**National Recovery and Resilience Plan**

**Mission 3 - Infrastructures for sustainable mobility**

**Component 1 - Investments on the railway network**



**Do No Significant Harm**

Update: 28 April 2021

Summary

[1 The National Recovery and Resilience Plan 3](#_Toc70514486)

[2 Mission 3– Infrastructures for sustainable mobility 5](#_Toc70514487)

[2.1 The Mission, Components and Lines of Action 5](#_Toc70514488)

[2.2 The Measures 6](#_Toc70514489)

[3 Do No Significant Harm 8](#_Toc70514490)

[3.1 The principle 8](#_Toc70514491)

[3.2 Application of the principle 9](#_Toc70514492)

[4 Approach in the development of the assessment 11](#_Toc70514493)

[4.1 Adopted criteria 11](#_Toc70514494)

[5 Do No Significant Harm assessment sheets for the railway infrastructure sector 15](#_Toc70514495)

[5.1 Acceleration of the approval process of the Contract between the MIMS and RFI 15](#_Toc70514496)

[5.2 Acceleration of the authorization process of projects 17](#_Toc70514497)

[5.3 High-speed railway connections to the South for passengers and freight 19](#_Toc70514498)

[5.4 High-speed lines in the North connecting to Europe 42](#_Toc70514499)

[5.5 Diagonal connections 66](#_Toc70514500)

[5.6 Introducing the European Rail Transport Management System (ERTMS) 87](#_Toc70514501)

[5.7 Strengthening metropolitan nodes and key national links 99](#_Toc70514502)

[5.8 Strengthening regional lines - Upgrading of regional railways (management RFI) 122](#_Toc70514503)

[5.9 Upgrading, electrification and resilience of railways South 136](#_Toc70514504)

[5.10 Upgrading railway stations in the South 158](#_Toc70514505)

# The National Recovery and Resilience Plan

Next Generation EU (NGEU), established by Regulation (EU) 2020/2094, represents the new European Union instrument for recovery, which will complement the Multi-annual Financial Framework for the period 2021-2027. On the basis of the NGEU, the European Commission will be authorised to borrow, on behalf of the Union, on capital markets up to an amount of € 750 billion (at 2018 prices).

With 672.5 billion Euro (360 in loans and 312.5 in grants), the **Recovery and Resilience Facility** (RRF) represents the most important instrument foreseen under Next Generation EU (almost 90% of the total endowment), which will support Member States' investments and reforms.

To obtain the resources allocated to them, Member States will have to prepare **National Recovery and Resilience Plans** defining the reform and investment program for the period 2021-2026 to be evaluated by the European Commission and approved by the Council of the EU.

Financial support from the Recovery and Resilience Facility:

* it cannot replace recurring national budgetary expenditure, except in duly justified cases;
* it must meet the principle of supplementation to Union funding, i.e. it can be added to the support provided by other Union funds and programs provided it does not cover the same cost;
* it must support measures that meet the Union's **"do no significant harm"** environmental target principle.

On January 15, 2021, the Government transmitted the proposal for a National Recovery and Resilience Plan (NRRP) to Parliament to address the economic and social impact of the pandemic crisis caused by Covid-19. The objective of the Plan is to make Italy a more sustainable and inclusive country, with a more advanced and dynamic economy.

It is a *Resilience Plan*, because the pandemic and the ecological emergency focus our attention to the extreme current and future events. Resilience is the preparation to face them by the state, businesses and all social players. It is the adaptation required of our production chains within the changes of globalisation and new technological frontiers. It is the ability to prepare for the future, to govern transformations without suffering from them.

It is also a *Reform Plan*, because the investment lines are accompanied by the adoption of a reform strategy, as an "enabling" and catalyst element, in line with the European Commission's Country Specific Recommendations (CSR) and the National Reform Programmes (NRP) adopted by the Government.

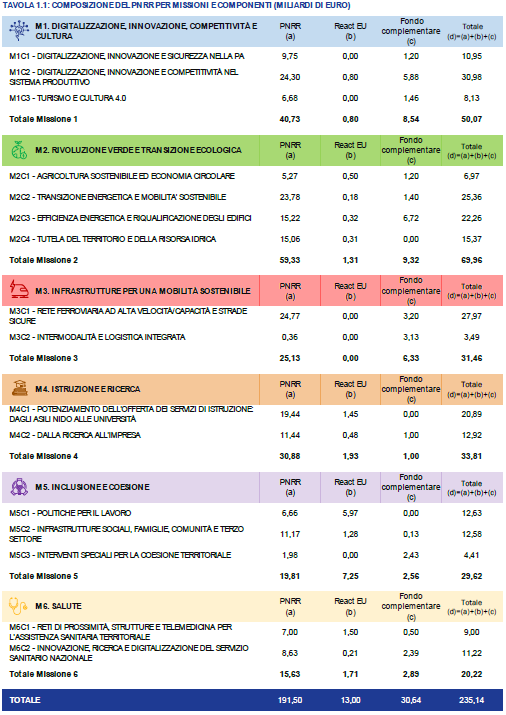
The NRRP is divided into 6 Missions, which in turn group together 16 Components functional to achieving the economic and social objectives defined in the Government strategy.

The reforms required to ensure more effective completion, linked to the implementation of one or more Components are indicated for each Mission. The individual investment projects were selected according to criteria aimed at concentrating interventions on transformational ones, with the greatest impact on the economy and on labour.

On April 27, 2021, the Government presented the final review of the National Recovery and Resilience Plan (NRRP) to Parliament.

Basically, the structure of the plan is confirmed with some changes.

The new resource allocation is shown below.



# Mission 3 – Infrastructures for sustainable mobility

## Mission and Components

Mission 3 - Infrastructures for sustainable mobility - aims to complete by 2026, a first and significant step in a longer-term journey towards the creation of a modern, digitised and environmentally sustainable infrastructure system, taking into account the specificity of the orography of the Italian territory. By adding resources to existing projects and accelerating them, as well as introducing new ones, the aim will be to create and complete works that are part of European infrastructure projects or that fill gaps that have hitherto penalised the economic development of the country and, in particular, of the South and the Islands.

For the implementation of this strategy on the infrastructural system of Italian mobility, NGEU resources, ordinary budget resources and the other European resources available for this purpose will contribute and will be synchronised. In line with the strategic design of the Recovery Plan, additional interventions have been included which are financed with state funds.

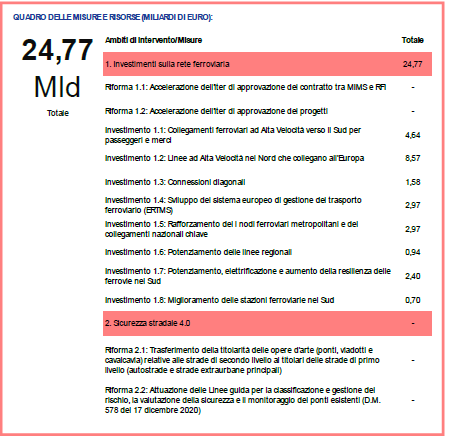
The Infrastructures for sustainable mobility mission takes the form of 2 components for a total amount of resources equal to 25,13 billion Euro, broken down as follows:



The mission aims to make, by 2026, the most modern, digital and sustainable infrastructure system, capable of responding to the challenge of decarbonisation indicated by the European Union with the strategies connected to the European Green Deal (in particular the "strategy for mobility intelligent and sustainable ", published on 9 December 2020) and to achieve the sustainable development goals identified by the United Nations 2030 agenda.

The planned investments are in line with the provisions of the current National Integrated Energy and Climate Plan (Piano Nazionale Integrato per l’Energia e il Clima - PNIEC), which provides that "For transport, priority is given to policies for increasing collective mobility , in particular by rail, including the shift of freight transport from road to rail ".

