developed as well, i.e. a web portal used for the promotion of sustainable mobility offers and services. A special emphasis will also be put on promoting the Green port concept to the wider public using the abovementioned tools.

The introduction of charging stations for the environmentally sustainable transport system and well-designed product promotion would contribute to a reduction of this risk.

5.7.4. Supplier risk

Supplier risk is the potential that a supplier will fail to deliver to their commitments to the Company. Projects and business processes that heavily rely on suppliers may face significant risk. In some cases, businesses choose to mitigate these risks by diversifying their suppliers. Furthermore, this risk also implies legal risk, more specifically the risk of non-compliance. It presents the potential for losses and legal penalties due to failure to comply with laws or regulations. In many cases, businesses that fully intend to comply with the law still have compliance risks due to the possibility of management failure. To prevent this risk, the company should practice a selection of quality and credible suppliers. In order to ensure compliance, the company needs to negotiate penalties and contractual penalties for non-compliance with the Agreement.

5.8. Structure and governance organization

The enterprise's organizational structure is the basis of a successful and high-quality business. There are two main types of marina ownership i.e. marina management: private and public. Martinis Marchi Marina is owned by a private investor, which indicates that Marina's business model is market-oriented and has a higher interest in investing than a publicly owned marina. According to the Commercial Companies Act, which governs the establishment and operation of companies, Martinis Marchi is owned by a limited liability company for catering, tourism, and trade which has been successfully operating since 2001. At the moment, the company has two shareholders, out of which both of them also constitute the company's board, together with one supervisor - the procurator, i.e. an authorized legal representative of the company. The board's responsibility is to determine the company's mission, vision, to set up goals and adopt implementation strategies. The rights and obligations of the procurator are laid down by the Commercial Companies Act – based on a power of attorney which is granted to them by the power donor, they are authorized to represent or act in the company's name regarding private affairs, business, and other legal matters. The company's board as well as the procurator, acting as marina operators, will be responsible of planning and incorporating the sustainable design principles and technologies in developing projects and innovative energy efficient services.

The Marina's organisational model is carried out by dividing and grouping tasks in the appropriate organizational units. At the moment, the Company has 29 employees in total, while 14 of them represent the Marina's staff. The Marina's internal organization has been divided into four departments:

- Marina captain
- Sailors
- Reception
- Maintenance

The most responsible person for handling the Marina is the marina captain, who is in charge of communication and safety in the Marina. The Marina captain manages the Marina's maritime and logistics operations, is the operational manager of the port, deploys vessels at the berths, and controls the port security. The captain's role is especially crucial in emergencies and during poor weather conditions. Sailors are persons who carry out the Captain's orders and answer to him directly. The sailors' most important tasks include taking care of the berth safety, mooring, and departure of vessels on a daily basis. The Marina's sailors also assist in mooring, regularly visit the Marina according to the internal protocols and the captain's orders and control the berth safety and correctness. The Reception is the central point in the Marina, through which all the information relevant to the vessels' stay in the marina passes - i.e. when the vessel enters the Marina, the first obligation of the vessel's owner is to notify their arrival at the reception desk and submit the needed documentation. Based on the records at the front desk, the Marina's captain performs operational planning in the Marina under which the berths are included, but also other services related to the vessel's navigation and stay. The aforementioned allows the Captain to be informed about the berths' capacity at any given moment.

5.9. Communication & Networking

Via the new equipment acquired through the DEEP-SEA project, Marina Martinis Marchi will increase the passenger transport quality, while simultaneously reducing CO2 emissions, lowering noise pollutions, and cutting energy consumption. The aforementioned will be accomplished by setting up charging stations connected to a microgrid-based photovoltaic station for e-boats and e-cars as well as a charging system for six electric bicycles. After implementing the new, sustainable services, the Marina will invest heavily in the promotion of new content as well as in the promotion of the entire Marina as an environmentally sustainable "green port". The key elements in the concept of green port management include a long-term vision towards an acceptable footprint on the environment and nature, transparent stakeholder participation, and stakeholder approved strategies, shift from

sustainability as a legal obligation to sustainability as an economic driver, active sharing of knowledge with other ports and stakeholders and, continuous striving towards innovation in process and technology.

To achieve the change in behaviour of all stakeholders in the port business, the Marina will use promotional and communication activities as well as networking, encouraging e.g. the shift towards sustainable mobility (e-cars, e-bikes, and e-boats) and sustainable nautical tourism as well as emphasising the importance of sustainable energy. This includes taking action aimed at improving the visibility of the green project, i.e. the Marina, in order to promote itself as green, which will direct its marketing and communication activities towards environmental sustainability. The Marina will encourage the participation of local stakeholders and will promote sustainable recreation and tourism. Information related to the local eco-system and environmental phenomena will also be available to the Marina users.

