

Local Action Plan for the ports of Trieste and Monfalcone

Final Version 15/03/2020

Deliverable Number D.3.3.2.

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Document Control Sheet

Project number:	
Project acronym	SUSPORT
Project Title	Sustainable Ports
Start of the project	July 2020
Duration	30 months

Related activity:	WP3 A 3.3. – Planning port environmental sustainability and energy efficiency
Deliverable name:	D.3.3.2 Local Action Plan for the ports of Trieste and Monfalcone
Type of deliverable	Report
Language	English
Work Package Title	Cross-border planning of port environmental sustainability and energy efficiency
Work Package number	3
Work Package Leader	Intermodal Transport Cluster

Status	Final
Author (s)	Port Network Authority of the Eastern Adriatic Sea
Version	1
Due date of deliverable	03/2021
Delivery date	15/03/2021

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Introduction

This document, based on the common methodology developed by WP Leader, illustrates the action plan for environmental sustainability and energy efficiency of the Port Network Authority of the Eastern Adriatic Sea, Ports of Trieste and Monfalcone (hereinafter PNAEAS), carried out as part of the SUSPORT project, co-financed by the Interreg Italy-Croatia Programme.

In this context, the PNAEAS, starting from the analysis of the carbon footprint described in the previous contribution to the project deliverable on the status quo (see D.3.2.2), aims to describe in the greatest possible detail the solutions identified to support the environmental performance of the System effectively ensuring the progressive reduction of emission factors in the port area.

During the articulation of the contents treated here, reference will be made to the solutions already implemented and the prospects for the realization of new interventions planned in the short, medium and long term, offering an overall picture of the holistic approach towards sustainability adopted by PNAEAS and focusing in particular on the pilot actions that PNAEAS will develop in WP4. In this regard, it should be noted that, as regards the calculation of the reduction of emission factors deriving from the solutions presented, the precise analysis of the scenarios requires the development of sophisticated models capable of processing a significant amount of data to be correlated with each other.¹ In the context of the PNAEAS these measurements will be subject to precise calculations in the context of the Energy and Port Planning Document (from now on DEASP)² the drafting of which is currently in the final stages of the assignment procedure to an external professional firm.

As proof of the potential of the actions considered here, pending the findings of the DEASP, we will refer here to the projections contained in the Commission reports and in the main publications developed by international, European and national institutions. Furthermore, as already foreseen during the drafting of the project Application Form, the lessons learned and the available estimates elaborated in 2019 (data base 2018) will be capitalized as part of the SUPAIR project contained in a

¹ Among the main references is the publication of the National System for the Protection of the Environment (SNPA), URL, [DOC-78 CF-Hemisison-inventories-in-atm-with-attachments.pdf \(snpambiente.it\)](https://www.minambiente.it/it/tema/inventories-in-atm-with-attachments.pdf)

On these lines, see also the surveys of the European Commission, Official Journal, 62nd year, 2019, Communication from the Commission - Guidelines for the development of national air pollution control programs, URL, <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=OJ:C:2019:077:FULL&from=EN>

²An extensive description of DEASP was provided in the previous contribution (see D.3.1.2.1). For a full consultation of the document, see the following URL, [jg_deaspfinale.pdf \(minambiente.it\)](https://www.minambiente.it/it/tema/deasp-finale.pdf)

study concerning the analysis of key technical aspects for strengthening the environmental performance of the PNAEAS.³

Observing the general framework, as will be detailed in the course of the discussion, it should first of all be noted that in recent years the PNAEAS, following an integrated development logic and considering current and future needs, has been deeply committed to identifying both infrastructural and organizational and management solutions that favor a more efficient transport system. Actions and strategies were thus adopted to enhance both the ability to monitor and manage the complex of port operations in a sustainable way.

SWOT analysis – weaknesses and threats tackled

The territorial needs assessment of the Ports of Trieste and Monfalcone (D.3.2.2) identified several weaknesses and threats.

Those tackled by this action plan are the following:

1. Impact of the port on air pollution and GHG
2. Strict EU and international regulations on GHG emissions due to maritime traffic

Actions for environmental sustainability and port energy efficiency

Following an integrated approach and considering current and future needs, PNAEAS has undertaken the development of both infrastructural and organizational and management solutions that favour a more efficient use of resources.

In addition to the initiatives detailed in the previous sections, further measures, actions and strategies were adopted to enhance the ability to monitor and manage the complex of port operations. These types of intervention include the following specific areas: a) electrification of the quays; b) energy requalification, which includes energy efficiency measures for buildings, lighting and photovoltaics.

³ For an in-depth study and full consultation of the document "Action Plan for a sustainable port with low CO2 emissions", URL, [DT1.3.1-Action-Plan-for-a-sustainable-and-low-carbon-Port-of-Trieste-with-ANNEX.pdf \(adriinterreg.eu\)](https://adriinterreg.eu/DT1.3.1-Action-Plan-for-a-sustainable-and-low-carbon-Port-of-Trieste-with-ANNEX.pdf)

Electrification of the docks

The issue of reducing the hours of operation of ships' engines while stationed in port is of great relevance and is considered one of the sectors with the greatest potential for contributing to the reduction of the environmental impact of ports. In concrete terms, this is the so-called cold ironing or on-shore power supply, i.e. the creation of the infrastructure that allows a ship set up for connection, to connect to the port electricity grid during the mooring phase, by switching off the engines on board. , but remaining operational for all activities on board and on the quay.

In fact, this solution is attributed a great potential in terms of benefits to air quality, but also to noise reduction. In this sense, for port realities such as the PNAEAS, which are located in the heart of the city / urban centre, it should certainly be noted that this latter factor is a further aspect of fundamental importance.

The PNAEAS has worked over the last few years, and with greater impetus in the light of what emerged from the carbon foot print 2018 and 2019 described in the previous report on the state of the art (see D.3.2.2), implementing numerous activities of significance with respect to which the main initiatives implemented and those currently planned for future achievements should be noted below. In particular, the following are mentioned among the main projects on the subject:

- Final design for RO-RO ships at the mooring at the root of Pier VI (COMPLETED);
- Technical and economic feasibility project of Bersaglieri Pier Electrification for cruise ships (COMPLETED);
- Technical and economic feasibility project for Electrification of Pier VII for container ships (ONGOING);
- Preparation for Electrification of the Logistics Platform (ONGOING);
- Electrification of other RO-RO terminals such as Pier V, Riva Traiana, Mooring 57 (TO BE IMPLEMENTED);
- Electrification of the Port of Monfalcone (TO BE IMPLEMENTED).

For now, the terminal of the Free Zone Mineral Oils serving the transalpine oil pipeline and managed by the SIOT company is excluded which, while including the moorings with the greatest quantity of Greenhouse Gas emissions due to ships (51,395 t CO₂eq caused by ships alone tank) and despite being the second terminal in terms of number of touches, it welcomes ships which by their nature,

during mooring, need to heat and maintain the oil product in temperature so that it reaches the viscosity suitable for being transferred to land by means of turbopumps. However, this system is difficult to replace by a live electrical network, both for logistical and preparation problems of the ship itself, as well as for safety.