Furthermore, as indicated by the Commission in the Country Specific Recommendations (CSR) 2020 and 2019 for Italy, "Investing in sustainable transport and infrastructure is also a way to address environmental challenges. Substantial green investments are needed to achieve the EU's ambitious energy and climate targets for 2030 ”.



## The Measures

Only investments belonging to the following classification will be considered in this document:

* Mission 3 - Infrastructures for sustainable mobility,
  + Component 1 - Investments on the railway network,

This Component includes interventions to implement the strategic and programmatic indications of the annex to the DEF #italia fast, approved by the Council of Ministers on 6 July 2020.

These are investments relating to the railway infrastructure sector, both belonging to the National Railway Infrastructure under concession to RFI SpA, and regional lines under concession to the Regions.

The main investments for HS concern the construction of some fundamental sections: Naples-Bari, Brescia-Verona-Vicenza-Padova and Salerno-Reggio Calabria.

Investments are planned to speed up and increase the capacity of 6 further sections: Rome-Pescara, Orte-Falconara, Palermo-Catania-Messina, Liguria-Alps, Taranto-Metaponto-Potenza-Battipaglia and Verona-Brennero (adduction works).

Technological updating of the railway lines and nodes through the start of the implementation of the European Rail Traffic Management System (ERTMS) on the entire national network.

The technological upgrade of traffic management systems improves traffic regularity and solves reduced capacity issues on some railway lines.

Investments relating only to the regional lines interconnected to the national network (Turin Cerese-Canavesana, FUC Ferrovia Udine-Cividale, Bari-Bitritto line, Rosarno-S. Ferdinando line, FCU Centrale Umbra railway, EAV, FSE Ferrovie del Sud Est).

Specific investments in upgrading, electrification and resilience in the south are foreseen (among the lines specifically concerned we can mention Ionica Sibari-Catanzaro Lido-Reggio Calabria, Venafro - Campobasso - Termoli, Catania node, Decimomannu-Villamassargia doubling, Olbia airport railway connection, and others).

Finally, the program envisages a specific line of intervention for the stations in the south (Southern Station Plan).

The Measures referred to the railway infrastructure both in terms of Reforms and Investments are the following.

|  |  |  |
| --- | --- | --- |
| **M3C1** | **Reform/**  **Investment** | **Measure** |
| Railway works  (HS/HC railway) | Reform | 1. Acceleration of the approval process of the Contract between the MIT and RFI |
| 2. Acceleration of the authorization process of projects |
| Investment | 3. High-speed railway connections to the South for passengers and freight (Napoli - Bari) |
| 4. High-speed railway connections to the South for passengers and freight (Palermo-Catania) |
| 5. High-speed railway connections to the South for passengers and freight (Salerno-Reggio Calabria) |
| 6. High-speed lines in the North connecting to Europe (Brescia-Verona-Padova) |
| 7. High-speed lines in the North connecting to Europe (Liguria-Alps) |
| 8. High-speed lines in the North connecting to Europe (Verona-Brennero - adduction works) |
| 9. Diagonal connections (Roma-Pescara) |
| 10. Diagonal connections (Orte-Falconara) |
| 11. Diagonal connections (Taranto-Metaponto-Potenza-Battipaglia) |
| 12. Introducing the European Rail Transport Management System (ERTMS) |
| 13. Strengthening metropolitan nodes and key national links |
| 14. Strengthening regional lines - Upgrading of regional railways (management RFI) |
| 15. Upgrading, electrification and resilience of railways South |
| 16. Upgrading railway stations in the South |

# Do No Significant Harm

## The principle

The **Do No Significant Harm** (DNSH) principle is defined by EU regulation 2020/852 concerning the establishment of a framework that promotes sustainable investments.

EU regulation 2020/852 is referred to as the "Taxonomy regulation" as it has provided for the definition of a classification system ("taxonomy") of eco-sustainable economic activities. The Regulation establishes, in fact, the conception of the first system in the world for the classification of sustainable economic activities, capable of creating a common language that investors can use everywhere when they invest in projects and economic activities that have significant positive effects on the climate and the environment. By enabling investors to redirect investments towards more sustainable technologies and businesses, this piece of legislation will be instrumental in achieving climate neutrality for the EU by 2050.

Art. 9 of the taxonomy regulation has defined the following 6 environmental targets:

a) climate change mitigation;

b) adaptation to climate change;

c) the sustainable use and protection of water and marine resources;

d) the transition to a circular economy;

e) the prevention and reduction of pollution;

f) the protection and restoration of biodiversity and ecosystems.

Article 17 of the Taxonomy Regulation defines the concept of "significant damage" for six environmental targets. In detail, an activity can cause significant damage:

a) the mitigation of climate change, if the activity leads to significant emissions of greenhouse gases;

b) adaptation to climate change, if the activity leads to a worsening of the negative effects of the current climate and the anticipated future climate on itself or on people, nature or assets;

c) the sustainable use and protection of water and marine resources, if the activity harms:

i) the good status or ecological potential of water bodies, including surface and groundwater;

ii) the good ecological status of marine waters;

d) the circular economy, including waste prevention and recycling, if:

i) the activity leads to significant inefficiencies in the use of materials or in the direct or indirect use of natural resources such as non-renewable energy sources, raw materials, water resources and soil, in one or more phases of the life of products, including in terms of durability, possibility of improving, repairing, reusing or recycling products;

ii) the activity involves a significant increase in the production, incineration or disposal of waste, with the exception of the incineration of non-recyclable hazardous waste;

iii) long-term disposal of waste could cause significant and long-term damage to the environment;

e) the prevention and reduction of pollution, if the activity involves a significant increase in emissions of pollutants into the air, water or soil compared to the situation before its start;

f) the protection and restoration of biodiversity and ecosystems, if the activity:

i) significantly harms the good condition and resilience of ecosystems;

ii) harms the conservation status of habitats and species, including those of interest to the Union.

When assessing an economic activity on the basis of the do no significant harm criteria, the environmental impact of the activity itself and the environmental impact of the products and services provided by it during their entire life cycle are taken into account, in particular taking into account the production, use and end of life of these products and services.

## Application of the principle

The emergence of the COVID-19 pandemic in early 2020 has changed the economic, social and budgetary outlook in the Union and the world, requiring an urgent and coordinated response at both Union and national levels to address the enormous economic and social consequences as well as asymmetrical effects for Member States. In the context of the COVID-19 crisis, the need to strengthen the existing framework for supporting Member States by providing them with direct financial support through an innovative tool has become apparent. To this end, a Recovery and Resilience Facility (RFF) has been designed to provide effective and meaningful financial support to accelerate the implementation of sustainable reforms and related public investment in Member States.

EU regulation 2021/241 of 12 February 2021 established the Recovery and Resilience Facility, aimed at promoting the economic, social and territorial cohesion of the Union by improving resilience, crisis preparedness, adjustment capacity and growth potential of the Member States.

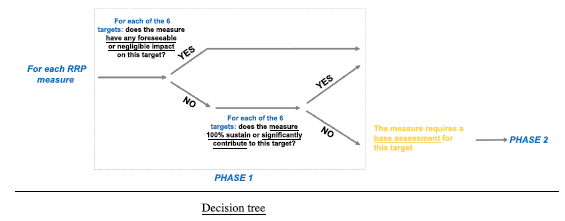
Regulation point 25 establishes that: "Member States should ensure that the measures included in their recovery and resilience plans comply with the 'do not cause significant harm' principle under Article 17 of Regulation (EU) 2020/852."

On 12 February 2021, under the Regulation on the mechanism for recovery and resilience, the Commission published **technical guidelines** on the application of the "do no significant harm” principle.

