Pilot Action Assessment Methodology

Deliverable Number D.4.1.3.

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Contents

1. Introduction

This document is the third deliverable of Work Package 4 (WP4). It focuses on the implementation of thirteen concrete pilot actions. They are the main outputs of the WP and are related to ports' operations and in particular to freight transport in the Interreg Italy-Croatia Programme Area.
These pilot actions are powerful tools to enhance the ports' overall environmental performance of all activities related to port and land-interface maritime transport in the Programme Area and at cross-border level, improving their role as green gateways and corridor roots for the transport of goods.

It is not necessary to remember that SUSPORT's Project Partners (hereafter PPs) are ports competing on both shores of the Adriatic, they have similar traffic flows, the same challenges (impacts of port operations on air quality, greenhouse gases and noise).
So, these pilot activities give PPs the possibility to work together towards the same goal: improving the environmental performance of ports both in Italy and Croatia in a coordinated way.

According to the Application Form (hereafter AF), among the deliverables of the Activity 4.1 of WP4 there are two methodologies: deliverable D.4.1.1 and deliverable D.4.1.3.
The deliverable D.4.1.1 is a joint methodology for the implementation of the WP4 activities and pilot actions in particular.
On the other hand, the **deliverable D.4.1.3** is a "pilot action assessment methodology", or in other words "**a methodology for the assessment of pilot actions**" (AF, page 111).

The next sections describe the evaluation activities (§ 2), list the pilot actions (§ 3), present a minimum framework of the "pilot action final report" (§ 4), propose **examples** of indicators to measure impacts of pilot actions (§ 5) and contents of the final evaluation report (§ 6).

1.1 Scope of the document

This document provides each Project Partner with a methodology to assess impacts of its pilot action on environmental protection and energy efficiency in ports. Specifically, we fulfill the scope of this document in four steps:

- in order to measure **impacts of pilot action**, it is necessary to define adequate indicators and collect information and data;
- therefore, it is necessary to define minimum contents of the "final report of the pilot action";
- then, it is necessary to verify if each "final report of the pilot action" satisfies these minimum contents;
- eventually, it is necessary to integrate those final reports of the pilot actions with what is missing compared to the minimum contents.

2. The evaluation activities

According to the AF, as said above, the deliverable D.4.1.3 contains an evaluation methodology for assessing pilot actions. (in the AF, pages 110 and 111). The main objective of this assessment is the analysis and measurement of main **impacts of pilot actions**. PPs usually face same challenges related to impacts of port operations on air quality, greenhouse gases and noise. Pilot actions should impact on environmental performance of ports and energy efficiency of ports operations.

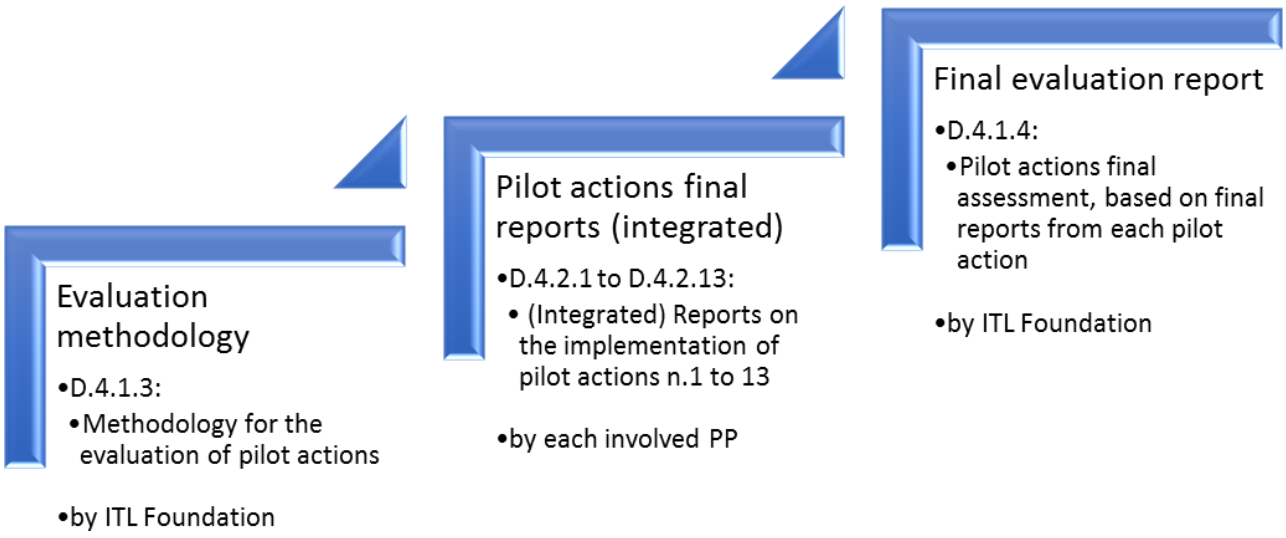
In order to identify these main impacts of pilot actions, ITL Foundation, in a subsequent section, proposes **a list of indicators** (or KPI) to evaluate the sustainability of the pilots that could be already analysed in the final reports of each pilot action (D.4.2.1 to D.4.2.13).