Pollutants - GHG	Tons emitted with OPS	Tones emitted with Diesel
CO2	2,016.00	4,055.04
NOx	2.02	86.17
PM	0.02	2.66
SO2	2.65	6.34

Table 1 - Estimation of the reduction of pollutants deriving from the implementation of the electrification of the quays and comparison with diesel systems⁴

With the exception of this type of ship, the electrification of the docks is widely recognized as a strategic solution for strengthening the environmental performance of ports by the main institutions of reference at an international, European and national level. In this regard, further information and precise data will be provided below on the path that has gradually configured a high degree of relevance of electrification in the effective promotion of the regulatory framework at international, community and national level, presenting, consequently, also diversified funding sources to support this direction.

With specific regard to the benefits that could derive from its implementation, as reported in the report on the carbon foot print, the weight of naval emissions in the mooring phase which represents the greatest source of pollution must be recalled. total value equal to 66%, they are also

⁴ European Commission, 2017, Study on differentiated port infrastructure charges to promote environmentally friendly maritime transport activities and sustainable transportation - Final Report, URL, [2017-06-differentiated-port-infrastructure-charges-report.pdf \(europa.eu\)](https://ec.europa.eu/economy_finance/2017-06-differentiated-port-infrastructure-charges-report.pdf)

immediately appreciable also in the projections on the abatement estimates of emissions from Ro-Ro ships contained in the Commission's publications and reported in table 1.⁵

Precisely in relation to the Ro-Ro traffic segment considered in the aforementioned Commission projection, it should be noted that this segment represents one of the main areas of interest for maritime traffic in the context of the PNAEAS and several studies have already been developed in this direction. aimed at recognizing the electrification opportunities for this type of boat.

Referring to the carbon footprint of the PNAEAS for 2019, although the CO₂ emissions related to the generation of electricity from the ground still exist (99.4 tCO₂ in 2020 and with an estimated forecast of 446.1 tCO₂ in 2035), the values are much lower than those of the emissions generated by the combustion of heavy fuel oil (HFO)⁶ or marine gas oil (MGO)⁷. On the other hand, the emissions produced by the ships' engines, calculated with the average values of HFO and MGO, would amount respectively to 457 tCO₂ in 2020 and 2048 tCO₂ in 2035.

In particular, there are two potentially interesting approaches for the electrification of Ro-Ro traffic, which could allow an ever-increasing number of ships (from 98 to 438 hypothesized in 2035) to shut down their engines, once the operations of docking, until the moment of departure. These approaches are particularly relevant as the average time of stay of these ships is among the highest recorded in the traffic of the PNAEAS, reaching a total number of around 20 hours overall. Due to these characteristics, the possibility of guaranteeing the connection to land for these vessels is much more effective than in other sectors of ship traffic characterized by much shorter residence times.

From the above it is evident the need to adapt the port electricity network by adapting it to the new needs deriving from the progressive electrification of the docks. To this end, it should be noted that a program agreement is being signed with AcegasApsAmga (local distributor), Terna (national distributor), as well as the Friuli-Venezia Giulia Region and the Municipality of Trieste, aimed at starting the procedures aimed at adaptation of the distribution infrastructure network necessary to

⁵Ibidem - Note that in the table the study considered an average estimate for a period of one year and 10 berths for Ro-Ro boats. For further information and full consultation of the report in PDF, URL, [2017-06-differentiated-port-infrastructure-charges-report.pdf \(europa.eu\)](#)

⁶ HFO (Heavy fuel oil), Heavy fuel oil

Source: Glossary, URL, [COMMISSION IMPLEMENTING DECISION \(EU\) 2017/1442 - of 31 July 2017 - establishing conclusions on best available techniques \(BAT\), pursuant to Directive 2010/75 / EU of the European Parliament and of the Council, for large combustion - \[notified under document C \(2017\) 5225\] \(europa.eu\)](#)

⁷ MGO (marine gas oil), Marine diesel

Source: Glossary, [Decarbonising maritime transport: The EU perspective \(europa.eu\)](#)

cope with the significant increase in demand for electrical power deriving from planned interventions.

In relation to the current process of evaluating solutions aimed at strengthening the power of the network, it should also be noted that for the future the promotion of incentive formulas is also planned with regard to the electrification of the operating vehicles operating on the docks: cranes, stackers, diggers, port tractors, etc.

In this line, at the same time as the progressive electrification of the docks and the adaptation of the grid power, it appears essential in any case to arrive at a unitary and stable national framework for the implementation of this solution, a unitary framework capable of favouring the progressive conversion naval units by ship owners in order to stimulate and facilitate the preparation / conversion of ships for shore power connection. This will allow us to continue to work, as the PNAEAS has been doing for several years, in creating the necessary bases for structuring synergies and 'public-private' partnerships in order to evaluate technical solutions (validated standards) and incentive pricing systems.

Energy requalification: buildings, lighting and photovoltaics

Energy requalification appears today as the key formula of the European Commission, shared by the Member States and by all the international organizations active in this field on the international scene. In fact, this is the direction confirmed by the first previews of the new National Energy Strategy, which reaffirms the central role assigned to energy efficiency in achieving the objectives of reducing emissions.

With particular regard to the redevelopment of buildings, at EU level, it is calculated that with the progressive adoption of the redevelopment actions necessary to achieve the climate objectives, for the period 2021-2030 an overall saving of 5 Mtoe / year (out of 9 total), divided between residential (3.5) and service sectors (1.5).

An ambitious path, supported by various regulatory measures and strategies which, although provided for by the implementation of the Energy Efficiency Directive, therefore with objectives and actions that had been established for 2020, lay the foundations for a virtuous path to 2030. In line with the horizon time outlined in the Clean Energy for All Europeans, the package proposed in November 2016 by the European Commission, among the various new measures soon to be

adopted, the revision of the Energy Efficiency Directive and the Directive on the energy performance of buildings is also expected.