The technical guidelines, while confirming that all measures require a DNSH assessment, indicate that a simplified approach can be adopted for those which have no foreseeable impacts or which have a negligible foreseeable impact on all or some of the 6 environmental targets.

To facilitate Member States in the assessment and presentation of the DNSH principle in their Recovery and Resilience Plan (RRP), the Commission has prepared a check-list to be used to support their analysis of the link between each measure and the DNSH principle.

The check-list is based on the following decision tree, which should be used for each measure of the RRP.



As a first step, Member States are invited to complete part 1 of the check-list, to identify which of the six environmental targets requires a background assessment of the measure in light of the DNSH principle.

These are the possible answers to the checks on the 6 targets.

1. The measure has **no or negligible foreseeable impact** on the environmental targets related to the direct effects and primary indirect effects of the measure over its life cycle, given its nature, and as such is considered compliant with the DNSH principle for the relevant target;
2. the measure has a **100% support** ratio for a climate change or environment-related target, and as such is considered to comply with the DNSH principle for the relevant target;
3. The measure **substantially contributes** to an environmental target, pursuant to the Taxonomy Regulation, and as such is considered to comply with the DNSH principle for the relevant target.

In case the measure has no or negligible impact on the target considered (option A of the response) or is considered compliant with the DNSH principle for that target (options B and C), the DNSH assessment can take a simplified form. In this case, a short justification for each environmental target must also be provided.

If the answer to the checks is as follows, the second phase of the assessment must be started:

1. **None of the above**: the measure requires a background assessment for this target.

Member States are invited to use part 2 of the check-list to carry out a background assessment in light of the DNSH principle for environmental targets.

# Approach in the development of the assessment

## Adopted criteria

With reference to the 18 measures of the NRRP in the context of Mission 3 Component 1, in coordination with the MIMS, 10 homogeneous clusters by type of investment/impact generated were identified for which the aforementioned Phase 1 was developed.

Below is the association between the Measurements and the do no significant harm assessment reports that have been developed by RFI.

|  |  |  |
| --- | --- | --- |
| **Reform/**  **Investment** | **Measure** | **RFI sheets for DNSH assessment** |
| Reform | 1. Acceleration of the approval process of the Contract between the MIT and RFI | 1. Acceleration of the approval process of the Contract between the MIMS and RFI |
| 2. Acceleration of the authorization process of projects | 2. Acceleration of the authorization process of projects |
| Investment | 3. High-speed railway connections to the South for passengers and freight (Napoli - Bari) | 3. High-speed railway connections to the South for passengers and freight |
| 4. High-speed railway connections to the South for passengers and freight (Palermo-Catania) |
| 5. High-speed railway connections to the South for passengers and freight (Salerno-Reggio Calabria) |
| 6. High-speed lines in the North connecting to Europe (Brescia-Verona-Padova) | 4. High-speed lines in the North connecting to Europe |
| 7. High-speed lines in the North connecting to Europe (Liguria-Alps) |
| 8. High-speed lines in the North connecting to Europe (Verona-Brennero - adduction works) |
| 9. Diagonal connections (Roma-Pescara) | 5. Diagonal connections |
| 10. Diagonal connections (Orte-Falconara) |
| 11. Diagonal connections (Taranto-Metaponto-Potenza-Battipaglia) |
| 12. Introducing the European Rail Transport Management System (ERTMS) | 6. Introducing the European Rail Transport Management System (ERTMS) |
| 13. Strengthening metropolitan nodes and key national links | 7. Strengthening metropolitan nodes and key national links |
| 14. Strengthening regional lines - Upgrading of regional railways (management RFI) | 8. Strengthening regional lines - Upgrading of regional railways (management RFI) |
| 15. Upgrading, electrification and resilience of railways South | 9. Upgrading, electrification and resilience of railways South |
| 16. Upgrading railway stations in the South | 10. Upgrading railway stations in the South |

Some Measures consist of a multiplicity of interventions that pursue the same objectives, but which are characterized by the diversity of types of work, the distribution in the territory in different locations and different environmental situations.

In particular, the interventions of the following Measures are particularly numerous:

13. Strengthening metropolitan nodes and key national links;

14. Strengthening regional lines - Upgrading of regional railways (management RFI);

15. Upgrading, electrification and resilience of railways South;

16. Upgrading railway stations in the South.

A brief description of these Measures is considered appropriate.

13. Strengthening metropolitan nodes and key national links

Investment programme regarding nodes and key links on the national territory with the following objectives:

- infrastructural development (doubling/quadrupling) and technological enhancement of key links of national interest, of connecting lines to the main freight terminals and of last mile connections to ports;

- adaptation of performance levels (module, gauge, axle weight) to allow the transit of higher freight volumes on the TEN-T corridors, on freight lines, and on the connecting lines with the main ports and intermodal terminals;

- mitigation of bottlenecks for the development of passenger and freight traffic, including punctual interventions to manage interferences between passenger and freight traffic flows;

- increases in capacity and reduction in journey times through the elimination of critical points; increases in the capacity of lines close to saturation;

- increase in the capacity of the suburban access lines to the nodes being doubled;

- renovation of stations.

The interventions foreseen on key national links concern the following geographic areas:

- Liguria-Alps link (strengthening of connections with the swiss border passes, speeding up of the line Turin/Milan-Genoa, infrastructural and technological upgrading of the lines Genoa-Ventimiglia and Genoa-La Spezia);

- Transversal link (infrastructural and technological upgrading of the line Turin-Venice);

- Bologna-Venice-Trieste/Udine link (connections to the eastern border crossings);

- Central and North Tyrrhenian link (infrastructural and technological upgrading of the Central Dorsale HS line and of access lines to the Tyrrhenian ports);

- Adriatic-Ionian link (doubling of Termoli-Lesina line, upgrading and speeding up of Bologna-Lecce, infrastructural and technological upgrading Adriatic link);

- Southern Tyrrhenian link (technological upgrading of the node of Naples);

- Sicilian network: upgrading of Caltagirone-Gela line and electrification of Palermo-Trapani line;

- Sardinian network (infrastructural and technological upgrading of Cagliari-Sassari/Olbia lines).

14. Strengthening regional lines - Upgrading of regional railways (management RFI)

The interventions foreseen on the regional lines have the following objectives:

- To strengthen the interconnected regional railway lines, in order to reach the safety levels, set by the National Agency for Railway Safety (ANSF);

- To support the connection of regional lines with the national high speed network.

As concerns the interconnected regional lines, which are expected to be transferred and managed by RFI, interventions are planned in the following regions:

Piedmont: upgrading and modernisation of the Torino Cerese-Canavesana: improving the regularity of traffic flows;

Friuli Venezia Giulia: FUC railway: infrastructural and technological works on the Udine-Cividale line: improvement of the regularity of traffic flows;

Umbria: Umbrian Central Railway (FCU): infrastructural and technological interventions;

Campania (EAV): Strengthening and modernisation of the Cancello-Benevento line: improvement of safety standards for railway operations;

Puglia:

(i) Bari-Bitritto line: infrastructural upgrading: compliance with technical/regulatory standards of the National Railway Infrastructure;

(ii) Ferrovie del Sud Est (FSE): infrastructural upgrading of the Bari-Taranto line: the intervention will allow the adaptation to the performance standards of RFI and to the technical specifications of interoperability;

(iii) FSE: Completion of SCMT/ERTMS equipment on the network: improvement of traffic performance, optimisation of capacity, improvement of safety standards;

(iv) FSE: Realisation of intermodal Hubs and upgrading of 20 stations: the intervention aims at improving the accessibility of the stations and creating areas for exchanges rail-bus, rail-private car and rail-bike;

Calabria: Rosarno-S. Ferdinando line: upgrading of the equipment of the Rosarno and San Ferdinando lines for connection to Gioia Tauro.