Meanwhile, in **activity 4.2** of WP4, **each Project Partner** (PP) responsible of a pilot action will draft a final report detailing its implemented pilot action. These final reports will be **integrated** by each PP **inserting specific data** and information **useful for the evaluation** of pilot actions, if they are not already inserted, following the guidelines provided on next pages. The "**minimum framework**" in **section 4** is **the template** of the "**final report of pilot action**" (D.4.2.1 to D.4.2.13).

Then, at the end of this WP4, **ITL Foundation** will carry out a **final assessment** of pilot actions at cross border level, and it will be based on **reports by participating Ports** and PPs responsible of pilot actions.

The figure below shows main steps that feed in the evaluation process of pilot actions.

Fig. 1 - Main steps of the pilot actions' evaluation process



The table below shows the deadline for each deliverable.

Tab. 1 - Assessment of pilot actions: deliverables and deadlines

Deliverable	Deadline
D.4.1.3 - Pilot actions evaluation methodology	M7 - 2021
D.4.2.1 - 13 – Pilot actions final reports (integrated)	M25 - 2022
D.4.1.4 – Final evaluation report	M26 - 2022

3. Objects of evaluation activity: the pilot actions

The main outputs of the WP4 are thirteen concrete pilot actions. Their main aim is to test technical solutions and experimental initiatives to identify innovative paths to solve existing problems and to drive participating ports towards a sustainable growth.

Participating ports implement concrete pilot actions to improve their environmental performance in the following six domains:

1) replacement of the existing lightning system with LED light bulbs;
2) installation of photovoltaic and solar thermal systems;
3) implementation of e-mobility measures;
4) improvement of the environmental performance of port buildings;
5) installations of sensors and stations to monitor noise, air and water quality;
6) pre-investment studies for on-shore power supply.

As core objectives of SUSPORT Project are strategies to improve ports' environmental performance and energy efficiency at cross-border level, pilot actions have to be developed with atransnational approach and they have not to be carried out with a stand-alone perspective.

By streamlining procedures and processes, logistic nodes of the Programme Area can achieve higher level of competitiveness and productivity, leading to increased total throughput and additional shares of modal shift from road to rail, with positive impacts on the region's environment in terms of pollution, greenhouse gas (GHG) emissions and noise.

As shown in the table below, all domains in the AF (and listed above) are covered by the implementation of one or more pilot actions.