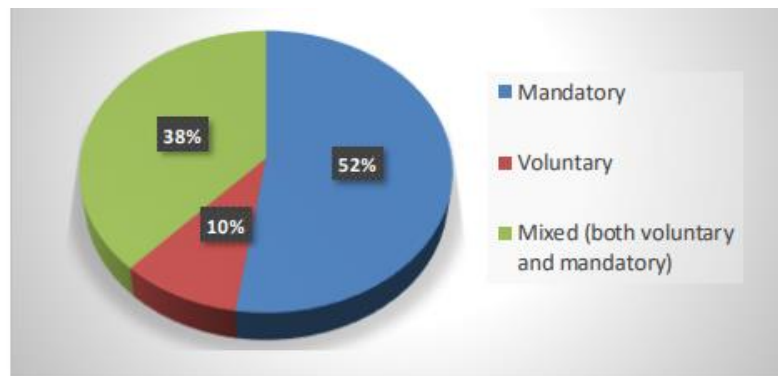


Figure 1 - United Nations Economic Commission for Europe, Stringency of building energy codes in the UNECE region 8

In the graph above, drawn up by the Economic Commission for Europe of the United Nations (UNECE), the distribution of the efficiency measures of the buildings is estimated in percentage terms, divided into compulsory and voluntary, or mixed character. An aspect of great importance is assumed by the stringent legislation which, according to the study, is not only the prevailing direction in recent years in the European context, but also falls within the framework of the recommendations also with reference to the usefulness of a progressive increase in mandatory requirements in terms of a holistic and mandatory approach to the certification of the energy systems of buildings, including the mandatory standardized implementation of accurate and reliable monitoring devices.⁹

Also in the recent study published by the European Commission it is estimated that the energy efficiency of buildings can bring a significant reduction in energy consumption which is estimated to vary from 5% to 6%, and consequently to a reduction of emissions of 5% on an annual basis. .

⁸ See the publication United Nations Economic Commission for Europe, Stringency of building energy codes in the UNECE region, 2018

The full PDF version of the report is available at the following link, [EE Standards in Buildings Draft 04-13-2018.pdf \(unece.org\)](#)

⁹ ibidem

On this basis, the projection reported on the energy requalification of buildings within the Member States in the perspective of the path towards achieving the objectives linked to the climate and the environment (see in particular the relevance of sustainability policies in chapter 4. Consistency with environmental sustainability and energy efficiency policies), it must necessarily be increased from the current estimated values in the range 0.4% - 1.2% (estimated variation depending on the various countries considered), to reach at least a doubled value.¹⁰

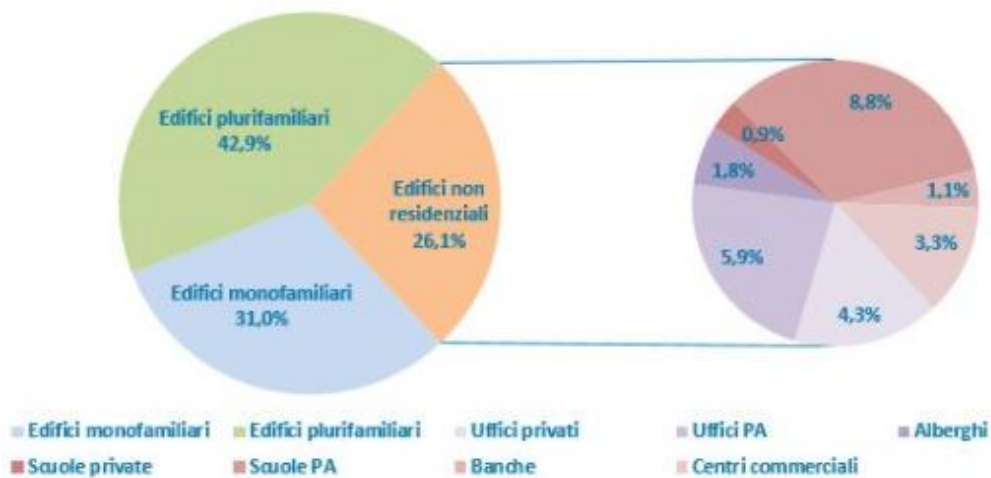


Figure 2 - Energy savings expected in 2020 by type of building, Ministry of Economic Development 11

In line with these forecasts, also the publication of the Ministry of Economic Development (MISE) in relation to the interventions for the efficiency of buildings on the national territory. In this regard, consider the data shown in graph 2 with the forecasts on energy savings expected in 2020 by type of building developed by the MISE.¹²

¹⁰ On the projections and estimates, see the data provided in the publication of the European Commission - Department: Energy - In focus, Energy efficiency in buildings, 2020, URL, [in focus energy efficiency in buildings en.pdf \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&plugin=1)

¹¹ Ministry of Economic Development, STREPIN Report - Strategy for the energy requalification of the national real estate stock

For further information on the subject see the link, [STREPIN 2020 - Public consultation on the strategy for the energy requalification of the national real estate stock \(mise.gov.it\)](https://www.mise.gov.it/strepin-2020)

¹² *ibidem*

With specific reference to the actions undertaken in this direction by the PNAEAS, as regards the energy efficiency of buildings, solutions have been implemented in terms of replacement and modernization of systems and thermal insulation of the casings by applying thermal insulation to "coat "with solutions such as windows with reduced thermal transmittance.

In this context, the PNAEAS has already promoted several completed initiatives and further interventions are currently underway in order to modernize the heating and air conditioning systems (use of high efficiency heat pumps and "condensing" generators) , as well as for the replacement of fixtures and interior lighting with LED lights in buildings under the direct responsibility of the Port System Authority.

Also with specific reference to the lighting in use in the areas of competence of the PNAEAS, the replacement of the lighting towers and most of the lighting placed on poles or buildings with LED technology lamps has already been planned, with a significant forecast saving of electricity consumption.

In fact, replacing sodium lamps with LED lamps leads to a significant reduction in installed power. Furthermore, the presence of LEDs allows a significant reduction in the hours of operation at full power, thanks to the installation of operating regulators that allow the power to be modulated according to the lighting needs, which varies considerably depending on the variation of the needs during the course. of the hours of the day.

Furthermore, it seems important to recall the commitment of the PNAEAS in this area profuse within the project called SUSPORT, which provides for the replacement of the external public lighting of PNAEAS competence with LED lamps.

As regards the photovoltaic sector, the PNAEAS, through synergies based on the paradigm of public-private partnership, supported the implementation of a large dedicated plant reaching a capacity of about 8 MW with panels that cover most of the roofs of the port warehouses and thus satisfying about a quarter of the electricity needs of the Port of Trieste.

An additional photovoltaic system with a capacity of about 12 kW was implemented at the Authority's headquarters, with a future expansion forecast to cover the needs of the management offices.