15. Upgrading, electrification and resilience of railways South

Specific investments are foreseen to upgrade the railway network in various critical points in the South of Italy, to increase the competitiveness and connectivity of the intermodal logistic system (railways-airports-ports) and the connections with the major cities.

In particular, investments are planned on the following lines:

- Molise region:

(i) Rome-Venafro-Campobasso-Termoli;

(ii) Electrification and speeding up Roccaravindola-Isernia-Campobasso

- Apulia region:

(i) Upgrading of Bari – Lamasinata;

(ii) electrification Barletta – Canosa;

(iii) Pescara-Foggia

(iv) Modernization linea Potenza-Foggia

(v) Strengthening links Brindisi

(vi) Strengthening links Taranto

- Calabria region: Upgrading Ionian Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme

- Basilicata region: completion of Ferrandina-Matera

- Campania region: completion of Salerno Arechi – Aeroporto Pontecagnano

- Sicily:

(i) Node of Catania

(ii) Upgrading Palermo - Agrigento - Porto Empedocle

(iii) Intermodality and accessibility to Trapani Birgi airport

(iv) Link to the port of Augusta

- Sardinia:

(i) Olbia airport railway link

(ii) Track-doubling Decimomannu-Villamassargia.

16. Upgrading railway stations in the South.

The upgrade will involve internal and external stations areas and will consist as a minimum of:

- Enhancing the accessibility of the stations

- Increasing the quality of the services provided to users

- Improve the comfort, safety and quality of the public areas (internal and external).

The interventions will take place in the regions of Abruzzo, Molise, Campania, Calabria, Sicilia, Puglia, Basilicata and Sardegna.

The indicative list of 30 railway stations that will benefit is the following: Vasto San Salvo, Chieti, Pescara, Giulianova Potenza Centrale, Potenza Superiore, Lamezia Terme, Cosenza, Scalea-S.Domenica Talao, Vibo Valentia-Pizzo, Reggio di Calabria Lido, Sibari, Sapri, Falciano-Mondragone-Carinola, Maddaloni Inferiore, Pozzuoli Solfatara, Termoli, Polignano a Mare, San Severo, Barletta, Giovinazzo, Brindisi, Foggia, Macomer, Oristano, Palermo Notarbartolo, Milazzo, Acireale, Marsala, Siracusa.

In addition, a set of 8 station and one city -line will be upgrade as metropolitan hubs, with larger interventions that will involve also local stakeholders and include improvement of the energy efficiency of the stations.

The metropolitan hubs will be: Messina Centrale e Marittima, Villa San Giovanni, Benevento, Caserta, L2 Line in Naples, Bari, Lecce, Taranto, Settimo Rende (new station).

Another issue that assumes relevance for the purposes of the assessment is that, in the National Recovery and Resilience Plan there are investments characterized by a different state of progress. There are interventions that are underway, interventions in the tender phase, interventions for which authorizations have already been acquired, interventions in the design phase. This implies that in some cases environmental authorizations have already been acquired (eg Environmental Impact Assessment). Furthermore, the application of particular criteria for the choice of contractors or the adoption of additional mitigating measures to those required by current legislation is closely related to the progress of the interventions and any contractual changes would lead to cost increases.

It should also be noted that, as regards the target relating to climate change, where applicable, reference was made to Regulation (EU) 2021/241 of the European parliament and of the council of 12 February 2021 which establishes the mechanism for recovery and resilience which, in Annex VI - Climate control methodology Dimensions and codes of the types of intervention for the device for recovery and resilience.

Still on the subject of climate change, where applicable, reference was made to EU regulation 2020/852, known as the "Taxonomy regulation", which in Article 10 provides that the increase in clean or climate-neutral mobility is considered an economic activity that makes a substantial contribution to the mitigation of climate change.

# Do No Significant Harm assessment sheets for the railway infrastructure sector

## Acceleration of the approval process of the Contract between the MIMS and RFI

|  |  |
| --- | --- |
| **DNSH assessment** | |
| **Mission** | **Mission 3 “Sustainable mobility infrastructures”** |
| **Cluster** | **High speed/capacity railway network** |
| **Related Measure (Reform or Investment)** | **Reform 1. Acceleration of the approval process of the Contract between the MIMS and RFI** |
| **Responsibility for reporting and implementation** | **RFI/MIMS** |
| **Date** | **28/04/2021** |

|  |  |  |
| --- | --- | --- |
|  | **Step 1** | |
| **Environmental objectives** | **Does the measure have no or an insignificant foreseeable impact on this objective or contribute to support this objective?** | **Justification if A, B or C has been selected** |
| 1. Climate change mitigation | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | Through the proposed reform, the approval process of the 5-year CdP (Contratto di Programma) between MIMS and RFI and of the annual variations will be accelerated, allowing to speed up the planning and implementation of the works. The acceleration of the process does not affect the ability of RFI to select, plan and implement investment neither the quality of works which by nature (mainly electrified railways) can contribute to a switch towards a low carbon transport system |
| 2. Climate change adaptation | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed+ reform does not affect the ability of RFI to plan investment which can ensure a higher degree of attention on current and expected future climate risks. At the same time, the reform does not limit investment to improve the resilience of railways infrastructure to cliamte change |
| 3. The sustainable use and protection of water and marine resources | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of sustainable use and protection of water |
| 4. The circular economy, including waste prevention and recycling | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of circular economy. |
| 5. Pollution prevention and control to air, water or land | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of environmental negative impacts, including pollution, control to air, water or land |
| 6. The protection and restoration of biodiversity and ecosystems | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of protection of biodiversity and ecosystems |

## Acceleration of the authorization process of projects

|  |  |
| --- | --- |
| **DNSH assessment** | |
| **Mission** | **Mission 3 “Sustainable mobility infrastructures”** |
| **Cluster** | **High speed/capacity railway network** |
| **Related Measure (Reform or Investment)** | **Reform 2. Acceleration of the authorization process of projects** |
| **Responsibility for reporting and implementation** | **RFI/MIMS** |
| **Date** | **28/04/2021** |

|  |  |  |
| --- | --- | --- |
|  | **Step 1** | |
| **Environmental objectives** | **Does the measure have no or an insignificant foreseeable impact on this objective or contribute to support this objective?** | **Justification if A, B or C has been selected** |
| 1. Climate change mitigation | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The MIMS will propose a regulatory change, in order to allow to anticipate the geographic location of the works at the time of the “Economic Technical Feasibility Project” (PFTE), instead of waiting for the definitive project design phase. The location will hence be included as a variation of the urban planning instruments, with a constraint linked to expropriation. The additional authorizations, which cannot be acquired on the PFTE, would be obtained in subsequent project design phases, without convening the “Conferenza dei Servizi”, as an exception to Law no. 241/1990. |
| 2. Climate change adaptation | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of sustainable use and protection of water |
| 3. The sustainable use and protection of water and marine resources | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of sustainable use and protection of water |
| 4. The circular economy, including waste prevention and recycling | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of circular economy. |
| 5. Pollution prevention and control to air, water or land | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of environmental negative impacts, including pollution, control to air, water or land |
| 6. The protection and restoration of biodiversity and ecosystems | A. The measure has no or an insignificant foreseeable impact on the environmental objective related to the direct and primary indirect effects of the measure across its life cycle, given its nature, and as such is considered compliant with DNSH for the relevant objective | The proposed reform does not affect both national regulation and RFI's internal investment policies in the field of protection of biodiversity and ecosystems |