Tab. 2 - Brief descriptions of Pilot actions by Project Partner

PPs	Project Partners	Pilot actions description
LP	Port Network Authority of the Eastern Adriatic Sea (AdSP MAO)	The pilot action of the Port of Trieste has four components: 1) replacement of the existing lighting system of the public areas, including the port of Monfalcone, composed of indicatively 979 lamps, with LEDs. The estimated energy saving amounts to almost 50%; 2) monitoring of the environmental effects resulting from the plan or programme implementation included in the Strategic Environmental Assessment (SEA); 3) pre-investment study for the application of on-shore power supply (OPS) in the Port of Trieste. This activity completes what has already been done in other EU-funded projects such as TalkNET (Interreg Central Europe) and METRO (Interreg Italy-Croatia) in other parts of the port; 4) purchase of an electric vehicle. This activity is complementary to what will be done in the CLEAN BERTH project (Interreg Italy-Slovenia), whereby the Port of Trieste will install a charging station for EVs.
PP1	Consorzio di Sviluppo Economico del Friuli (COSEF)	The pilot action of Porto Nogaro (COSEF) has three components: 1) replacement of existing 108 lamps with 200w LEDs. This activity is complementary to what will be done in the CLEAN BERTH project (Interreg Italy-Slovenia), whereby COSEF will replace the other port lamps; 2) improvement of the energy efficiency of the port's main building which hosts the Harbour Master's office, Customs, ONG "Stella Maris", etc. by: a. low-emission windows for a total of 185.33 sq.m., ensuring that the heat will not filter outside; b. insulation coat of the whole building surface, with the application of insulating sheets in expanded natural cork, thermal conductivity not exceeding 0,040 W/mk, for a total of 700 sq.m.; c. condensing boiler, combustion with reduced polluting emissions, in compliance with limit values according to the Swiss "Blue Angel" directives, tested in accordance with DIN 4702 and DIN-DVGW approved; d. solar thermal system for the production of how water and heating, surface of 4 sq.m. with accumulation of up to 200 liters; 3) pre-investment study assessing the use of geothermal power.
PP2	North Adriatic Sea Port Authority - Ports of Venice and Chioggia (AdSP MAS)	The pilot action of the Port of Venice hast two components: 1) replacement of existing lighting in the public areas with LEDs. More specifically, the Port of Venice will replace 84 light sources; 2) purchase of two electric vehicles.

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PPs	Project Partners	Pilot actions description
PP5	Port of Ravenna Authority (AdSP MACS)	The pilot action of the Port of Ravenna has two components: 1) installation of a photovoltaic system whose nominal power will be equal to 130 KWp. The energy produced in excess will be returned to the electricity grid as energy from renewable sources. For this purpose it will also be adapted the existing electrical transformation cabin; 2) purchase of an electric vehicle.
PP6	Central Adriatic Ports Authority (AdSP MAC)	The pilot action of the Port of Ancona has 2 components: 1) technical and economic feasibility study to test the application of innovative technologies for the supply of electric power to the ferries while at port. The study will include also the estimation of environmental benefits in terms of, among other, air pollution; 2) replacement of the existing four high mast lights of the Nuova Darsena Commerciale with LEDs.
PP7	Agenzia di Sviluppo, Special Agency of the Chamber of Commerce Chieti-Pescara (ASVI)	Following an agreement with the Central Adriatic Ports System Authority (PP6), PP7 replaces the existing lighting systems in the public areas with LEDs. Priority will be given to the following public berths: a) Banchina di Riva e Banchina di Riva Nuova; b) Molo Nord, Banchina Commerciale; c) Via Cervana. The exact number and types of LEDs will be determined by the ad hoc preparatory study which will be conducted within WP4 and will depend on the market costs of these components at the time of the public tender.
PP8	Southern Adriatic Sea Port Authority - Ports of Bari, Brindisi, Manfredonia, Barletta and Monopoli (AdSP MAM)	The pilot action of the Port of Bari consists in the installation of sensors and stations to monitor noise, air (concentrations of PM, pollutant gases) and water quality (turbidity produced by excavations and ship traffic, solid and hydrodynamic transport to the port mouths). Inter alia, the equipment will consist of: 1) weather station, measuring the speed and direction of wind, air temperature, atmospheric pressure, humidity, solar radiation; 2) Monitor Direct-Reading Acoustic Doppler Current Profiler (ADCP) to monitor the water currents, waves, including software and firmware; 3) sensor to monitor chlorophyll and turbidity; 4) sensor to monitor PM10 and PM2.5; 5) outdoor sound level meters, including management software; for the correct management of all this equipment, a new module in the port' PCS GAIA will be developed.