At the moment Marina collaborates with various public and private stakeholders as well as institutions such as the Croatian Employer's Association and Croatian Chamber of Commerce. With this project implementation, the Marina will have an opportunity to further cooperate and network with other marinas in the nearby area that have introduced sustainable mobility services. The aforementioned provides an ideal opportunity for the exchange of knowledge, ideas, research of different systems/services and testing of results that will strengthen the institutional knowledge base. Using networking activities, the Marina will not only be able to attract more target groups but also further develop environmentally sustainable services, which will bring them great credibility with all consumers who value businesses which are environmentally sustainable. The ICT web-based application and DEEP-SEA CARD developed through the DEEP-SEA Project will also provide easier access to the Adriatic nautical marinas service network to the existing and future users and will thus serve as a promotional tool. The ICT application will also inform the users about new services during both high and low season and will help establish a community with local tourist operators.

The aforementioned marketing, communication and networking activities and tools are also expected to help Marina cope with seasonality and extend the demand for its services throughout the year, with special emphasis on winter months. Marina users will benefit from the higher quality of service as well as the new services offered by the operators, and since the purpose of their visit is pleasure, leisure, and comfort, the green port approach is completely in line with their expectations.

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5. PILOT Province of Foggia - Marina del Gargano; Marina di Rodi Garganico; Marina di Vieste; Marina di Mattinata – ADRIATIC ITALIAN COAST

Document: Public/<u>Confidential</u>			
Responsible partner: Province of Foggia **Involved partners: All**			
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Executive Summary

The province of Foggia implemented pilot installations to improve the impact of coastal transport service on the environment in terms of sustainability and multimodality, above all to reduce CO2 emissions in line with the goal of public policy of the main important territorial stakeholder (Gargano National Park, Apulia Region).
The aim of the Deepsea project for the province of Foggia is to protect the delicate and fragile natural environment of the Gargano area from the impact of the transport services and from the activities related to the seaports, in order to also improve the efficiency of seaports from the sustainable point of view.
A further objective of the implementation of the investment plan in sustainable mobility infrastructures is to improve the transport services to and from the seaports of the Gargano, aiming for green mobility that may reduce pollutant emissions into the atmosphere and sea.
Seas nowadays show high levels of pollution, caused by swimming activity but also due to the huge land traffic to access the marine areas. The aim is to create a sustainable mobility network in the Gargano area that may represent the beginning of a new and massive investment policy designed to obtain energy independence and reduce the human load on the environment.

1. Introduction

The Activity 3.4. Investment, part of Work Package 3 “Nautical ports framework analysis and investment plans” of the DEEP-SEA project aims at helping and supporting the province of Foggia marinas in the development of maritime transport, with the main objective of achieving sustainable tourism and developing energy efficiency measures.
Public ports and private marinas along the Adriatic coast represent one of the most important centers and nodes for the mobility flows and network, as well as areas characterized by elevated C02 emissions, noise pollution, traffic congestion, and infrastructure developments.

In the territories of the Province of Foggia, three sites have been identified for the development of an investment plan that will cover the entire territory in which these sites are localized and that will be characterized by the installation of new infrastructures and e-mobility services:

- Marina del Gargano, Manfredonia;
- Marina di Rodi Garganico, Rodi Grganico;
- Marina di Vieste, Vieste;
- Marina di Mattinata, Mattinata.

The document will represent an overview of the current marinas and ports' internal environment, including a general description of the marina, the institution, and the interaction between stakeholders. An analysis of the current mobility services, traffic volumes, and energy consumption baseline will follow, supported by the indication of targets to achieve and their indicators. The document will move towards the description of the assets used to support the investment plan and the classification of investment priorities, the evaluation of investment options based on cost benefits and multi-criteria analysis, the description of investment funding available and potential investors, and the possible risks. Finally, a description of the structure and governance organization and networking will be provided.

2. Methodology

This document will capitalize on the results from the analysis carried out in DEEPSEA WP3, i.e.: 3.1 Analysis of best solutions integrating energy efficiency in sustainable coastal and nautical mobility, 3.2 Analysis of marinas management and investments model, 3.3 AS-IS analysis on current mobility services and related energy consumption. Based on these, specific investment plans are here elaborated for each project pilot site thanks also to specific meetings and working tables with marinas' managers and stakeholders and site surveys carried out during the project. The investment plans are finally fine-tuned thanks to pilot implementation and potentially transferred to marinas and relevant stakeholders outside the DEEP-SEA partnership and pilot areas for potential replication and uptake.