## High-speed railway connections to the South for passengers and freight

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **3. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **High speed railway connections to the South for passengers and freight** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU Regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 064) have a "Coefficient for calculating support for climate change targets" equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases (GHG)** are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:   * by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe; * by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.   At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (<https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment>)  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  The Italian railway lines are 72% electrified and, for these, the GHG emission is indirect, as it is connected to the production of electricity.  The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen traction.  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.  *Passenger transport*  In 2019, limited to land transport only (road + rail), equal to 938 billion pax.km, the modal split was:   | Transport mode | Modal share | | --- | --- | | Railway transport | 6% | | Extra-urban public transport | 10% | | Urban public transport | 2% | | Private road transport | 82% |   *Source: CNIT 2018-2019*  At 2030, with the entry into operation of the investments presented in the Recovery Fund, the modal share is estimated to be:   | Transport mode | Modal share | | --- | --- | | Railway transport | 10% | | Extra-urban public transport | 11% | | Urban public transport | 2% | | Private road transport | 77% |   This modal shift is reflected in terms of CO2 saved by passenger road vehicles for a value of approximately **2.3 million tonnes per year**.  *Freight Transport*  In the case of freight transport, the traffic data for 2019 were considered, which indicate the total value and the following modal breakdown at approximately 200 billion tonnes km   | Transport mode | Modal share | | --- | --- | | Railway transport | 10.7% | | Coastal maritime navigation | 29.3% | | Inland waterways | 0.0% | | Air navigation | 0.6% | | Road transport (> 50km) | 54.5% | | Oil pipelines (> 50km) | 4.8% |   *Source: CNIT 2018-2019*  By applying a prudential shift of about 10% from road to rail by 2030 (the long-term targets include 50% road transport, 50% rail transport by 2050 excluding transport by sea and air and excluding transport on routes shorter than 300km), the following modal share was estimated:   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 16.5% | | Coastal maritime navigation | 30% | | Inland waterways | 0.1% | | Air navigation | 0.6% | | Road transport (> 50km) | 47.7% | | Oil pipelines (> 50km) | 5.1% |   This breakdown makes it possible to quantify the CO2 savings from heavy road vehicles from 2030 equal to approximately **400,000 tonnes per year**.  Overall, therefore, starting from 2030 it is reasonable to assume that the eligible investments in the Recovery Fund will contribute to the achievement of the long-term targets both in terms of modal share and in terms of CO2 savings (approximately 2.8 million tonnes of CO2 from transport passenger and freight road).  These forecasts have been developed considering all the investments envisaged in the NNRP and constitute a challenging target but which is deemed achievable, if the hypotheses relating to the response of the Railway Companies for the services offered, to the demand for railway mobility and to the situation are also confirmed with specific regard to economic conditions, transport policies, technological innovations and transformations in progress (energy mix, electric mobility, hydrogen mobility).  The cluster of investments relating to the *High-speed railway connections to the South for passengers and freight* area includes intervention programs for the enhancement of the Naples-Bari, Salerno-Reggio Calabria and Palermo-Catania connections. These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network. In particular, benefits are expected for the passenger segment due to the increase in the speed of the new railway lines and the elimination of the subjection to the formation of the timetable connected to the presence of the single track in most of the Caserta-Foggia lines (current Naples-Bari connection axis) and Palermo-Catania. Added to these are the foreseeable benefits associated with improving the accessibility of areas that are not currently served by the railway carrier. As regards the freight segment, the investments of the cluster envisage intervening on the infrastructural performances to which freight transport is most sensitive: possibility of running longer trains (module), heavier (axial weight) and with greater transversal dimensions (shape).  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GHG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (*Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014*).  The Cost Benefit Analysis of the program of interventions on the Naples-Bari route is available as part of the *High-speed railway connections to the South for passengers and freight* investment cluster. The Cost Benefit Analysis of the new Palermo-Catania connection and of the new Salerno-Battipaglia-Reggio C line are in progress.  Starting from the multi-modal traffic study, the following avoided emissions were assessed in the Cost-Benefit Analysis of the investment program on the Naples-Bari route:  **“Avoided” GHG emissions**   |  |  |  | | --- | --- | --- | | **Vehicle type** | **Years** | **Co2 emissions**  **(tonnes)** | | **Car** | 2026 | -145,610 | | 2035 | -105,979 | | 2047 | -99,792 | | **Accumulated 2023-2047** | **-2,515,196** | | **Heavy freight vehicles** | 2026 | -31,912 | | 2035 | -29,769 | | 2047 | -28,031 | | **Accumulated 2023-2047** | **-652,274** | | **Total Accumulated 2023-2047** | | **- 3.167,470** |   It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional High-Speed sections planned in the South of the country during project development and therefore provide evidence of the further expected benefits in relation to the "climate change mitigation” environmental target. |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | In case of new project, a specific vulnerability and climate risk assessment, related to flooding, snow, arising sea level, rainfalls, etc. will be performed in order to identify, to select and to implement the relevant adaptation measures, accordingly to the EU framework.  The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  RFI is among the main beneficiaries of the National Operational Program financed by the ERDF. As part of the National Operational Program (NOP), the systematic completion of "Form A" - Indicator 6 "Studies/Works of adaptation to climate change" is envisaged, in which some "Soft", Green", Gray” actions in the design or used in the context of sharing design choices with the territory are identified.  As part of the participation in the "Infrastructures and Networks" NOP (2014-2020), a first application of identification in the design of the actions defined in the National Strategy for Adaptation to Climate Change (NSAC) of the MATTM was also carried out for the “Bicocca-Catenanuova” railway section project, included in Mission 3 Component 1 of the NRRP.  The cluster of investments relating to the high-speed lines in the south of the country includes intervention programs for the enhancement of the Naples- Bari, Salerno-Reggio Calabria and Palermo-Catania connections. These are investments that involve the construction of new railway lines according to the best technical standards.  As regards the upgrading of the Naples-Bari route, it is noted that the existing line was affected by major landslides (Monte Aguto) which led to prolonged closures of the railway operation. The new infrastructure, which replaces the existing one in the variant sections, has avoided areas with high geological risk.  Furthermore, for the “Naples-Bari Route” investment program, RFI has adopted the «Envision»TM Sustainability Protocol, a rating system for objectively measuring the environmental, economic and social sustainability of the works.  This Protocol provides for an assessment based on 60 sustainability criteria, divided into 5 categories:   * Quality of life: Purpose, Wellbeing, Community; * Leadership: Collaboration, Management, Planning; * Resource Allocation: Materials, Energy, Water; * Natural World: Siting, Land-water, Biodiversity; * Climate and Resilience: Emissions, Resilience.   The Envision system provides four levels of certification, based on the percentage of achievement of the maximum applicable score for the work (respectively 20% for the "Verified" level, 30% for the "Silver" level, 40% for the "Gold" level and 50% for the “Platinum” level).  With reference to the Naples-Bari investment program, the Frasso Telesino - San Lorenzo Maggiore section design achieved the Envision certification with a maximum “platinum” level in 2019, becoming the first design in Europe to obtain this certification.  In particular, the excellent result achieved in the “Climate and Resilience” category highlights that the design solutions chosen for the construction of the infrastructure are generally characterised by effective climate change mitigation and adaptation measures.  The set of planned interventions, which can be counted among those called upon to provide an adequate response to changed conditions and/or changes in the long-term scenario, consists of the extensive network of protection works and hydraulic arrangement of the surface network, from the hydraulic manholes. (transparency, aimed at guaranteeing the continuity of the natural water run-off, currently existing on the ground level), compliance with hydraulic clearances for works, implementation of the rules on hydraulic invariance, all interventions allow to strengthen the "adaptation" and protection strategies, being also dimensioned (and hydraulically verified) for a 300-year return time of flood events (in accordance with the Railway Design Manual), therefore with a margin of caution in addition to the local and national reference standards (i.e. 100 years, according to the Technical Implementation Standards of the PAI or PSDA, and 200 years, according to the NTC2008). |