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PPs	Project Partners	Pilot actions description
PP9	Rijeka Port Authority (LUR)	The pilot action of the Port of Rijeka has three components: 1) replacement of existing lighting in the public areas with LEDs. More specifically, it will be installed on Rijeka breakwater - which is part of public port. Moreover, it will be necessary also to replace light Poles, upgrade and repair existing installations. The new public lighting will have a dual function: a. primarily: to ensure the safe movement of people at night through breakwater areas; b. secondary: to highlight the ambience of the space with light, but not causing light pollution; 2) purchase of an electric vehicle; 3) installation of charging station for electric vehicles. The type of plug to be installed (e.g. AC, Type1, Type2, fast charging) will depend on the price of the market at the time of the installation.
PP11	Port of Zadar Authority (LUZ)	The pilot action of the Port of Zadar concerns renewable energy production and has the following components: 1) installation of photovoltaic system for port lightening; 2) installation of solar thermal system (hot water and heating); 3) installation of energy storage system for night consumption; Energy storage systems are an essential part of the renewable power generation system. The renewable power sources like solar, wind, and hydro are fluctuating resources. To supply a smooth output power to the power grid, energy storage systems are installed to the power generation system.
PP12	Split Port Authority (LUS)	The pilot action of the Port of Split has two components. The first one is: 1) acquisition of mobile environmental laboratory (MEL) that would measure concentrations of pollutants in the port area is planned. MEL is equipped with devices for measuring all listed pollutants in the port area. Instruments are working 24 hours a day, measuring the current concentration of pollutant in real time. On the basis of data collected form the measuring equipment in real-time information on pollution will be obtained, which will enable port to control, supervise and manage environmental pollution in the port area. Also, included in this pilot action, a display will be purchased showing the measures and an IT platform will be developed to support data exchange between measuring equipment, port operational centre and display; (continued)

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PPs	Project Partners	Pilot actions description
PP12	Split Port Authority (LUS)	(continued) The second component of the pilot action of the Port of Split is: 2) replacement of existing port lightning with the aim of achieving electricity savings and reducing emissions of gaseous pollutants by meeting existing standards and regulations by replacing lighting systems by applying the latest technology. Through the project it is planned to change 154 lamps on port of Split area. Total installed power of 154 pieces of LED lamps and reflectors after replacement will be 17,30 kW, what is reduction for 61.745,46 kW/g according to currently installed port lightning system, and with the reduction of CO2 emission 14,50 tCO2/g . Lamps with DDF are provided for controlling the lamp power over a period of time that can be programmed according to the needs of the port. This management system envisages management that would result in 35% of electricity savings.
PP13	Ploče Port Authority (LUP)	The pilot action of the port of Ploče has four components 1) replacement of the existing port lightning system with energy-efficient technology; 2) purchase and implementation of environment protection barriers; 3) installation of sensors and stations for monitoring noise, air and water quality to measure concentrations in port areas and to display measurements with related development of IT platform to support data exchange within subsystems; replacement of the existing air condition system in Port of Ploče Authority data center with energy-efficient technology.
PP14	Dubrovnik Port Authority (LUD)	Dubrovnik Port Authority will replace existing port lightning considering all light technology parameters thanking in to consideration reduction of the reflector on the pillars. Through the project we are planning to exchange 122 lighting fixtures, from witch 87 pieces of LED lamps and 87 pieces of LED reflectors on Dubrovnik port area. Total installed power of 122 pieces of LED lamps and reflectors after replacement will be 36,62 kW, what is reduction for 39,05kW (app. 52%) according to currently installed port lightning system. In a yearly period saving of electricity total will be 160125kWh (from 310263 kWh to 150,138 kWh).
PP15	Dubrovnik Neretva County (DNR)	Dubrovnik Neretva County will purchase a hybrid vehicle. In this kind of vehicle, the electric motor is more efficient at producing torque, or turning power, and the combustion engine is better for maintaining high speed (better than typical electric motor). Switching from one to the other at the proper time while speeding up yields a win-win in terms of energy efficiency, as such that translates into greater fuel efficiency. The type of hybrid vehicle (i.e. classic hybrid, mild hybrid or plug-in hybrid) will depend on the cost of the market at the time of the purchase.