3. Description of DEEP-SEA pilot sites and State of art

3.1 Description of the Institution, the site, the interaction with the other stakeholders

Turistic ports along the Adriatic coastline are strongly characterized by a great number of transport streams of various types, both in the coastal areas and in the countryside. Four sites in the province of Foggia were identified and chosen to place new installations. Those places were chosen after several site inspections and meetings with the managers of the marinas. The four chosen sites are:

- Marina del Gargano, Manfredonia;
- Marina di Rodi Garganico, Rodi Grganico;
- Marina di Vieste, Vieste;
- Marina di Mattinata, Mattinata.

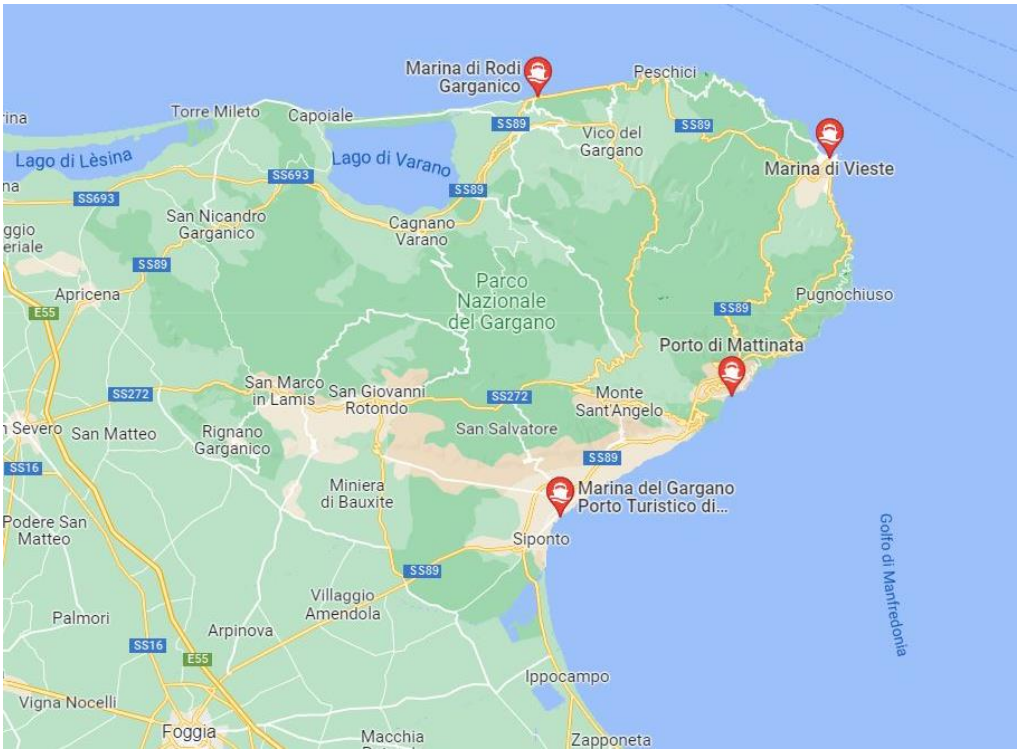

Figure 1: pilot marinas territorial localization

Marina del Gargano, Manfredonia

Marina del Gargano is in the municipality of Manfredonia, a city with a population of 54112 inhabitants located on the south of the Gargano National Park, in the homonymous bay. The city is on the shoreline between the cities of Peschici and Vieste, and it is 36 kilometers far from the A14 highway (Foggia tollbooth), and 51 kilometers from the airport of Foggia, "Gino Lisa".

This site is known as a "touristic port" as it represents the access point to the touristic sites where cruise passengers land to visit both the coastline and the hinterland. From a logistic point of view, in fact, it is an ideal starting point for discovering the Gargano area (Peschici, Vieste, Mattinata, Tremiti islands, Monte Sant'Angelo, San Giovanni Rotondo), but also other locations such as the Puglia region and the Adriatic sea, and even Croatia, Montenegro and Greece. The marina has a surface area of 270000 m2 with 700 boat moorings, the seabed is 6.5 meters deep which enables the safe mooring and transit of boats and super yachts (up to 50 meters long) in all the seasons of the year. The tourist port offers plenty of services, among others: 24h security assistance, free Wi-fi, toilets and showers, car parking, gas stations, scuba diving services, laundry, boat repair service, sailing schools, a swimming pool, a beauty center, a commercial and shopping area, bars, and restaurants.