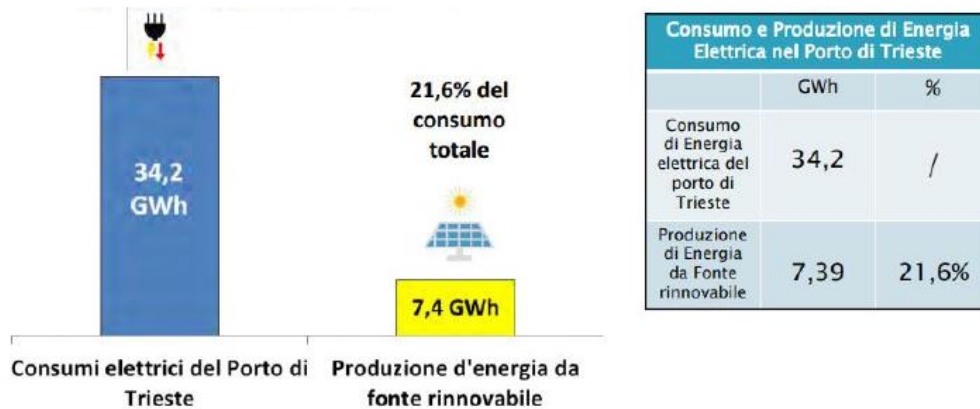


Figure 3 - Consumption and production of electricity from renewable sources - Estimate photovoltaic capacity, Source PNAEAS (2020)

Finally, considering the overall picture of the electricity consumption of port users, it seems useful to highlight that the extension of the plant currently implemented is configured as the largest photovoltaic system currently in use in a city context throughout the national territory. This plant achieves an energy production that is estimated to lead to a total of 2,271.5 t CO₂eq of emissions per year saved (data base 2019).

In the future, the goal of the PNAEAS is to progressively increase the production of energy from renewable sources, also through the installation of additional photovoltaic panels and working on the broader panorama of energy innovation and on new opportunities related to use of alternative energy sources (for example bio-LNG and wind).

From the foregoing it is clear that the commitment of the PNAEAS to strengthen energy efficiency over the last few years has made it possible to achieve important results, to which must be added the various ongoing initiatives that focus on the identification of further regulatory solutions and measures aimed at encouraging the green conversion of concessionaires and private operators. On this point it should in fact be noted that specific incentives have already been activated for investments promoted in terms of energy efficiency, providing for the reduction of the annual fee currently recognized to a maximum extent of 50% for the duration of the concession (Article 6 of

the "Concessions and state property fees regulation" approved with Decree no. 1409 dd. 27.11.2012).

Estimates on CO2 reduction

Estimates of cumulative CO2 and economic emissions savings deriving from the main solutions presented					
Activities	Intervention description	Investment [€]	Cumulative energy savings [MWh / y]	Savings of cumulated CO2 emissions 2030 [tCO2]	Cumulative economic savings 2030 [€]
AP2-LP	e-mobility	215,635	477.4	115.27	111.593
A2	Redevelopment of buildings and areas of expertise (including estimates on LED lighting and photovoltaic)	672.242	3,610.90	1456.2	527.097
A3	Dock electrification	3,000,000	-	7,860.30	-
TOTAL		4,346,277	4,088.30	9,431.77	638.690

Table 2 - Estimates and overall projections of CO2 emissions reduction, savings in energy and economic consumption deriving from the measures presented 13

¹³ Calculation based on the study developed in 2019 (data base 2018) as part of the SUPAIR project referred to in the note (see note n.3)

It should be noted that in the building redevelopment sector, the analyzes refer to the redevelopment of state-owned buildings and the PNAEAS registered office; for the estimates and assessments on the electrification of the quays, Pier VI and the Ro-Ro traffic with projection of a connection point were considered in advance.

Time frame and possible sources of financing

Phase	Year	1	2	3	4	5	6	7	8	9	10
1	Monitoring DEASP drafting and updating; updating and evaluation of the Carbon Footprint of the System, creation of an Energy Database, strengthening of technological tools dedicated to the emissions inventory	■	■	■	■	■	■	■	■	■	■
	1.1 -LP pilot action - 1 Use of drones for monitoring activities and creation of a database dedicated to the pollutant inventory	■	■	■	■	■	■	■	■	■	■
2	-LP pilot action - 2 e-Mobility	■				■					■
2.1	Entrusting the installation of two charging stations / Vehicle purchase, phase 1	■	■								
2.2	Entrusting the installation of additional charging stations / Vehicle purchase, phase 2					■	■	■			
2.3	Implementation of the identified actions	■	■			■	■	■			
2.4	Monitoring	■	■	■	■	■	■	■	■	■	■
3	Energy requalification of buildings, lighting and photovoltaics	■	■	■	■				■	■	■
3.1	Energy audit Redevelopment plan for lighting systems	■									
3.2	Analysis and preparation of procedures for awarding public contracts for specialist services ah hoc	■	■	■	■						
3.3	Implementation of the identified actions		■	■	■				■	■	■
3.4	Monitoring		■	■	■	■	■	■	■	■	■
4	Dock electrification	■	■	■	■						
4.1	Executive planning	■	■								
4.2	Analysis and preparation of procedures for awarding public contracts for specialist services ah hoc	■									
4.3	Implementation of the identified actions		■	■	■						

4.4	Monitoring								
5	Revisions of the Plan and identification of new actions								

Table 3 - GANTT, ten-year development plan projection for the actions presented by PNAEAS

Sources of financing

In general, the financing opportunities, whether they are promoted at European, national and regional / local level, are framed within the global strategic vision aimed at reducing polluting emissions outlined in compliance with the provisions established on 12 December 2015 by the Paris Agreement (Conference of the Parties to the United Nations Framework Convention on Climate Change - UNFCCC)¹⁴ which constitutes the founding reference of the policies, and consequently of the international regulatory framework of reference for the European / national / regional-local context and related funding.¹⁵

In fact, at the basis of all the available funding in this field, it should be noted that they all contribute to the achievement of the interconnected and intersectoral strategic objectives established in the framework of the broader EU reference program called Green Deal.¹⁶, and are integrated into horizontal strategies referable to the sphere of international initiatives in the field of environmental protection.¹⁷

As evidence of the importance of the integrated approach in promoting environmental sustainability, the most recent Next Generation EU Program, the broadest instrument of financial support for economic recovery and growth, superior to the investments made after the Second World War with the Plan Marshall, represented an opportunity to relaunch the Green Deal which, already started before the pandemic with the official presentation of the European Commission on

¹⁴ The full text is available in PDF format on the United Nations website, URL, [ADOPTION OF THE PARIS AGREEMENT - Paris Agreement text English \(unfccc.int\)](https://unfccc.int/paris_agreement/text/english)

¹⁵ On the fundamental weight of the Paris Agreements, see the publication European Council, General Secretariat of the Council, 2019, [European Council conclusions, 12 December 2019 \(europa.eu\)](https://european-council.europa.eu/media/e3001920/1/161912main_en.pdf)

¹⁶ See the report of the session of the Parliament - European Parliament, European Green Deal, AT A GLANCE, 2019, URL, [European Green Deal \(europa.eu\)](https://european-council.europa.eu/media/e3001920/1/161912main_en.pdf)

¹⁷ EU Commission, The European Green Deal, full PDF available at URL, [resource.html \(europa.eu\)](https://ec.europa.eu/eip/eip-act/eip-act_en.pdf)

EU Commission, Orientations towards the first Strategic Plan for Horizon Europe - 2021 to 2024,

For the full consultation of the publication in PDF, URL, [ec_rtd_orientations-he-strategic-plan_122019.pdf \(europa.eu\)](https://ec.europa.eu/eip/eip-act/eip-act_en.pdf)

11 December 2019, involves all sectors of the economy and society, representing one of the key pillars in order to create the best conditions for the future of the Union as a whole.