Sources: SUSPORT Application form, pag. 58; 2nd Steering Committee Meeting on 28.09.2020

4. Contents of the final report of each pilot action

Each Project Partner responsible of a pilot action will draft its "final report of the pilot action" at the end of WP4. As already said above, this final report is a deliverable of the Activity 4.2.

ITL Foundation asks each Project Partner to verify that its "final report of the pilot action" (D.4.2.1 to D.4.2.13) contains at least the following aspects:

- description of the pilot action;
- aims of the pilot action;
- description of activities carried out;
- involvement of stakeholders;
- assessment of the pilot action (achieved results; indicators).

Below, the contents of the integrated final report of each the pilot action are illustrated in details.

Please note that it is the framework that should have the "final report of the pilot action".

A minimum framework

1. Introduction

2. Pilot action description
   This section describes in detail the pilot action, filling in the following paragraphs.

   2.1. Aim of pilot action (and challenges it tackles).

   2.2. Investment cost, operating costs and revenues, if known. Possible sources of funding that could finance the identified interventions.

   2.3. Period of realization/construction (start date – end date) and the operating period corresponding to the technical/economic life, in years (for example: a car has a technical life of 5 years).

   2.4. Context
   It describes the context and the existing needs that require the pilot action development.

   2.5. Description of activities carried out

It describes briefly the activities that have been done for the implementation of the project. In addition it describes the thematic equipment needed for the development of the pilot action.

2.6. Actors/stakeholders mapping

It describes the actors/stakeholders/beneficiaries involved and their role in the implementation of pilot action, if applicable.

Stakeholder	Role	Contribution to the projects
...	..	..
..	..	..

2.7. Problems encountered

Which problems have been encountered during the pilot action implementation? How they have been overcome? Could they have affected the planned results and/or original planning?

3. Evaluation of the pilot action

This section describes the assessment procedure, filling in the following paragraphs.

3.1. Achieved results

It describes the results achieved by the pilot action. Do they correspond to the expected ones? Insert schemes or add any annexes that may complete the description of results.

3.2. Indicators

This section illustrates the implementation of indicators that have been chosen for the pilot action's monitoring and evaluation activities. For each indicator, as illustrated in the table below, the unit of measure and achieved values are indicated.

Indicator	Unit of measure	Value
Indicator 1	*...*	*...*
Indicator 2	*....*	*...*
...	*...*	*...*

4. Conclusion

This last section summarises the main content that have been illustrated in previous chapters.

5. Integration of the final report of the pilot action

As indicated above, it is necessary that the final report of each pilot action has the minimum framework presented in previous section 4 and contains the elaboration of a list of indicators that ease the evaluation of the implementation of that pilot action described in the report.
If not, it is necessary that each Project Partner integrates the "final report of the pilot action" with those data and information, in order to assess the impacts of pilot actions.

Each pilot action will use **its specific set of indicators**, according to the scope, the methodology, the beneficiaries and the stakeholders involved in its development. Indicators will be monitored in pilot's advanced sessions and presented in the final report. If it is not, it is necessary to integrate the final report.