Marina di Rodi Garganico, Rodi Garganico

The marina of Rodi Garganico was born on July 2009 in the area next to the ruins of the ancient roman port of the homonymous city of Rodi Garganico, a small town of 3334 inhabitants. The port is located on the Adriatic coastline and, at the moment, it is the nearest port to the Tremiti islands, moreover, it is in a strategic position to visit the Croatian coasts: Lastovo, for example, is 60 miles away, while Korcula is 78 miles away. In addition, a few kilometers away from the touristic port of Rodi Garganico is the Foresta Umbra, a protected natural area with unique flora and fauna. The marina offers various services as 300 boat moorings for boats up to 45 meters long, a shipyard, a mooring service, 24-hour sea assistance, an info point, a hiking service, boat renting, restaurants and bars, a fitness area, free Wi-fi, showers, laundry rooms, car parking, video surveillance, boat transfer and cleaning services.

Marina di Vieste, Vieste

The marina of Vieste is located on the most extreme strip of land of the Gargano, at the foot of the historical center of Vieste, a city of 13.946 inhabitants. The marina is located in a strategic position: from Vieste, in fact, it is possible to easily and rapidly reach the Tremiti islands, as well as the Croatian, Greek, Albanian, and Montenegran coasts. The port is also an important starting point to visit and discover the Gargano land. The marina can accommodate more than 200 boats up to 60 meters long, providing a safe and comfortable landing point.

In the marina area, there are also several touristic complementary services, such as restaurants and bars, a fitness area, free Wi-fi, congress and meeting rooms, toilets and showers, car parking, markets, and surveillance services. Hereafter are reported the distances (by sea and by land) from the most important touristic destinations.

<u>Distances by sea:</u>
Lastovo (Croatia) | 60 miles
Hvar (Croatia) | 86 miles
Dubrovnik (Croatia) | 96 miles
Porto Montenegro (Montenegro) | 110 miles
Corfù (Grecia) | 230 miles
Durazzo (Albania) | 276 miles
Valona (Albania) | 316 miles
Tremiti islands | 30 miles

<u>Distances by land:</u>
Manfredonia | 50 kilometers
Foggia – train station | 126 kilometers
Foggia airport | 105 kilometers
Termoli | 120 kilometers
Bari | 190 kilometers
Bari airport | 190 kilometers

Marina di Mattinata, Mattinata.

The marine of Mazzone Centro is located in Mattinata, a city of 5.971 inhabitants on the south coast of the Gargano. Mattinata is in front of Manfredonia bay, in the middle of the coast road between Vieste and Manfredonia. The marina offers 60 boat moorings for boats up to 10.5 meters long. Several touristic services are also available in the marina: relax and fitness area, solarium, toilets and showers, changing rooms, water and snack dispensers, electric charging points, info points, free

Wi-fi, and video surveillance. In the range of 100 meters from the port, it is possible to find hotels, restaurants, bars, and transfer services to and from the city center.

