Final pilot action report

Central Adriatic Ports Authority

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Pilot action no. 1: Technical and economic feasibility studies for innovative technologies application for the supply of electric power to the ferries while at port.

1. Ex-ante situation

Central Adriatic Ports Authority develops its territorial competences on 7 ports of Marche and Abruzzo region: Ancona-Falconara, Pesaro, San Benedetto del Tronto, Pescara, Ortona and Vasto.
The main port is Ancona, located at the center of the Italian Adriatic coast and core port of the Scan-Med and Baltic-Adriatic corridor of TEN-T network. The port of Ancona is a multipurpose hub with a transit of nearly 1 MIL of passengers (ferry and cruise) and 10,5 tons of freight moved in 2022, playing strategic role as main gateway connecting South-east Mediterranean countries with the Northern and Central Europe countries.

The improvement of the environmental and energy performance of the port activities is one of the main strategical challenges of Central Adriatic Ports Authority, in line with the objectives of the Green Deal policy to decarbonize transport and reduce emissions by 90% by 2050 through the promotion of alternative fuels technologies and processes and on shore power supply implementation. Parallelly, at national level, the Italian Government launched a series of intervention in the framework of the Piano Nazionale per gli Investimenti Complementari (National Plan for Complementary Investments) to contribute to the decarbonization of maritime transport and the reduction of GHG emissions.

The Central Adriatic Ports Authority is pursuing the environmental and energy performances through the recently adopted Port energy and environmental management plan (DEASP – Documento di pianificazione energetica e ambientale) that contains various measures to reduce the environmental impact of port activities in the 7 ports of the system.

The aim of Central Adriatic Ports Authority is to explore a wide range of environmentally sustainable solutions for the greening of maritime transport, with the final scope of improving the quality of air and the wellbeing of local citizens, as well as ensuring the economic competitiveness of the whole actors of the transport and logistics chain.

2. Pilot action description

In the framework of SUSPORT project, ADSPMAC realized technical and economic studies to support the long-term investments for the application of innovative technologies, ranging from OPS to alternative fuels, to the maritime transport and the port activities in the ports under the competences of Central Adriatic Ports Authority.

The studies are:

1- studies on on-shore power supply;
2- methodological documents for the operative management of onshore power supply systems in the ports of Central Adriatic Ports Authority
3- technical and economic analysis for the implementation of alternative fuels distribution in the ports of Central Adriatic Ports Authority

2.1 – Studies on on-shore power supply

The report summarizes the preliminary and propaedeutic studies implemented by Central Adriatic Ports Authority staff for the upgrading of the electric grids of the ports of Ancona, Pesaro, San Benedetto del Tronto, Pescara and Ortona. The efficiency of the electrical network is necessary for a greater optimization in the distribution of energy and represents the mitigation action with regard to the main source of pollutant emissions in all the involved ports.
The intervention is consistent with the objectives of energy and environmental sustainability for the port system provided by the current planning tools and with the objectives of the DEASP in terms of reducing energy demand and climate-changing gas emissions (GHG - CO2, CH4, N2O).
Moreover, the report includes the main conclusions of a feasibility study on the cold ironing technology in the port of Ancona carried out by a thesis of the Polytechnic University of Marche-UNIVPM.
The intervention studied allows the auxiliary engines to be turned off when the ship is in port and therefore represents an important opportunity to reduce atmospheric pollutants and the production of greenhouse gases, clearly if the electricity is produced from renewable sources.

2.2 - methodological documents for the operative management of onshore power supply systems in the ports of Central Adriatic Ports Authority

Central Adriatic Ports Authority developed an economic and financial analysis connected to the concession of the operational management of the onshore power supply plants (cold ironing) in the port of Ancona. The strategic objective of the analysis is to evaluate critical issues and the economic parameters of reference to use as a basis for the future public tender procedure for the assignment in concession of the management service of the cold ironing plants of the port with main focus on ferries. The analysis focusses on the main drivers and on the regulatory context and governance in the cold ironing sector and on the definition of input data to subsequent phase of economic-financial modelling.

- **Technical-economic driver analysis**

• Current and prospective regulatory and policy framework: analyses of the main policies and regulations applicable to the cold ironing sector and the expected evolution determine constraints and opportunities for the ADSPMAC.