Based on ITL's previous project experience[1], the suggested indicators aim:

- to collect specific information regarding the implementation of pilot actions;
- to evaluate the sustainability of pilot actions by measuring or estimating indicators that relate to all three pillars of sustainability: economy, society and environment.

In previous Table 2, we note that each pilot action is generally composed of several components. Often each pilot action is made up of elements that replace someone currently in use in our ports. This substitution is justified by the need to improve ports' environmental performance and energy efficiency.

In order **to evaluate impacts** of pilot actions and their sustainability, we propose **two approaches** (called A and B), and invite PPs to adopt the most appropriate to their pilot action.

The first one (called A) could be adopted by the PPs responsible of "energy" pilot actions that concern projects directly related to energy saving. In these cases, usually the pilot action operates using **electricity from renewable sources**, consequently it replaces the traditional electricity from fossil fuels. This replacement reduces CO2 emissions. So, we propose to use the indicator "**tons of avoided CO2eq emissions**". This indicator would allow easier comparisons with the ecological footprint calculated in the TNAs (WP 3, Activity 3.2). And it will allow to each PP to communicate more effectively how much CO2eq has been saved thanks to the SUSPORT Project.

[1] **SUMPORT** - Sustainable Urban Mobility in MED PORT cities https://sumport.interreg-med.eu/;
NOVELOG - New Cooperative Business Models And Guidance For Sustainable City Logistics http://novelog.eu/;
C-LIEGE - Integrated Urban Freight Transport http://www.c-liege.eu.

The second approach (called B) to evaluate impacts of pilot actions could be obtained from Evalsed[2] by European Commission, in particular in chapter 8 "Impact evaluation" of the Guidance "Evalsed Sourcebook: Method and techniques"[3]. This chosen approach consists in the **comparison "before-and-after"**, in a situation in which pilot action has been implemented (also called "ex-post evaluation").
So, based on this approach, one way to evaluate the pilot action is to compare the energy consumption of the system currently in use with the energy consumption of the new system provided by the pilot action. Another way is to compare the amount of pollutant emission by the system currently in use with the amount of pollutants emitted by the new system provided by the pilot action.

Example of lighting system indicators
For example, a component of nine of the thirteen pilot actions is the replacement of existing **lighting system** of public areas with LEDs. The nine PPs responsible of these pilot actions are: LP- AdSP MAO; PP1-COSEF; PP2-AdSP MAS; PP6-AdSP MAC; PP7-ASVI; PP9-LUR; PP12-LUS; PP13-LUP;
PP14-LUD. In this case, following the first approach (called A), each PP could use the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNAs.
On the other hand, following the second approach (called B), the indicators could be:

- electrical consumption of the existing lighting system composed of lamps;
- electrical consumption of the new lighting system with LEDs.

The difference calculated between the value of these two measures of consumption (expressed in the same unit of measure and referred to the same time period) quantifies improvements in energy efficiency of port lighting system.

We invite each PP to adopt the approach that is most appropriate to their pilot action, that is easier to be applied, that could provide information easier to be disseminated among stakeholders.

Example of electric vehicle indicators
For example, a component of five of the thirteen pilot actions is the purchase of one or more **electric vehicles** (in one case hybrid). The five PPs responsible of these pilot actions are: LP-AdSP MAO; PP2-AdSP MAS; PP5-AdSP MACS; PP9-LUR; PP15-DNC.

[2] https://ec.europa.eu/regional_policy/en/policy/evaluations/guidance/.
[3] It is available online at this link (accessed in May 2021):
https://ec.europa.eu/regional_policy/sources/docgener/evaluation/guide/evaluation_sourcebook.pdf.

In this case, following the first approach (called A), each PP could use the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNAs.
On the other hand, following the second approach (called B), the indicators could be:

- consumptions of the electric vehicle, component of the pilot action (in a given time period);
- consumptions of a diesel or petrol vehicle replaced by the electric vehicle of the pilot action and equivalent to it (in the same time period).