Figura 1 marina del Gargano, Manfredonia

Figura 2 marina di Rodi Garganico, Rodi Garganico

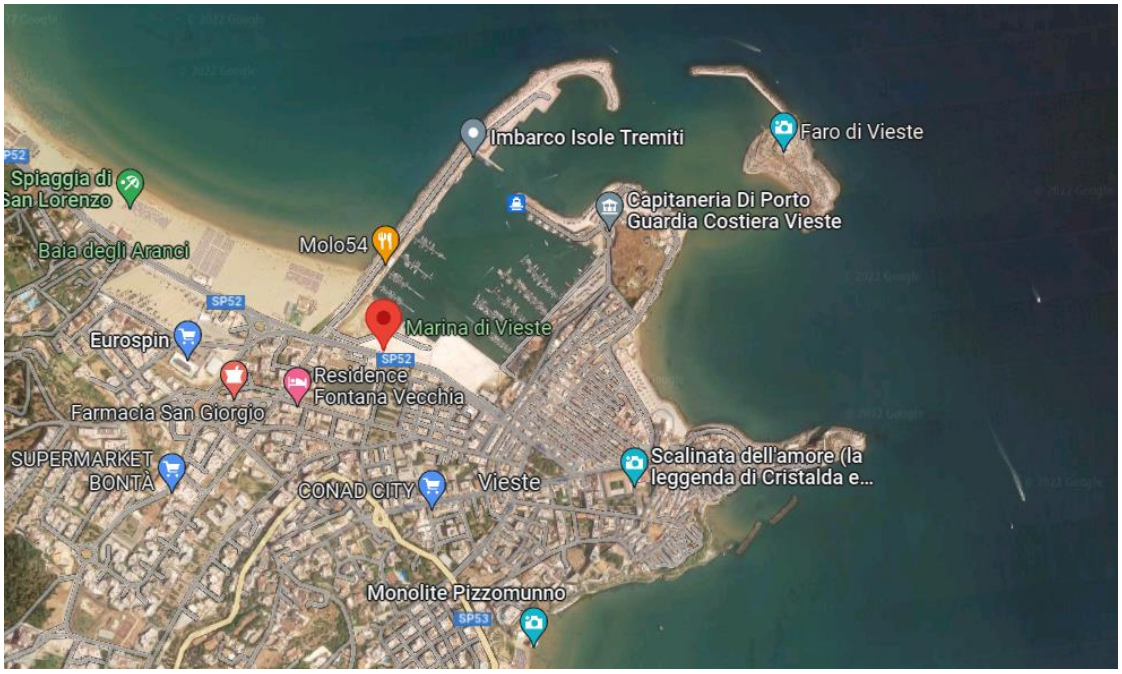

Figura 3 Marina di Vieste, Vieste

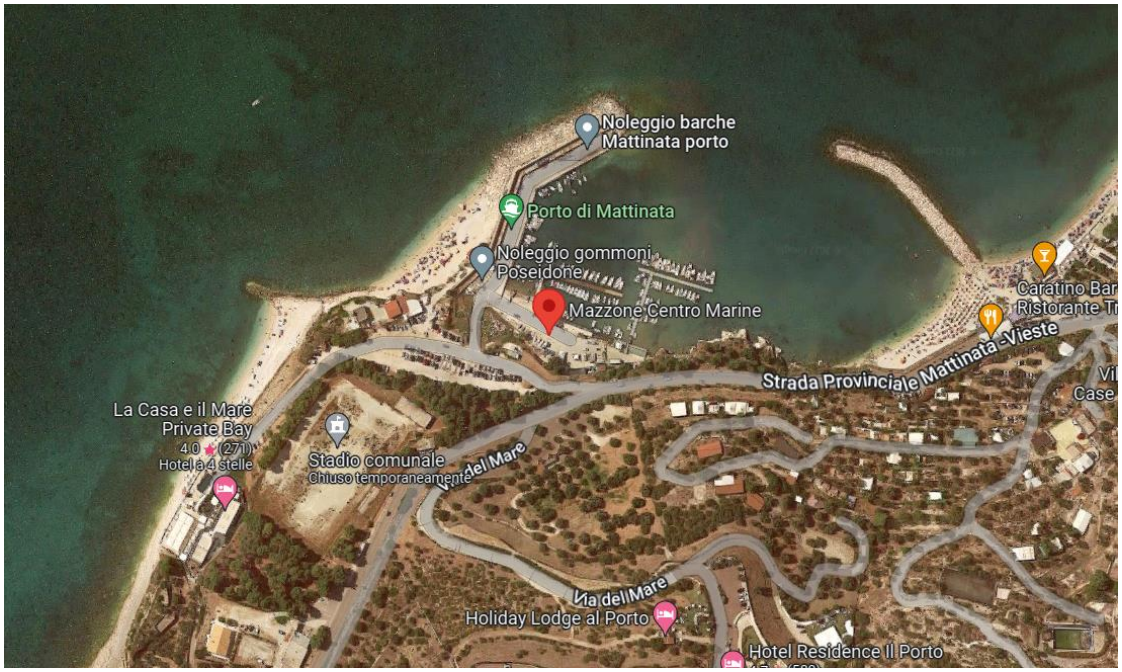

Figura 4 Marina di Mattinata, Mattinata

3.2 Current management models

The table below summarizes the main selected:

	Marina del Gargano	Marina di Rodi Garganico	Marina di Vieste	Marina di Mattinata
Typology of marina	Departing Hub (where users use to start their journey without stopping there) and a Touristic Marina (access point to tourist sites where cruisers arrive for visiting).	Departing Hub (where users use to start their journey without stopping there)	Touristic Marina (access point to tourist sites where cruisers arrive for visiting).	Transit Marina (mainly used for fuel supply or documents provision without staying or visiting).
Public – private marina	**private**	**private**	**public**	**public**
Number of employees	**8**	**7**		
Contact subject	**Gespo SRL**	**Meridiana Orientale SRL**	**Municipality of Vieste**	**Municipality of Mattinata**
Main activities performed	The marina offers 700 moorings for boats with a maximum length of 50 meters.	The marina offers 300 moorings for boats with a maximum length of 45 meters.	The marina offers 200 moorings for boats with a maximum length of 60 meters.	The marina offers 60 moorings for boats with a maximum length of 10,5 meters.