| 1. **Sustainable use and protection of water and marine resources** | D. None of the above: the measure requires a background assessment for this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For the new infrastructure projects promoted by RFI, the Environmental Impact Study and the Environmental Project of the Construction Site represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The Environmental Monitoring Project is also drafted from the design phase to identify the points to be monitored on potentially critical factors as resulting from the results of the Environmental Impact Study.  In fact, said Monitoring verifies and controls the impact of the construction of the work also on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble. The treatment and management of excavated earth and rocks has been subject, over the last few years, to various regulatory changes, up to the implementation of article 5 of Directive 98/2008/EC, implemented with the introduction of art. 184-bis in the Consolidated Environmental Law. The Directive governs measures and criteria to be met to establish whether specific substances or objects can be considered by-products or waste. The implementation of the principle outlined in article 184-bis has therefore given rise to Ministerial Decree 161/2012 which then evolved into the current Presidential Decree 120/2017 containing the simplified regulation of the management of excavated earth and rocks. This regulation establishes that earth and rocks coming from excavations in the construction sector can sometimes present themselves as materials to be considered as real "products" to be reused to replace the natural resources deriving from quarry "exploitation". RFI therefore proceeded to adapt its procedures (design manuals and tender specifications) to proactively respond to EU principles, achieving very high standards in the European construction landscape. As part of the RFI Civil Works Design Manual, the procedural system to be adopted both in the design phase and in the execution phase of the interventions aimed at maximising the reuse of excavated earth and rocks in the same works of origin or, alternatively, in other works or industrial processes was defined so as to reduce, on the one hand, the production of special waste and, on the other, the need to procure virgin quarry material, promoting the transition towards the circular economy.  Only in the event that the material does not meet the environmental characteristics or performance criteria, RFI admits its management as waste. Also in this case the procedural system is such as to promote the delivery of waste for recovery rather than disposal with the aim of promoting its circularity in order to guarantee its re-entry into the product cycle.  By-products not intended for re-use in railway works are instead intended for environmental redevelopment and restoration interventions identified in synergy with local administrations, in order to identify degraded or abandoned areas or interventions of public interest and of priority importance in the areas impacted/affected by the Design. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | D. None of the above: the measure requires a background assessment for this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    The cluster of investments relating to the high-speed lines in the south of the country includes intervention programs for the enhancement of the Naples- Bari, Salerno-Reggio Calabria and Palermo-Catania connections. These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of pollutant emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (*Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014*).  Starting from the multi-modal traffic study, the following avoided emissions were assessed in the Cost-Benefit Analysis of the investment program on the Naples-Bari route:  "Avoided” pollutant emissions   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Vehicle type** | **Period** | **Total tonnes for the period** | | | | | **SO2** | **NOx** | **COVNM** | **PM2.5** | | **Car** | **2026** | -0.6 | -320.4 | -29.5 | 11.8 | | **2035** | -0.6 | -265.0 | -25.4 | -7.2 | | **2047** | -0.6 | -191.2 | -19.9 | -1.1 | | **Accumulated 2023-2047** | **-12.4** | **- 5,683.4** | **- 548.4** | **- 144.3** | | **Heavy freight vehicles** | **2026** | -0.1 | -143.4 | -5.3 | -3.1 | | **2035** | -0.1 | -113.0 | -4.3 | -2.4 | | **2047** | -0.1 | -72.3 | -3.0 | -1.4 | |  | | | | | | | **Vehicle type** | **Period** | **Total tonnes for the period** | | | | | **SO2** | **NOx** | **COVNM** | **PM2.5** | | **Accumulated 2023-2047** | **-3.0** | **-2,372.7** | **-91.4** | **-49.5** | | **Total Accumulated 2023-2047** | | **-15.4** | **-8,056.1** | **- 639.8** | **- 193.8** |   It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional High-Speed sections planned in the South of the country during project development and therefore provide evidence of the further expected benefits in relation to this environmental target.  As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water.  As part of the design of new railway infrastructures and in particular those to be subjected to Environmental Impact Assessment (EIA), all the necessary studies are carried out to verify the conditions of minimum interference with the components defined by the EIA regulations, including air , water, soil, biodiversity, raw materials, acoustic and vibrational climate, etc. The environmental studies for the interventions subjected to EIA are completed by the Environmental Design of the Construction Site and by the Environmental Monitoring Plan.  The studies also include the identification of the possible presence of contaminated sites in order to guide the route choices, limit interference and, if possible, redevelop and reclaim the areas.  The Environmental Design of the Construction Site aims to identify, describe and assess the significance of the direct and indirect environmental problems that can be generated and define mitigation measures and operational procedures to contain the environmental impacts connected to the construction phase of the work.  The measures essentially consist of direct and indirect interventions in the construction site areas, on the roads used for the construction of the work (movements between the construction site areas, roads to/from quarries and landfills, storage sites, etc.), in land storage areas, contributing to the protection of surface and deep waters, soil, biodiversity, the need for raw materials, the acoustic climate, vibrations, air quality, waste and waste materials, water discharges, harmful substances and the landscape.  The attention to the environment, which characterises the model for the construction of sustainable railway infrastructures, is also concretely applied in the adoption, in the contract assignment phase, of specific contractual clauses which provide for the obligation for the companies carrying out the works to ensure constant and timely supervision of the environmental aspects of the construction site also through the implementation of specific environmental management systems that comply with the requirements of the international standard by the contractor.  The Environmental Monitoring Design is drawn up in accordance with the current legislation on environmental matters, and in compliance with the guidelines in force and in compliance with the provisions of the pertinent bodies for the supervision of the various environmental components. It defines the objectives, requirements, methodological criteria, methods and timing for Before - During - After Work Monitoring, taking into account the territorial and environmental reality in which the design of the work is inserted and the potential impacts it determines both in positive and negative terms, as a result of the assessments that emerged in the analyses carried out on environmental factors as part of the drafting of the Environmental Impact Study.  The proponent, through Environmental Monitoring activities, verifies the impact of the work on the environmental matrices by carrying out measurement campaigns in the ante-construction phase (for the characterisation of the site), during work (for the construction phase) and after (for the operating phase).  The campaigns include investigations on the components of surface and groundwater, soil and subsoil, acoustic and vibrational climate, air quality, social environment and vegetation, flora, fauna and ecosystems.  Monitoring data are entered and organised through a geographic information database, which constantly provides updates on the environmental status of the areas affected by the works, to the bodies responsible for the control and validation process of the environmental data, through specific alerting tools.  As regards the verification of the acoustic and vibrational impact, specific forecast studies are drawn up in which the receptors present in the design's range or influence are identified and the post-work climate is characterised by means of simulations conducted with specific specialised software that take into account the characteristics of the design, territory, infrastructure and traffic planned both during the day and night. Downstream of this activity, the post-construction emission scenario is compared with the limits imposed by current legislation, in order to dimension the mitigation measures necessary to bring the acoustic climate and any vibration emissions within the standard deadlines. For vibrations, in particular, reference is made to the standard indications (UNI standards) concerning the disturbance to people. |
| 1. **Protection and restoration of biodiversity and ecosystems** | D. None of the above: the measure requires a background assessment for this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures. I    According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  For the new infrastructure designed promoted by RFI, the analysis of the reference context in terms of biodiversity is one of the main tools for the prevention of potential significant impacts on the environment, already in the phase of choosing the corridor and the route.  In fact, starting from a study of a large area, and in the context of route choices that respect the geometric and functional constraints of the work, the solution is identified that has the greatest characteristics of sustainability also minimising interference with parks, protected areas and Natura 2000 sites.  Evidence of this design focus and of all the actions aimed at mitigating the construction and operation phase of the infrastructure, is provided in the Environmental Impact Study and, if necessary, in the Incidence Report.  With regard to Natura 2000 sites, if the design solution as selected above in any case directly or indirectly (5 km range) concerns a Site of Community Interest/Special Conservation Areas and/or a Special Protection Area, the Impact Assessment procedure Environmental is integrated by the Environmental Impact Assessment Procedure.  The Incidence Report examines all possible alterations on the habitats and on the protected animal and plant species, also by means of precise surveys in the field. |