The difference calculated between the value of these two indicators (expressed in the same unit of measure and referred to the same time period) quantifies improvements in ports' environmental performance and energy efficiency.

Also in this case, we invite each PP to adopt the approach that is most appropriate to their pilot action, that is easier to be applied, that could provide information easier to be disseminated among stakeholders.

Below, some specific examples of indicators are presented for PPs that have in their pilot action components not yet analysed.

Port of Trieste (LP AdSP MAO)
In addition to the replacement of existing lighting system and the purchase of an electric vehicle, specific evaluation indications (as examples) are provided for the other two components of pilot action of Port of Trieste:

1. "monitoring of the environmental effects resulting from the plan or programme implementation included in the Strategic Environmental Assessment (SEA)". A first elementary measure is the implementation or not of the monitoring activity (for example Italian National Statistics Institute in the data set "Urban Environment"[4] provides the information about "number of control units installed", "number of approved territorial plans"). In addition, impact of this pilot action's component could be measured by indicators analysed in the SEA. The comparison "before-and-after" approach can be applied considering specific indicators of environmental effects measured before and after the plan or programme implementation included in the SEA;

[4] http://www.istat.it/it/archivio/ambiente+urbano.

2. “pre-investment study for the application of on-shore power supply (OPS) in the Port of Trieste”. Impact of this pilot action’s component could be measured by indicatorsrelated to avoided emissions[5]. To define specific indicators, relevant source is the TNA methodology (in deliverable D.3.2.1 of SUSPORT project). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the comparison “before-and-after” described above. In addition we note that it is an “ex-ante evaluation”, because the application of on-shore power supply is not operating. So the “after” values of indicators may only be estimated.

COSEF (PP1)

The pilot action of Porto Nogaro (COSEF) has three components. In addition to the replacement of existing lighting system, we could propose some indications about examples of evaluation indicators for the other two components of its pilot action:

1. the first one is “improvement of the energy efficiency of the port's main building which hosts the Harbour Master's office, Customs, ONG "Stella Maris", etc. by: a) low- emission windows b) insulation coat of the whole building surface for a total of 700 sq.m, c) condensing boiler, d) solar thermal system for the production of hot water and heating, surface of 4 sq.m.”. In this case we suggest to use the TNA methodology (in deliverable D.3.2.1), in particular the section 7.2.1 “Terrestrial emissions” (page 11 of D.3.2.1). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the indicator “tons of avoided CO2eq emissions”, that allows comparisons with the ecological footprint calculated in the TNA. Or eventually we propose the approach based on the comparison “before-and-after” described above;
2. for the component “pre-investment study assessing the use of geothermal power”, it is possible to realize just an ex-ante evaluation, because the geothermal power is not operating. Impact of this pilot action’s component could be measured by indicators related to avoided emissions eventually in case of use of the geothermal power.

[5] Reference emission factors from national databases or other institutional sources.

Port of Ravenna Authority (PP5 AdSP MACS)
In addition to the purchase of an electric vehicle, specific indications about examples of evaluation indicators are provided for the other component of the pilot action of Port of Ravenna:

- "installation of a photovoltaic system with nominal power 130 KWp placed on a platform roof in the yard of the Port of Ravenna Authority". Impact of this pilot action's component could be measured by indicators related to avoided emissions. To define specific indicators, relevant source is the TNA methodology (in deliverable D.3.2.1). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNA. Or eventually we propose the approach based on the comparison "before-and-after" described above.