• Technical-economic elements: definition of the technical-economic input drivers to the economic-financial sustainability analysis, with reference to connection points, plant power, plant operating and maintenance costs, expected consumption based on the types of vessels, the time spent on the quay and the number of calls, electricity cost/sales price, traditional power cost to define the opportunity costs for shipping companies in the absence of regulatory constraints on the use of the cold ironing service (in the hypothesis of ships equipped or not with scrubbers).

- **Economic-financial modelling**

The phase focuses on preparing a business case evaluating the conditions for the economic-financial sustainability of the concession assignment of the cold ironing plant.
The business case includes perspectives of three subjects:
• ADSPMAC, in relation to investment costs and the rental fee concession;
• Concessionaire, in relation to operating costs and revenues;
• Users, in relation to demand and convenience threshold prices for use of the service.
The main indices used to evaluate the profitability and sustainability of the initiative will be:
• EBITDA Margin (%);
• Project Internal Rate of Return (project IRR).

2.3 - technical and economic analysis for the implementation of alternative fuels distribution in the ports of Central Adriatic Ports Authority

The technical analysis focusses on the application of alternative fuels for naval use. This analysis is also extended to intermodal transport with particular reference to heavy vehicles which represent an important element of interaction with the Port infrastructures.
With this aim, the following insights are analyzed:
- descriptive analysis of the physico-chemical characteristics of alternative fuels with impact on the energy density of storage, hazards in terms of toxicity and/or flammability;
- analysis of the national and EU regulatory context with particular reference to the Fit for 55' package initiative and the FuelEU Maritime proposal;
- analysis and description of best practices at local, national and EU level;
- analysis of the infrastructures for the production, distribution and storage of alternative fuels available on the national territory which could predict the future development of an infrastructure capable of ensuring effective intermodal transport through the integration with the port infrastructures.
- analysis of the needs of the ports of Ancona, Ortona and Vasto with the aim to estimate the future need for alternative fuels.

Pilot action no. 2: Upgrading of the public lightening at the commercial dock

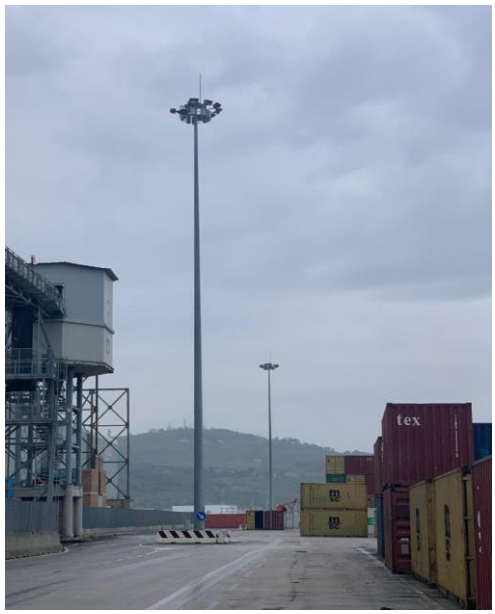
1. Ex-ante situation

One of the main measures implemented by ADSP concerns the upgrading of the public lightening system in public area of the Central Adriatic Ports. Under SUSPORT project, ADSPMAC improved the environmental performance of the existing lightening system of the commercial dock.

2. Pilot action description

In December 2020, Central Adriatic Ports Authority launched a public procurement procedure for the substitution of 4 lighthouse towers in the commercial dock of the port of Ancona with new towers with LED technology. The procedure concluded in May 2021 with the assignment of the works for 303.059,03€, including both works for the dismantling of the towers and the equipment for the substitution of the traditional projectors with new LED lamps. Only the part of the contract related to the new LED lamps substitution was covered by SUSPORT project.

The activity concluded in May 2022.
The project allowed the substitution of 35 SAP 1000W lamps, with 21 LED 629W lamps and 6 LED 1075 W, allowing an annual saving of 44.796 kW, corresponding to nearly 44%.



Pilot action no. 3: Plug-in hybrid vehicles

1. Ex-ante situation

Central Adriatic Ports Authority has a fleet of vehicles used by the staff to reach the 7 ports included in the Central Adriatic Ports System, from Pesaro to Vasto, with a distance of more than 230 Km from the ADSPMAC headquarter.
In line with the commitment of ADSPMAC to improve the environmental performance of port activities, the vehicles, endowed with internal combustion engines, must be gradually replaced with green vehicles.