## High-speed lines in the North connecting to Europe

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **4. High-speed lines in the North connecting to Europe** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU Regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 064) have a "Coefficient for calculating support for climate change targets" equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:   * by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe; * by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.   At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment)  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  The Italian railway lines are 72% electrified and, for these, the GHG emission is indirect, as it is connected to the production of electricity.  The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen drive  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.  *Passenger transport*  In 2019, limited to land transport only (road + rail), equal to 938 billion pax.km, the modal split was:   | Transport mode | Modal share | | --- | --- | | Railway transport | 6% | | Extra-urban public transport | 10% | | Urban public transport | 2% | | Private road transport | 82% |   *Source: CNIT 2018-2019*  At 2030, with the entry into operation of the investments presented in the Recovery Fund, the modal share is estimated to be:   | Transport mode | Modal share | | --- | --- | | Railway transport | 10% | | Extra-urban public transport | 11% | | Urban public transport | 2% | | Private road transport | 77% |   This modal shift is reflected in terms of CO2 saved by passenger road vehicles for a value of approximately **2.3 million tonnes per year**.  *Freight Transport*  In the case of freight transport, the traffic data for 2019 were considered, which indicate the total value and the following modal breakdown at approximately 200 billion tonnes km   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 10.7% | | Coastal maritime navigation | 29.3% | | Inland waterways | 0.0% | | Air navigation | 0.6% | | Road transport (> 50km) | 54.5% | | Oil pipelines (> 50km) | 4.8% |   *Source: CNIT 2018-2019*  By applying a prudential shift of about 10% from road to rail by 2030 (the long-term targets include 50% road transport, 50% rail transport by 2050 excluding transport by sea and air and excluding transport on routes shorter than 300km), the following modal share was estimated:   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 16.5% | | Coastal maritime navigation | 30% | | Inland waterways | 0.1% | | Air navigation | 0.6% | | Road transport (> 50km) | 47.7% | | Oil pipelines (> 50km) | 5.1% |   This breakdown makes it possible to quantify the CO2 savings from heavy road vehicles from 2030 equal to approximately **400,000 tonnes per year**.  Overall, therefore, starting from 2030 it is reasonable to assume that the eligible investments in the Recovery Fund will contribute to the achievement of the long-term targets both in terms of modal share and in terms of CO2 savings (approximately 2.8 million tonnes of CO2 from transport passenger and freight road).  These forecasts have been developed considering all the investments envisaged in the NNRP and constitute a challenging target but which is deemed achievable, if the hypotheses relating to the response of the Railway Companies for the services offered, to the demand for railway mobility and to the situation are also confirmed with specific regard to economic conditions, transport policies, technological innovations and transformations in progress (energy mix, electric mobility, hydrogen mobility).  The cluster of investments relating to the *High-speed lines in the North connecting to Europe* sector includes interventions programs for the strengthening of the Brescia-Verona-Padova, Liguria-Alps and Verona-Brenner connections. These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network. In particular, the Milan- (Brescia) -Verona-Padova line is one of the most important lines at national level and acts as a distributor of freight traffic arriving from Northern Europe through Austria and Switzerland to the rest of the country. At the same time, it is characterised by the presence of a high number of passenger trains during the day, to which is added a substantial amount of freight trains, especially at night.  The completion of the HS/HC horizontal axis is therefore of strategic importance both to overcome the capacity and performance constraints of the existing infrastructure and to seize the opportunities for developing traffic along the TEN-T Mediterranean corridor. In fact, the line is an integral part of the infrastructural corridor that connects the Iberian Peninsula with the border between Hungary and Ukraine passing south of the Alps.  As regards the freight segment, the investments of the cluster envisage intervening on the infrastructural performances to which freight transport is most sensitive: possibility of running longer trains (module), heavier (axial weight) and with greater transversal dimensions (shape). In particular, the Liguria-Alps connection is configured as a new high-capacity fast line which aims to strengthen the railway connections between the Ligurian port system and the upper Tyrrhenian with the north of the country and the north centre of Europe (Rotterdam and Antwerp). The line, in fact, as part of the High Speed/High Capacity system along the Milan-Genoa axis, is part of the Reno-Alps Core Network Corridor which connects the most densely populated European regions with the greatest industrial vocation.  As regards the Verona-Brenner upgrading project, the increase in freight traffic given by the opening of the Brenner tunnel highlighted the existence of critical issues along the current access line, which can be summarised as follows:   * point limitations due to route constraints (longitudinal slope); * crossing of urban centres (with operating restrictions resulting from noise); * non-functional connections with the existing network (with consequent operating limitations such as in the Verona node).   Therefore it was decided to quadruple the adduction line through the construction of a new line.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GhG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014).  Starting from the multi-modal traffic study, the following avoided emissions were assessed in the Cost-Benefit Analysis of the investment program on the Brescia-Verona-Padova route:   |  |  |  | | --- | --- | --- | | **Vehicle type** | **Years** | **CO2 emissions**  **(tonnes)** | | Car | 2028 | -91,496 | | 2035 | -88,293 | | 2050 | -84,402 | | **Accumulated 2028-2050** | **-1,918,299** | | Heavy freight vehicles | 2028 | -502,349 | | 2035 | -485,484 | | 2050 | -464,090 | | **Accumulated 2028-2050** | **-9,521,108** | |  | | | | **Total Accumulated 2028-2050** | | **11,439,407** |   It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional High-Speed sections planned in the North of the country during project development and therefore provide evidence of the further expected benefits in relation to the "climate change mitigation” environmental target. |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | In case of new project, a specific vulnerability and climate risk assessment, related to flooding, snow, arising sea level, rainfalls, etc. will be performed in order to identify, to select and to implement the relevant adaptation measures, accordingly to the EU framework.  The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  RFI is among the main beneficiaries of the National Operational Program financed by the ERDF. As part of the National Operational Program (NOP), the systematic completion of "Form A" - Indicator 6 "Studies/Works of adaptation to climate change" is envisaged, in which some "Soft", Green", Gray” actions in the design or used in the context of sharing design choices with the territory are identified.  The cluster of investments relating to high-speed lines in the north of the country includes interventions programs for the strengthening of the Brescia-Verona-Padova, Liguria-Alps connections and Verona-Brenner adduction works. These are investments that involve the construction of new railway lines according to the best technical standards.  As regards the enhancement of the Brescia-Verona-Padova route, for example, the previous design of the 2nd "Crossing of Vicenza” functional lot, which initially also extended to the east of the Vicenza station, involved the need to redo/raise the railway bridges on the Retrone and Bacchiglione rivers to adapt them to the technical standards for construction.  For this reason, the route of the 2nd lot has been modified, providing for its end at the eastern root of Vicenza, while the 3rd Vicenza-Padova lot extends east of Vicenza after the area where the two bridges stand.  The construction of a new pair of tracks has not been planned in the short stretch east of Vicenza where there are the two bridges over the Retrone and Bacchiglione but the current layout has been maintained by allocating two tracks for high-speed and the other two to the historic Verona-Padova and Schio-Treviso lines. |