Port of Ancona (PP6 AdSP MAC)
The pilot action of Port of Ancona has two components. In addition to the replacement of existing lighting system, we could propose some examples of evaluation indicators for the other component of its pilot action:

- "technical and economic feasibility study to test the application of innovative technologies for the supply of electric power to the ferries while at port. The study will include also the estimation of environmental benefits in terms of, among other, air pollution". Impact of this pilot action's component could be measured by indicators related to avoided emissions. To define specific indicators, relevant source is the TNA methodology (in deliverable D.3.2.1 of SUSPORT project). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the comparison "before-and-after" described above. In addition we note that it is an "ex-ante evaluation", because the supply of electric power to the ferries is not operating. So the "after" values of indicators may only be estimated

Port of Bari (PP8 AdSP MAM)
The pilot action of the Port of Bari consists in the installation of sensors and stations to monitor noise, air (concentrations of PM, pollutant gases) and water quality (turbidity produced by excavations and ship traffic, solid and hydrodynamic transport to the port mouths). A first elementary impact of the installation of sensors and stations is the number and kind of indicators that can be measured now (not observed before this installation).

Port of Rijeka (PP9 LUR)
The pilot action of Port of Rijeka has three components. In addition to the replacement of existing lighting system and the purchase of an electric vehicle, we could propose some examples of evaluation indicators for the other component of its pilot action:

- "installation of charging station for electric vehicles". Impact of this pilot action's component could be measured by indicators related to avoided emissions. To define specific indicators, relevant source is the TNA methodology (in deliverable D.3.2.1 of SUSPORT project). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNA. Or eventually we propose the approach based on the comparison "before-and-after" described above.

Port of Zadar (PP11 LUZ)
The pilot action of Port of Zadar has three components:

1. "installation of photovoltaic system for port lightening". Impact of this pilot action's component could be measured by indicators related to avoided emissions. To define specific indicators, relevant source is the TNA methodology (in deliverable D.3.2.1). And, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNA. Or eventually we propose the approach based on the comparison "before-and-after" described above;
2. "installation of solar thermal system (hot water and heating)": see the previous component;
3. "installation of energy storage system for night consumption": see the first component.

Port of Split (PP12 LUS)
In addition to the replacement of existing lighting system, specific indications about examples of evaluation indicators are provided for the other component of the pilot action of Port of Split:

- "acquisition of mobile environmental laboratory (MEL) that would measure concentrations of pollutants in the port area is planned. Purchase of a display showing the measures and an IT platform will be developed to support data exchange between measuring equipment, port operational centre and display". A first elementary impact

of the installation of MEL is the number and kind of indicators that can be measured now (not observed before this installation).

Ploče Port Authority (PP13 LUP)

In addition to the replacement of existing lighting system, specific indications about examples of evaluation indicators are provided for the other three components of pilot action of Ploče Port Authority:

1. "purchase and implementation of environment protection barriers". Impact of this pilot action's component could be measured by indicators related to avoided emissions and to the "before-and-after" comparison approach;
2. "installation of sensors and stations for monitoring noise, air and water quality to measure concentrations in port areas and to display measurements with related development of IT platform to support data exchange within subsystems". A first elementary impact of the installation of these sensors and stations is the number and kind of indicators that can be measured now (not observed before this installation);
3. "replacement of the existing air condition system in Port of Ploče Authority data center with energy-efficient technology". Also in this case, in order to evaluate impacts of this component of the pilot action, we propose the approach based on the indicator "tons of avoided CO2eq emissions", that allows comparisons with the ecological footprint calculated in the TNA. Or eventually we propose the approach based on the comparison "before-and-after" described above. More details are above in the exampleof lighting systems.

6. Contents of the final evaluation report

The Final Evaluation Report describes the steps for the accomplishment of the pilot actions, the challenges and the risks encountered, the set of indicators that were used for monitoring and evaluate the activities.

In addition a **set of specific indicators evaluates impacts** of pilot actions, as described in previous section 5.

So, this report is going to summarise and select the key elements of piloting activities, in order to collect key points and transform them in transferable experiences.

References

European Commission (2013), *Evalsed Sourcebook: Method and techniques*, Brussel (https://ec.europa.eu/regional_policy/sources/docgener/evaluation/guide/evaluation_sourcebook.pdf).

Robson and others (2001), Before-and-after design: A simple evaluation design, NIOSH, Canada (http://www.burgess-limerick.com/site/Resources_files/01-119.pdf).