Table 26 features of the marinas

3.3 Analysis of current mobility services

The table below summarizes the mobility services currently present in the three marinas selected and in the surrounding territories:

	Marina del Gargano	Marina di Rodi Garganico	Marina di Vieste	Marina di Mattinata
Bike sharing	NO	NO	NO	NO
Car sharing	NO	NO	NO	NO
ECS for e-cars	YES	YES	NO	NO
ECS for e-boats	NO	NO	NO	NO
Other mobility services (bus, train, etc)	Train station (1,5 Km) Bus station ECS for e-cars (on-site)	Local train station (1 Km) Bus station ECS for e-cars (on-site)	Bus station (1 km) ECS for e-cars (1 km)	Bus station (4 km)
Mobility services present	Boat renting	Transfer services Boat and car renting Excursion to Tremiti island	Transfer services Boat and car renting Excursion to Tremiti island	Transfer services Car renting Bike sharing

outside the marina				

Table 27current mobility services in the marinas

3.4 Traffic volumes and energy consumption baseline

Marina di Manfredonia, Manfredonia

All the 700 moorings are equipped with electric supply, with a rated power of 3 / 6 / 10 / 20 kW (each one). Around 450 boats per year use the marina, and passengers come mainly from Italy (90%) and EU (10%), 80% of these passengers come from an average distance of less than 300 km, reaching the marina mainly by private car (95%) or boat (5%).

Marina di Rodi Garganico, Rodi Garganico

All the 300 moorings are equipped with electric supply, with a rated power of 16-32 kW (each one). Around 500 boats per year use the marina, and passengers come mainly from Italy (90%) and EU (10%), 75% of these passengers come from an average distance of less than 300 km, reaching the marina mainly by private car (90%) or boat (10%).

Marina di Vieste

All the moorings are equipped with electric supply, with a rated power of 16-32 kW (each one). Around 400 boats per year use the marina, and passengers come mainly from Italy (70%) and EU (30%), reaching the marina mainly by private car (70%) or boat (30%).

Marina di Mattinata, Mattinata

All the moorings are available with electric supply, with a rated power of 16-32 kW (each one). Around 220 boats per year use the marina, and passengers come mainly from Italy (90%) and EU (10%), reaching the marina mainly by private car.

4. Strategy of new development

4.1 Strategic vision on tourism, accessibility and mobility

Description of the marina's vision on these issues considering:

- *Global level: general contest where the specific marina is operating/acting:*
- *specific context of the site/area/marina*

Following the Strategic Plan for tourism 2017-2022, the entire Deep-Sea project intends to promote sustainable forms of coastal and marine tourism, so that they would be in line with the objectives of protection and promotion of the natural heritage, but also of the cultural and landscape ones, all elements that contribute to the touristic attractiveness of the Italian coastal areas. This approach is to be applied to the entire Adriatic marine area and in particular to the Gargano, considering the natural heritage of the Gargano National Park and the impact of the tourist sector on the region's economy. In accordance with the described approach, for the long-term sustainability of the touristic fruition of these sites, it must be considered the protection of the environment, as well as the culture and landscape of the coastal areas, together with the improvement or the maintenance of the quality of bathing waters, the prevention from floodings, the contrast to the coastal erosion and the maintenance or recovery of beaches and their natural habitat. These objectives are in synergy with those aimed at promoting quality coastal and marine tourism, including the improvement of the various services available for the different segments of tourism activity, the diversification and deseasonalization of the tourism offer (also including options for experience-based tourism), the integration of marine fruition with that of the hinterland, the integration of synergic actions with other maritime activities typical of the Adriatic coastal strip (such as fishing and aquaculture), the development of activities aimed at improving environmental protection and cultural heritage (e.g. ecotourism).

Under a general and territorial vision, the main objective is to develop energy efficiency measures to reduce energy consumption, create a network of low-carbon marinas and invest in infrastructures and e-mobility services. In the Gargano territory, the startup of an e-car sharing service, the installation of 4 e-charging stations (22kWh) for e-vehicles and 2 for e-

boats with interoperable systems, the installation of 2 racks with electric and muscular bicycles for sharing.

4.2 Targets, indicators and objectives of investment

- *indication of targets the marina wants to achieve and their indicators (mobility sustainability, energy efficiency, etc.);*
- *indication in case of new services offered; if available with pricing*
- *identification of investment objectives in the sector of energy-efficient Mobility; (synthesis of 3.3.1 and from SWOT of 3.1);*

The Marinas involved in the pilot sites will be characterized by new infrastructures and new e-mobility services, in particular:

- Startup of an e-car sharing service for the coastal area of Gargano (provinces of Foggia), connected with the main transport infrastructure nodes (airport, railway station, bus station).
- Installation of 4 e-charging stations (22kWh) for e-vehicles and 2 for e-boats with an interoperable system;
- Installation of 2 racks with electric and muscular bicycles for sharing;

Users will be offered the following services:

- charging stations for electric ships and vehicles;
- rental of electric bicycles and scooters.