The main strategic tool for the implementation of the Next Generation EU Program is represented by the Regulation¹⁸ on the Device for recovery and resilience (sometimes called Recovery Plan) which establishes, in Title III, the essential contents of the "Recovery and resilience plans" that the Member States must prepare in order to access the huge funding (these are the so-called Plans National Recovery and Resilience - PNRR).

With regard to our country, the Plan is currently being defined but it appears significant that, observing the most recent investment forecasts, the environment is in first place in investment priorities, reaching 67.49 billion euros (see tab. n.6 Resource allocation - Recovery Plan Italy).¹⁹

Recovery Plan Italia	
Ripartizioni risorse per missione	
	miliardi
Ambiente	67,49
Digitale	45,50
Infrastrutture	31,98
Istruzione e Ricerca	26,66
Inclusione e coesione	21,28
Salute	18,01
TOTALE	210,91

Fonte: PNRR

Table 6 - Resource breakdown - Recovery Plan Italy²⁰

¹⁸ Still in the approval phase, Regulation Proposal see URL, [EUR-Lex - 52020PC0408R \(02\) - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2020/1025/oj)

¹⁹ EU Commission, Political Guidelines for the Next European Commission 2019-2024, URL, [political-guidelines-next-commission_en.pdf \(europa.eu\)](https://ec.europa.eu/commission/presscorner/detail/en/ip19_1911)

²⁰ The general presentation with the allocation of resources is available at the URL, [Standard PowerPoint presentation \(politicoeuropee.gov.it\)](https://www.politicoeuropee.gov.it/)

Having made this premise, which anticipates the direct link between the discussion of the main funding opportunities illustrated below and the next chapter dedicated to the policy framework, it is important to point out that the various available loans differ according to the sector and project phase, drawing on programs of various kinds.

The allocations of the funds available starting from the specific scope of the European Green Deal are thus shown below, subsequently reference will be made to some of the most important financing initiatives promoted within the framework of actions at the national and regional level, underlining that all the lines funding have a direct link with the actions presented by the PNAEAS as they are resources aimed at supporting both the type of interventions of the pilot actions (drones and e-mobility), and the solutions illustrated for energy efficiency (building redevelopment, LED and photovoltaic lighting) and dock electrification, also embracing the transversal and integrated initiatives presented in order to develop the digital sector and that linked to the promotion of rail and intermodal transport.

Funding under the European Green Deal

The investment plan pertaining to the plan called "European Green Deal Investment Plan" aims to ensure the implementation of the actions envisaged by the Green Deal, which provides for the allocation of one trillion euros to be disbursed during the period 2021-2030 and it is structured on three dimensions: 1) project funding; 2) the creation and development of a common framework aimed at guaranteeing adequate conditions for the implementation of the plan through legislative initiatives and incentives; 3) the organization of a support system for public administrations and private individuals involved in the implementation of the plan (see table no.6 - European Parliament, 2020, investment plan relating to the implementation of the Green Deal - 2021-2030) .

This huge investment will be financed, first of all, by increasing the resources already allocated by the European Union to the fight against climate change. In fact, about half of the funding will come from the EU budget, while the remainder will come from other investments, both public and private. In this regard, it is possible to distinguish five macro categories of loans, including: the Union budget (503 billion euros), the intervention of the European Investment Bank (EIB) and other partners under the InvestEU program (€ 279 billion), the Just Transition Mechanism (JTM) (€ 143 billion), the

contribution of the Member States (€ 114 billion) and, finally, the European Emission Trading System (EU ETS) (€ 25 billion)), with the breakdown shown below in fig. n.6.²¹

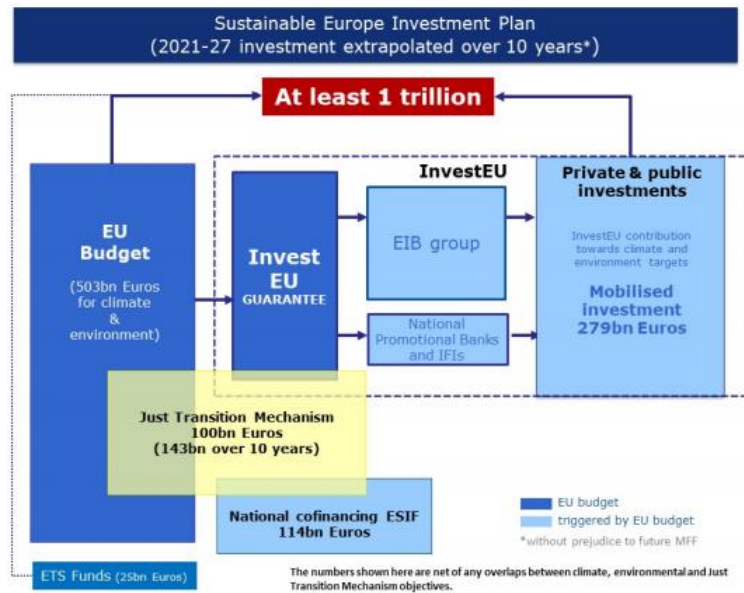


Figure 7 - European Parliament, 2020, investment plan relating to the implementation of the Green Deal - 2021-203022

In this context, the creation of financial support with the so-called European Fund for Energy Efficiency deserves specific mention²³, which provides for the financial commitment of the European Investment Bank (EIB, English EIB) with the aim of supporting the energy efficiency interventions carried out by companies and by the Public Administration, on buildings, plants and production processes.

In this context, the direct connection with the initiatives promoted and previously illustrated by the PNAEAS is evident, also due to the distinctive feature of prefiguring the promotion of public-private partnerships aimed at increasing energy efficiency and promoting renewable energy. (see section 2.3 Further solutions implemented for environmental protection and energy efficiency of the port

²¹ European Parliament, 2020, [European Green Deal Investment Plan \(europa.eu\)](https://european-council.europa.eu/media/en/press-room/default.aspx?id=12216)

²²Ibidem, Figure on p. 3, Financing elements making up at least € 1 trillion over the 2021-2030 period under the European Green Deal Investment Plan, URL, [European Green Deal Investment Plan \(europa.eu\)](https://european-council.europa.eu/media/en/press-room/default.aspx?id=12216)

²³For more information, see the URL, [Home - European Energy Efficiency Fund EEEF](https://www.mise.gov.it/)

The declination in the national territory of the Fund: [National Energy Efficiency Fund \(mise.gov.it\)](https://www.mise.gov.it/)

system and the discussion on “Energy requalification: buildings, lighting and photovoltaics”). In particular, the EIB represents, within the framework of the actors active in financing opportunities, one of the most important players worldwide, as reported in the official publications and on the institutional website " The European Union and the EIB Group play a leading role in implementing the Paris Agreement. We place sustainability at the heart of our activities ".²⁴

Funding under the Connecting Europe Facility (CEF)

Referring now to the funding program called Connecting Europe Facility (CEF), the program that supports the development of transport, energy and digital infrastructures in the context of trans-European transport networks (English Trans-European Networks - TEN-T), as regards the long-term forecast and the budget for the next seven years 2021-2027, the following amounts are estimated for each of the investment segments: transport € 11.4 billion (plus the transfer of € 10 billion from the cohesion), of which 1.4 billion specifically dedicated to the segment of projects aimed at strengthening cross-border rail links included in the Cohesion Fund²⁵, energy sector for a total of € 5.2 billion, digital infrastructure sector with € 1.8 billion.²⁶

The official launch of the first call is scheduled for summer 2021.