2. Pilot action description

Central Adriatic Ports Authority focussed one of the SUSPORT pilot actions on the purchase of two plug-in hybrid vehicles.
In order to effectively and efficiently answer to the need of ADSPMAC related to the movements of staff between the 7 ports of the port authority system, located up to 230 km of distance from ADSPMAC for the port of Vasto, guaranteeing at the same time the environmental sustainability in terms of CO_2 emissions reduction and the safety for the involved staff during long trips, the following characteristics of the vehicles were deemed necessary:

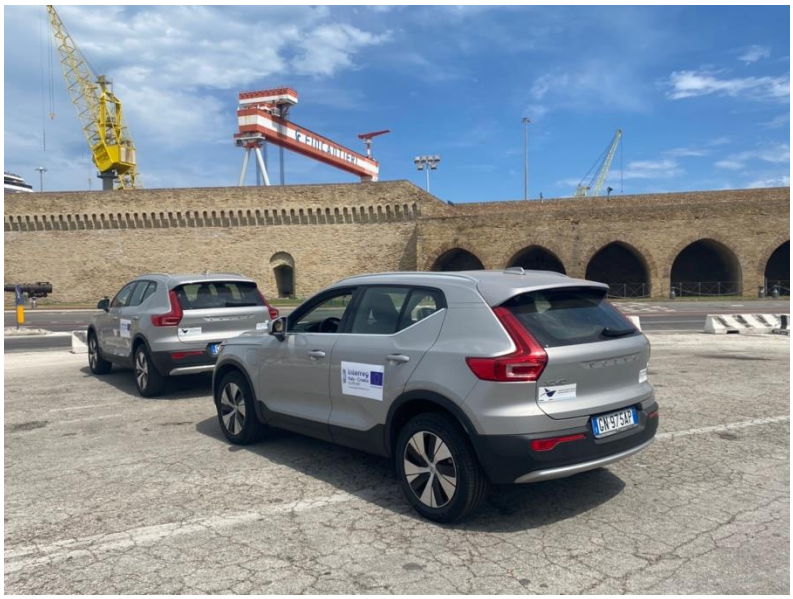
- Capacity for 5 people (driver and 4 passengers);
- Capacity of the luggage van of at least 400 litres, able to carry 5 cabin luggages, medical and/or technical equipment that might be needed for the implementation of specific tasks;
- At least 40 km of autonomy

The public procurement procedure implemented is market research through the invitation of 6 different market operators to present their best offers. The invitation was sent on 13/12/2022 and closed on 21/12/22. Two valid offers were received, and the more technical and financially favourable option was chosen.

The chosen vehicles are Volvo XC40 Recharge Essential T4 AUT, with technical specifications as follows:

Fuel: gasoline/electricity

Vehicle power: 211CV/155 KW
Maximum speed: 180 km/h
Gearbox: automatic
Transmission type: Rear wheel drive
Autonomy with electric engine: 46 km
Length: 444 cm
Width: 186 cm
Height: 164 cm
Trunk volume: 419/1295 l



They replace the 2 Fiat 500 L 900cv methane/gasoline vehicles leased by ADSPAC and that terminated their leasing period. The old vehicles produced around 105 gr of CO_2/km; considering an average of 10.000 km travelled annually, it can be estimated a production of more than 1.000 kg of CO_2 per year, each vehicles.

Considering the same amount of km travelled per year by each one of the new vehicles, and given the production of 54gr CO_2/Km, the annual reduction of CO_2 emissions can be estimated, for the two cars, the annual GHG reduction of 10 tons per year.

VEHICLES	Km PER YEAR	CO2 gr/Km	TOT ANNUAL EMISSIONS CO2 gr/Km
500 L	10.000	105	1.050.000
VOLVO XC40	10.000	54	540.000
SAVING CO2/YEAR in gr/km			510.000
SAVING CO2/YEAR in tons/km for 1 vehicle			5,1
SAVING CO2/YEAR in tons/km for 2 vehicles			10,2

4. Conclusions

As a result of three 3 pilot actions realized in the framework of SUSPORT project, the expected positive environmental impact is highlighted in the table below:

PILOT ACTION DESCRIPTION	**CO2 emissions reduction (TONS per year)**
1) estimation of CO2 emissions reduction further to the application of innovative technologies such as OPS and alternative fuels at the port of Ancona	3.759
2) upgrading of the public lightening at the commercial dock with **LED** technology	11,37
3) purchase of **two plug-in hybrid vehicles**	10,2
Total CO2 emission reductions (tons per year)	**3.780,57**

SUSPORT project sensibly contributed to promote the environmental sustainability of the port activities and of the maritime transport in the ports of Central Adriatic.