According to the installations described above, three main objectives could be identified, which are described in the following chart:

- Increase marina's energy efficiency: increase the knowledge about the benefits of using electric boats and vehicles; use of ICT solutions in electric mobility to improve the quality of life of residents and reduce the cost of living;
- Increase marina's mobility: promotion of more comfortable, quieter and cheaper driving of electric boats and vehicles; development of better maritime and coastal transport network and infrastructure;

- Increase marina's sustainability: reduction of emission of gases and CO2 in the atmosphere; encouragement to the use of renewable energy sources and investment in this sector;

Investment objective	**Increase the marina's energy efficiency**
Indicators	- Increase of energy consumption from renewable sources and energy productivity of the marina; - Reduction of CO2 emissions per year; - Installation of an emission monitoring system.
Investment objective	**Increase the marina's mobility**
Indicators	- 1 e-car sharing service; - 4 e-charging stations (22kWh) for e-vehicles and 2 e-boats with interoperable system; - 2 racks with electric and muscular bicycles for sharing; - Increased number of customers using e-mobility services. - Increase the infrastructural networks of existing mobility flows (cycle paths) and proposed ones.
Investment objective	**Increase the marina's sustainability**
Indicators	- Increase of energy produced using photovoltaic system; - Increase of e-charging station occupancy; - Increase of photovoltaic self-consumption energy.

Table 28 Investment objectives

The investment plan, supported by the guidelines for sustainable energy efficient solutions for electric mobility and maritime and coastal mobility management skills will ensure the provision of long-term innovative technologies, scenarios and models to be applied during the pilot implementation and in the long-term, to guarantee to the main stakeholders in the maritime sector to continue to use them for the development of electric mobility of maritime and coastal transport.

5. Investment Plans

5.1 Investment details: list and description of marinas investments

Deep Sea pilot equipment has contributed to expanding e-mobility services already available in the city centers and by the marinas.

The first phase of actions carried out is related to the study of the specific needs of the private and public bodies that manage the most important marinas, supporting their lack of energy and transport models.

The entire area where the equipment was located is within the seaports, and with the installation of e-bike stations, it was possible to connect this area to the city centers.

Public procurements were conducted using the national public procurement marketplace (MEPA) and all the procedures were carried out without any particular problem.

E-charging stations for e-cars and e-boats

The choice of the location of electric charging columns for hybrid use (both for electric cars and electric boats), was structured around a strategic assessment that took into account two main elements:

- the presence of relevant infrastructure nodes in the marinas, in terms of dimensions and touristic interest of the marinas;
- the identification and selection of potential private and public stakeholders, interested in the installation and management of the electric columns.

Installation of 6 e-charging stations for e-vehicles and/or e-boats in the marinas of Manfredonia, Mattinata, Vieste, and Rodi Garganico;

Figura 5 E-charging station, mattinata

Figura 6 E-charging station, rodi garganico

Figura 7 e-charging station Manfredonia

Figura 8 e-charging station, manfredonia

Figura 9 e-charging station, manfredonia

Figura 10 e-charging station, vieste

Bike sharing and racks for bicycles

Also for bike sharing, the ports with greater relevance and affluence of tourists from outside the province of Foggia were chosen for the installation. A further evaluation element was the availability to collaborate for the release and withdrawal of the bikes and to ensure their maintenance. The bicycle racks were installed in the ports of Manfredonia and Rodi Garganico.

This installation is particularly important because it is connected to the Adriatic cycle route, a national touristic itinerary of 1300 kilometers long, that passes across seven Italian regions connecting Trieste (Friuli Venezia Giulia) with Santa Maria di Leuca (Puglia) passing from the Gargano. The part of the itinerary that goes through the Puglia region is 500 km long and it is one of the most spectacular and exciting tracts of the tour because it is surrounded by outstanding landscapes, amazing nature trails and breathtaking spots.

Figura 11 bike-station, manfredonia

Figura 12 bike station rodi

E-car sharing

E-car sharing system has not completed due to problems of territorial and administrative competence of Province of Foggia and due to lack of availability of e-car in short-middle term renting solution for public bodies.

5.2 Description of assets used to support investment plan

The investments determined by the project, together with the locations and expected procurement amounts are as follows:

Investment	Location	Amount (€) without VAT
4 ECS	Manfredonia, Mattinata, Vieste Rodi Garganico	
2 ecs boats	Manfredonia, Rodi Garganico	
2 bike racks	Manfredonia, Rodi Garganico	
1 car sharing system	Foggia	
	VAT (22%)	
	Total	

Table 29 investment, location and expenditures

5.3 Classification of investments priorities

Investments will be realized by means of a public procurement procedure, which is in progress and the planned completion of all the works is due by October 2022. The analysis of the current mobility services in the marinas and the surrounding territories points out the focus and the need to invest in energy resources, environment protection, and sustainable mobility. Sustainable mobility solutions must be designed to contribute positively to the communities they serve while respecting their environmental, social, and economic objectives. For this reason, obtaining e-bikes, e-boats, and e-vehicles is seen as a priority by the three marinas involved.