Still remaining within the framework of the 2021-2027 financing funds of the CEF Program, it should be noted that as regards digital infrastructures, the European Commission has proposed an additional amount of € 3 billion for the promotion of a new line to support these initiatives called CEF2 Digital.²⁷

²⁴ More information is available on the official website at the URL, [Homepage | European Investment Bank \(eib.org\)](https://www.eib.org)

²⁵For the definition "The Cohesion policy is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the EU average". On the funding plan for the next seven years and for more details, see the publication, EU Regional Policy, New Cohesion Policy, URL,[New Cohesion Policy - Regional Policy - European Commission \(europa.eu\)](https://ec.europa.eu/eu-ropa/regional-policy/)

²⁶ The programmatic framework of the funding is illustrated in the dedicated publication entitled "Proposal for a Regulation Establishing the Connecting Europe Facility 2021-2027", URL, [12 2020 | New boost for jobs, growth and investment | Proposal for a regulation establishing the Connecting Europe Facility 2021-2027 \(europa.eu\)](https://ec.europa.eu/eu-ropa/regional-policy/). Further references are also available on the dedicated official website, URL,[Connecting Europe Facility | Mobility and Transport \(europa.eu\)](https://ec.europa.eu/eu-ropa/regional-policy/)

²⁷ Among the main regulatory references, see the publication, Council of the European Union, General Secretariat of the Council, 13 March 2019, "Proposal for a Regulation of the European Parliament and of the Council establishing the Connecting Europe Facility and repealing Regulations", (EU) No 1316/2013 and (EU) No 283/2014, URL for full consultation in full PDF, [st07207-re01-en19.pdf \(europa.eu\)](https://ec.europa.eu/eu-ropa/regional-policy/)

The Digital Europe Programme

We have previously dealt with the relevance of the ICT sector (see section 2.4 "Transversal activators for the system transition towards sustainability", in particular "The importance of ICT technologies for energy efficiency").

On this level, it should be noted that a funding program entirely dedicated to digital transformation is foreseen in the 2021-2027 EU budget of the European Commission. It is called Digital Europe and will count on total resources of approximately € 9.2 billion.

The Commission expects the complementarity and synergy of this funding line with the additional funding lines, in particular the Horizon 2020 Program, which will be discussed below, and the CEF for digital infrastructures.²⁸

Although evaluations and analyzes are still in progress, on 16 December 2020 a document was published that contemplates a formal agreement scheme for the launch of the Program and the launch of the first calls is expected for the first quarter of 2021.²⁹

The 2021-2027 Horizon Programme

The Horizon funding program provides for an allocation of resources of € 84.9 billion for the seven-year period 2021-2027.³⁰

The Program, also making use of the experience and successes recorded in previous programs, will feature a strong focus of funding lines aimed at supporting the implementation of the European Union's intervention priorities of the Green Deal and addressing global challenges. that affect the quality of life in line with the Sustainable Development Goals (Agenda 2030)³¹and theParis Agreementon the climate.³²

²⁸ More details are available in the Commission's publication "Digital Europe Program: A proposed € 7.5 billion of funding for 2021-2027", URL, [Commission welcomes agreement on Digital Europe Program \(europa.eu\)](https://ec.europa.eu/euro-pressroom/content/commission-welcomes-agreement-on-digital-europe-program)

²⁹ On Digital Europe see the details at the following URL, [12 2020 | New boost for jobs, growth and investment | Proposal for a regulation establishing the Digital Europe Program 2021-2027 \(europa.eu\)](https://ec.europa.eu/euro-pressroom/content/12-2020-new-boost-for-jobs-growth-and-investment-proposal-for-a-regulation-establishing-the-digital-europe-program-2021-2027)

³⁰ For further information, please refer to the URL, [ec_rtd_orientations-he-strategic-plan_122019.pdf \(europa.eu\)](https://ec.europa.eu/euro-pressroom/content/ec-rtd-orientations-he-strategic-plan-122019.pdf)

³¹ On the 17 Development Goals - Sustainable Development Goals (SDGs), see the publications available at the URL, [Take Action for the Sustainable Development Goals - United Nations Sustainable Development](https://www.un.org/sustainabledevelopment/)

³² For an in-depth analysis of the alignment of Union strategies with the Paris Agreements [EUR-Lex - 52018PC0435 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eur-lex-content/doc/text/html/eur-lex-52018PC0435-en)

The financing framework in the European Territorial Cooperation - Interreg

The European Territorial Cooperation (in short CTE - also known as INTERREG) is the instrument of the European Cohesion Policy which aims to solve problems beyond the national context and to jointly develop the potential of the different territories. The European Commission, for the new programming period, has proposed a series of significant changes now under consideration by the Council and the European Parliament. The updated picture of the components is as follows:

- **INTERREG A-** cross-border cooperation (sea and land);
- **INTERREG B-** transnational cooperation;
- **INTERREG C-** interregional cooperation;
- **INTERREG D-** cooperation of the ultra-peripheral regions.

The total budget allocated for the Program is € 8.05 billion, distributed as follows: € 5.812 billion for the maritime sector and cross-border cooperation, € 1.466 billion for transnational cooperation, € 490 million for interregional cooperation and for € 281.21 million for cooperation between ultra-peripheral regions.³³

The framework of the loans promoted on the national scene

On the national scene, it seems useful to refer to the broader strategic and programmatic framework of the Ministry of Infrastructure and Transport defined in the document “Connecting Italy: the state of implementation of transport and logistics infrastructure programs”.³⁴

In this context, the main incentive set up for the maritime sector, also in the wake of continuity with similar previous initiatives, is represented by the so-called Marebonus³⁵, intended for the development of motorways of the sea and the promotion of road-sea intermodality in the transport of goods through the launch of new maritime services and / or the support of existing ones. The program for the Motorways of the Sea was created to enhance transport by ship as a valid alternative to road transport, because it is sustainable both from an environmental and economic point of view, and because it is advantageous in terms of time. Furthermore, an aspect of great

³³ Council of the European Union, 11 December 2020, Interreg Regulation - Confirmation of the final compromise text with a view to agreement, the full PDF is available at the following URL, [pdf \(europa.eu\)](#)

³⁴ See the full PDF at the URL, [Connecting Italy | mit](#)

³⁵ Normative references: art. 1 paragraph 647 Law 208 of 28/12/15, DM 13.09.2017 n. 176; DD 13.12.2017 (Marebonus); art. 47 paragraph 11quater DL 50 of 24/4/17, updated with L 96 of 21/6/17 (terminal operators)

importance for the internationally open vision that distinguishes the PNAEAS, it works in the direction of the important objective of strengthening cohesion between the Mediterranean states, guiding them to operate in a system perspective.