5.4 Investment funding available and investor potential

The investment aims to achieve Specific objective 4.1. of Priority Axis (Maritime transport) within the DEEP-SEA project for the improvement of quality, safety, and environmental sustainability of marine and coastal transport services and nodes by promoting multimodality in the Programme area. Initial investments will be financed by the Interreg VA Italy Croatia 2014-2020 program.

Due to the opportunity created by the DEEP-SEA project, which brings together new nautical and shipbuilding entrepreneurs, marina and port managers, hotel managers, and other businessmen, further investments could be expected to be financed by the stakeholders themselves or by opportunities for further investment from additional projects and through the space that political and institutional authorities can create.

5.5 ROI

Return on investment (ROI) is a performance measure used to evaluate the efficiency or profitability of an investment or compare the efficiency of several different investments. ROI tries to directly measure the amount of return on a particular investment, relative to the investment's cost. To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment.

5.6 Communication & Networking

In all the marinas involved in the project, and together with the collaboration of the relative municipalities, all the services of the Deep-Sea project were promoted through the website, app, newsletter, and social media. Moreover, a very deep connection was established among all the professionals of the ports.

In parallel to the installations and the technical aspects related to infrastructures and e-mobility services, what is necessary is the development of the project outputs and the diffusion of the benefits and opportunities that these investments offer.

To achieve the change in behavior of all stakeholders in the port business, the Marinas will use promotional and communication activities as well as networking, encouraging e.g. the shift towards sustainable mobility (e-cars, e-bikes, and e-boats) and sustainable nautical tourism as well as emphasizing the importance of sustainable energy. The Marinas will encourage the participation of local stakeholders and will promote sustainable recreation and tourism.

Below follows a summary of the Communication and Networking tools that the DEEP-SEA project will use to disseminate project knowledge and outputs/results:

Work Package	Activity	Description
Work Package 2 Communication	Activity 2.1 Start-up activities	Communication Strategy Project website Kick-off meeting Adriatic Marina business and policy stakeholder list
	Activity 2.2 Media Relations	Kick-off Press Releases Mid Press Releases Final Press Releases Press Conference
	Activity 2.3 publications	3 publications in EU paper magazines Project newsletters
	Activity 2.4 public events	Mid-term conference Final Conference High-Level Conference

		Partner Meeting and Steering Group
	Activity 2.5 targeted events	Local meetings organized by PPs involving observers and non PP stakeholders
	Activity 2.6 Digital activities including social media and multimedia	Twitter and Facebook account to regularly update on project events, activities, results and other relevant info for the general public. Social Media will promote links to project websites in order to deliver more detailed information. A LinkedIn account will be also created to reach more specialized PA and other stakeholders and to promote debate on energy-efficient mobility for passengers. Furthermore, PPs will deliver a "short movie", uploaded and diffused on YouTube.
	Activity 2.7 Promotional materials	Cross bordering flyer folders/brochures Cross border poster Cross border Roll up USB
WP5 Guidelines for the energy efficient mobility in the Adriatic marinas and its transferability	Activity 5.1 Guidelines for Elaboration of intervention and investment plans related to mobility services	The Guidelines will represent a standard model for all MOs and PAs responsible for accessibility to sustainable inland, coastal and maritime mobility services for passengers and tourists.
	Activity 5.2 DEEP-SEA ICT Application and Services CARD	The App will present a map of the ESC and sharing services; it will enable users to book e-mooring, ESC parking places or e-sharing vehicles. The App will also monitor end-users behaviors and utilization (with aggregated info for privacy reasons) and will provide data for investments, improvements, and assistance to users. The App will also inform (push approach) the user about new services during high and low touristic seasons and will establish a community with local tourist operators.
	Activity 5.3 Adriatic marina mobility Memorandum of Understanding	The MoU will support the strategic implementation of the DEEP-SEA findings in regional and local policies related to passengers and touristic mobility. The MoU will be signed by the PAs involved in the project and other PAs not directly included in the project partnership
	Activity 5.4 Cross-border Network and transferability	The network, coordinated by ARIES with the contribution of all PPs, will represent a community of PAs, MOs, and other Decision Makers, investors, infrastructure and public service providers, SMEs, sectoral agencies, and end-users.

Table 30 list of Communication and Networking activities

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