The maritime sector also indirectly benefits from the incentives for rail freight transport dedicated to supporting the use of rail transport services arriving and / or departing from national logistical and port hubs, in this context The main incentive mechanism put in place Ferrobonus is the field for rail transport, through which the funds already allocated for the promotion of modes of transport of interest to Italian ports amount to approximately € 250 million.

Having regard to the framework of the total funding foreseen up to 2024, the estimated allocations will reach 20 Meuro.³⁶

The framework of funding promoted at the regional level

In addition to the direct management of regional funding relating to the European Territorial Cooperation referred to above, and having regard to the initiatives promoted in the regional context, of particular relevance for our discussion are the specific actions aimed at the green revolution and ecological transition with the launch of a new strategic line of funds entitled Green Deal FVG and included in the broader framework of the opportunities offered by the Green Deal. The Friuli Venezia Giulia Region has in fact applied as a pilot Region.³⁷

In particular, the creation of a carbon-free system towards climate neutrality worth a total of 2.2 billion for territorial interventions mainly aimed at decarbonisation is envisaged in this direction.³⁸

³⁶ The full consultation is available at the URL, [Decree 14 July 2017 n. 125 - Ferrobonus.pdf \(mit.gov.it\)](#)

³⁷ For more information see, URL, [Autonomous Region of Friuli Venezia Giulia - News from the Government](#)

³⁸ More details can be found on the official website of the Region, URL, [Autonomous Region of Friuli Venezia Giulia -](#)

Consistency with environmental sustainability and energy efficiency policies

As anticipated in the previous chapter, in line with what is illustrated above in the discussion on the European Green Deal and related financing forecasts, the main policy initiatives relevant to the various actions presented here by the PNAEAS will be presented below, both with reference to the type of interventions of the pilot actions (drones and e-mobility) which had regard to the solutions illustrated for energy efficiency (building redevelopment, LED and photovoltaic lighting) and dock electrification, also embracing transversal initiatives in order to develop the digital sector and that linked to the promotion of rail and intermodal transport.

Policies in the European context

In light of the current challenges posed by the global health emergency, the Commission has reformulated its commitment to tackle climate and environmental problems on a new basis, defining the perspectives for our and the next generation.

The European Green Deal, which as we have described above, represents the heart of a progressive effort towards sustainability carried out over the last decade, placing itself at the basis of all EU policies, and consequently of the Member States, in response to the challenges facing sustainability. From the point of view of related policies, it represents an integrated growth strategy aimed at transforming the EU to make it resource efficient, so as to achieve zero net greenhouse gas emissions in 2050 and create a new social and economic model in which growth is completely dissociated from the use of resources.³⁹

The Green Deal first and foremost recognizes the guiding principle that recognizes the progressive reduction of emissions as an unprecedented challenge, which will require massive public investment and greater efforts to direct private capital towards climate and environmental action. For this reason, the implementation path for its realization has been designed to allow accelerating and supporting the green transition in all sectors.

³⁹ See the Political Guidelines of President-elect Ursula von der Leyen: Political Guidelines for the next European Commission 2019-2024 - "A more ambitious Union: my agenda for Europe", URL, [political-guidelines-next-commission_en.pdf \(europa.eu\)](https://ec.europa.eu/commission/presscorner/detail/en/political-guidelines-next-commission_en.pdf)

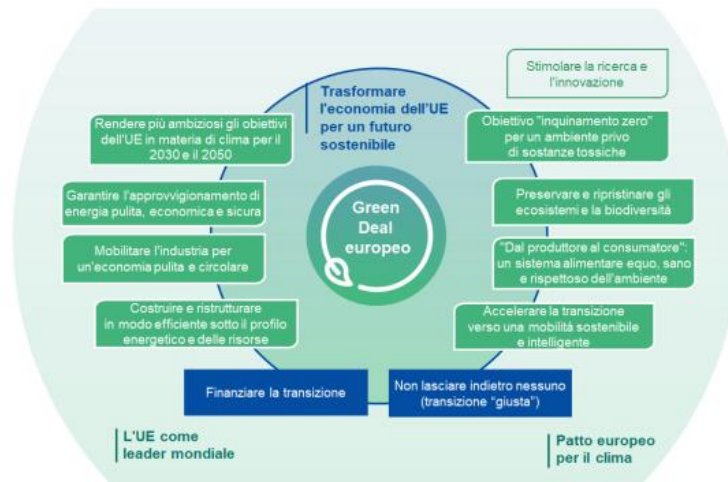


Figure 8 - General outline of the elements of the European Green Deal, Political guidelines for the next European Commission 2019-2024

In consideration of the guiding principle referred to above, and the transversal objectives that derive from it, the Green Deal represents the most important reference to which all the actions of the PNAEAS illustrated in chapter 2 are inspired and oriented.

The objectives of the Green Deal and its implementation in the Member States are thus part of the main strategic instrument of the Next Generation EU Program, which provides for specific rules for its implementation within the Member States in the Regulation on the Mechanism for recovery and resilience, which was recently updated in its guidelines (22 January 2021)⁴⁰ As mentioned above, the Regulation establishes, in Title III, the essential contents of the "Recovery and resilience plans" that Member States must prepare in order to access the huge funding (the so-called National Recovery and Resilience Plans - PNRR).⁴¹

⁴⁰ See the updated provisions of the Commission in the publication "Guidance to Member States Recovery and Resilience Plans", full PDF available at the URL, https://ec.europa.eu/info/sites/info/files/document_travail_service_part2_v3_en.pdf

⁴¹ The full PDF is available at the following URL, [guidelines-pnrr.pdf \(politicoeuropee.gov.it\)](https://politicoeuropee.gov.it/guidelines-pnrr.pdf)

The policies relating to the European Territorial Cooperation (CTE) - Interreg

Beyond the "typical" interventions and the peculiarities of the "Objective" for the seven-year period 2021-2027, the reflection on the added value that the CTE can bring to sustainability and energy efficiency responds to the need to harmonize and maximize its impacts on within the various European, regional and national policy lines in compliance with the European Structural Funds Regulation for the 2021-2027 programming cycle. The programming must in fact ensure a link between the objectives of the Union's sustainable growth by providing that each national and regional operational program makes its expected contribution to the Macro-Regional Strategies and interregional and transnational actions explicit in the programming phase.⁴²

In detail, in the period 2021-2027, the priority intervention sectors of greatest interest for the actions presented by the PNAEAS can be summarized as follows:

- a smarter Europe through innovation and digitization;
- a greener and carbon-free Europe through the implementation of the Paris Agreement and investments in the energy transition, renewable energy and the fight against climate change;
- a more connected Europe with strategic transport and digital networks.

Policies on the national scene

As indicated in the previous discussion on financing opportunities, the projects and initiatives within the National Recovery and Resilience Programs must comply with the policy priorities linked to green and digital transitions, as well as consistent with the contents of the Energy and climate (PNIEC).⁴³ At the internal legislative level, the European Directives of the so-called Winter package.⁴⁴

⁴² For an in-depth analysis of the national context, see the report by the Government, ITALY AND THE EUROPEAN NEGOTIATION FOR 2021-2027 PROGRAMMING, [Introduction \(Agenziacoesione.gov.it\)](https://www.agenziacoesione.gov.it)

⁴³ On the distinctive features with in-depth information related to the most recent update of the PNIEC (11 December 2019) and its alignment with the Green Deal, see the Document of the Chamber of Deputies and Research Service, Climate Change, 11 January 2021, URL, [Climate change \(camera.it\)](https://www.camera.it)

⁴⁴ On the alignment of national policy orientations on the matter, see the Chamber's publication, 30 September 2020, URL, [European and national governance on energy and climate \(camera.it\)](https://www.camera.it)

As anticipated, in compliance with the Commission Regulation⁴⁵, the resources for the implementation of the Green Deal are part of the Financial Plan for Recovery and Resilience, constituting its policy priorities: supporting the green and digital transition and promoting sustainable growth are the priority objectives.

The PNRR thus substantiates and enhances the strategies developed over the last few years, enhancing them with a view to using the resources made available by the EU to contribute to the country's economic recovery. The investments and reforms envisaged by the PNRR on the one hand are consistent with the Government's relaunch strategy, on the other hand they contribute to pursuing the environmental, economic and social objectives agreed at European level by responding to the specific Recommendations that the Commission has addressed to our country.⁴⁶

In particular, having regard to the alignment of the actions presented by the PNAEAS with the contents of the National Guidelines of the PNRR, the following interconnected "missions" should be noted:

- *Green transition and ecological transition;*
- *Digital transition;*
- *Safe and efficient infrastructures.*

As regards in particular the ICT sector, whose contributions can contribute to the three lines of missions / policies mentioned above, among the main initiatives already launched before the current health emergency and financed by the Ministry of Infrastructure and Transport, it is useful to mention the project dedicated to the creation of a digital telematic platform, the UIRNET project, which aims to improve the efficiency and safety of the entire national logistics system, with significant benefits expected both for individual users and for the system as a whole. complex.⁴⁷

In this context, it is also worth mentioning the new National Energy Strategy (SEN)⁴⁸ adopted by the Government in November 2017. The objective of the SEN is to encourage initiatives to reduce

⁴⁵Cit. Regulation on the Facility for Recovery and Resilience, updated to 22 January 2021, URL, https://ec.europa.eu/info/sites/info/files/document_travail_service_part2_v3_en.pdf

⁴⁶ ibidem

⁴⁷ On this point, please refer to the consultation of the Dossier of the Chamber of Deputies, Senate of the Republic, Research Department, Budget Law 2020, Transport Commission, URL, [Normal Secretariat \(camera.it\)](#)

⁴⁸ For further information see the full PDF available at the URL, [text of Strategia Energetica Nazionale 2017.pdf \(mise.gov.it\)](#)

consumption in order to achieve 30% savings in 2030 compared to the trend set in 2030, as well as to boost supply chains Italian companies operating in the context of energy efficiency such as construction and production and installation of photovoltaic systems.

The SEN also provides for the following areas of intervention:

- *Support systems to promote the energy requalification of buildings, in particular of the public building stock;*
- *Adoption of new minimum energy performance standards for public buildings.*

Again in the context of the SEN, and with specific regard to the transport sector, initiatives linked to the energy and environmental performance of the vehicle fleet are also considered a priority.⁴⁹

Policies in the regional context

At the regional level, the Regional Energy Plan (PER) is the strategic reference tool with which the Friuli Venezia Giulia Region, in compliance with the Community, national and regional guidelines in force, ensures an orderly correlation between the energy produced, its efficient use and effective and the ability to absorb this energy by the territory and the environment. The basic strategy of the PER pursues the principle of sustainable development, protecting the historical and cultural environmental heritage and, at the same time, completes the actions and the economic and financial strategy of the LR 3/2015 Rilancimpresa, orienting the economic system towards "clean technologies" ⁵⁰

⁴⁹ For further information and the policy lines, see the programmatic indications contained in the publication of the Chamber at the following URL, XVII Legislature - XVII Legislature - Documents - Themes of Parliamentary Activity (camera.it)

⁵⁰ For further information, see the forecasts contained in the document of the Central Directorate for the Environment and Energy in collaboration with ARPA FVG and the University of Udine, Department of Electrical, Management and Mechanical Engineering, URL, [Proposal for a regional energy plan \(Regione.fvg.it\)](http://Regione.fvg.it)

Conclusions

The commitment of the PNAEAS towards sustainability and energy efficiency issues, demonstrated through the implementation of a plurality of activities dedicated to different levels, has made it possible to record key steps in the crucial challenge towards the objectives of the European Green Deal and it has been a driving force in strengthening the dialogue also with key public-private stakeholders, creating the necessary adhesion of the port community to the project of a sustainable and low CO2 emission port.

The construction of a system for measuring the total consumption of the PNAEAS through the carbon footprint and the various dedicated projects are important steps to give a measure and a reference to short, medium and long term actions. The implemented solutions and the monitoring system, which will accompany the construction of a dedicated database, will provide the data to validate the actions put into practice and will guide those planned, providing useful information to enhance the most effective interventions and to identify new lines of intervention. to consolidate the best long-term strategies for sustainability.

Pending the elaborations of the DEASP, in this document reference has been made to the estimates of the reduction of the emission factors available and to the projections developed by the main institutions operating in the field at international, European and national level. The reconnaissance of the DEASP will allow to accurately size the reference parameters in relation to each action undertaken so as to accurately assess the respective effects and potential.

In conclusion, although the availability of updated data increases the fidelity of the forecasts on the significance of the actions presented here, it is not believed that the estimates used have affected their validity and potential. This is because, although working with details not yet known with respect to the conformation of the potential abatement of emissions, the PNAEAS has considered previous estimates, concentrating its efforts on the implementation of integrated solutions in perfect alignment with the recommendations / programmatic indications of the Commission and of the Italian legislator.