| 1. **Sustainable use and protection of water and marine resources** | D. None of the above: the measure requires a background assessment for this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For the new infrastructure projects promoted by RFI, the Environmental Impact Study and the Environmental Project of the Construction Site represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The Environmental Monitoring Project is also drafted from the design phase to identify the points to be monitored on potentially critical factors as resulting from the results of the Environmental Impact Study.  In fact, said Monitoring verifies and controls the impact of the construction of the work also on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble. The treatment and management of excavated earth and rocks has been subject, over the last few years, to various regulatory changes, up to the implementation of article 5 of Directive 98/2008/EC, implemented with the introduction of art. 184-bis in the Consolidated Environmental Law. The Directive governs measures and criteria to be met to establish whether specific substances or objects can be considered by-products or waste. The implementation of the principle outlined in article 184-bis has therefore given rise to Ministerial Decree 161/2012 which then evolved into the current Presidential Decree 120/2017 containing the simplified regulation of the management of excavated earth and rocks. This regulation establishes that earth and rocks coming from excavations in the construction sector can sometimes present themselves as materials to be considered as real "products" to be reused to replace the natural resources deriving from quarry "exploitation". RFI therefore proceeded to adapt its procedures (design manuals and tender specifications) to proactively respond to EU principles, achieving very high standards in the European construction landscape. As part of the RFI Civil Works Design Manual, the procedural system to be adopted both in the design phase and in the execution phase of the interventions aimed at maximising the reuse of excavated earth and rocks in the same works of origin or, alternatively, in other works or industrial processes was defined so as to reduce, on the one hand, the production of special waste and, on the other, the need to procure virgin quarry material, promoting the transition towards the circular economy.  Only in the event that the material does not meet the environmental characteristics or performance criteria, RFI admits its management as waste. Also in this case the procedural system is such as to promote the delivery of waste for recovery rather than disposal with the aim of promoting its circularity in order to guarantee its re-entry into the product cycle.  By-products not intended for re-use in railway works are instead intended for environmental redevelopment and restoration interventions identified in synergy with local administrations, in order to identify degraded or abandoned areas or interventions of public interest and of priority importance in the areas impacted/affected by the Design. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | D. None of the above: the measure requires a background assessment for this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    The cluster of investments relating to high-speed lines in the north of the country includes interventions programs for the strengthening of the Brescia-Verona-Padova, Liguria-Alps connections and Verona-Brenner adduction works. These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of pollutant emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (*Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014*).  Starting from the multi-modal traffic study, the following avoided emissions were assessed in the Cost-Benefit Analysis of the investment program on the Brescia-Verona-Padova route:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | | **TOTAL TONNES** | | | | | **Vehicle type** | **Years** | **SO2** | **Nox** | **COVNM** | **PM2.5** | | Car | 2028 | -1.1 | -216.8 | -40.2 | -4.9 | | 2035 | -1.1 | -213.2 | -39.3 | -4.5 | | 2050 | -1.1 | -205.4 | -37.4 | -3.6 | | **Accumulated 2028-2050** | **-24.6** | **-4,638.8** | **-559.5** | **-92.5** | | Heavy freight vehicles | 2028 | -1.5 | -1,734.2 | -30.4 | -18.1 | | 2035 | -1.6 | -1,860.6 | -31.1 | -18.5 | | 2050 | -1.6 | -2,125.4 | -31.8 | -18.8 | | **Accumulated 2028-2050** | **-34.5** | **-42,665.8** | **-688.3** | **-408.5** | |  | | | | | | | **Total Accumulated 2028-2050** | | **-59.2** | **-47,304.7** | **-1,247.9** | **-501.0** |   It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional High-Speed sections planned in the South of the country during project development and therefore provide evidence of the further expected benefits in relation to this environmental target.  As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water.  As part of the design of new railway infrastructures and in particular those to be subjected to Environmental Impact Assessment (EIA), all the necessary studies are carried out to verify the conditions of minimum interference with the components defined by the EIA regulations, including air , water, soil, biodiversity, raw materials, acoustic and vibrational climate, etc. The environmental studies for the interventions subjected to EIA are completed by the Environmental Design of the Construction Site and by the Environmental Monitoring Plan.  The studies also include the identification of the possible presence of contaminated sites in order to guide the route choices, limit interference and, if possible, redevelop and reclaim the areas.  The Environmental Design of the Construction Site aims to identify, describe and assess the significance of the direct and indirect environmental problems that can be generated and define mitigation measures and operational procedures to contain the environmental impacts connected to the construction phase of the work.  The measures essentially consist of direct and indirect interventions in the construction site areas, on the roads used for the construction of the work (movements between the construction site areas, roads to/from quarries and landfills, storage sites, etc.), in land storage areas, contributing to the protection of surface and deep waters, soil, biodiversity, the need for raw materials, the acoustic climate, vibrations, air quality, waste and waste materials, water discharges, harmful substances and the landscape.  The attention to the environment, which characterises the model for the construction of sustainable railway infrastructures, is also concretely applied in the adoption, in the contract assignment phase, of specific contractual clauses which provide for the obligation for the companies carrying out the works to ensure constant and timely supervision of the environmental aspects of the construction site also through the implementation of specific environmental management systems that comply with the requirements of the international standard by the contractor.  The Environmental Monitoring Design is drawn up in accordance with the current legislation on environmental matters, and in compliance with the guidelines in force and in compliance with the provisions of the pertinent bodies for the supervision of the various environmental components. It defines the objectives, requirements, methodological criteria, methods and timing for Before - During - After Work Monitoring, taking into account the territorial and environmental reality in which the design of the work is inserted and the potential impacts it determines both in positive and negative terms, as a result of the assessments that emerged in the analyses carried out on environmental factors as part of the drafting of the Environmental Impact Study.  The proponent, through Environmental Monitoring activities, verifies the impact of the work on the environmental matrices by carrying out measurement campaigns in the ante-construction phase (for the characterisation of the site), during work (for the construction phase) and after (for the operating phase).  The campaigns include investigations on the components of surface and groundwater, soil and subsoil, acoustic and vibrational climate, air quality, social environment and vegetation, flora, fauna and ecosystems.  Monitoring data are entered and organised through a geographic information database, which constantly provides updates on the environmental status of the areas affected by the works, to the bodies responsible for the control and validation process of the environmental data, through specific alerting tools.  The cluster of investments relating to high-speed lines in the north of the country includes interventions programs for the strengthening of the Brescia-Verona-Padova, Liguria-Alps connections and Verona-Brenner adduction works. These are investments that involve the construction of new railway lines according to the best technical standards.  In particular, Third Pass tunnel excavations concern rock that may contain natural asbestos. Considering the possibility of excavating in the presence of natural asbestos, in order to protect health and the environment by avoiding the dispersion of asbestos dust in the air outside the tunnel, environmental protection and mitigation standards have been applied and some sites are also equipped with systems and equipment useful for managing the asbestos risk. The "Asbestos Risk Management Working Group", set up within the Environmental Observatory, has adopted the asbestos management protocol which defines specific methods of control, sampling and analysis for "Green Stone" excavation with the primary asbestos risk management aim of safety of the population and the protection of the territory crossed by the work.  In particular, the document defines:  · the geological model of the work as a function of the Probability of Occurrence of Asbestos Minerals (POMA);  · The protocols to be implemented for the characterisation of excavated materials in order to ascertain the presence of asbestos in the stone;  · The protocols to be adopted for the monitoring of airborne asbestos in the living environment at the production and storage sites of excavation materials containing asbestos under the threshold;  · The mitigation measures to be adopted in the management of excavation materials containing asbestos under the threshold, in order to prevent the dispersion of asbestos fibres into the air.  The presence of asbestos fibres in the air is checked both inside and outside the site in each operating site and storage site for excavated material containing asbestos. The analyses performed provided values substantially below the reference limit defined by the asbestos protocol for the living environment (equal to 1 fibre/litre), confirming the absence of health and environmental hazards.  As regards the verification of the acoustic and vibrational impact, specific forecast studies are drawn up in which the receptors present in the design's range or influence are identified and the post-work climate is characterised by means of simulations conducted with specific specialised software that take into account the characteristics of the design, territory, infrastructure and traffic planned both during the day and night. Downstream of this activity, the post-construction emission scenario is compared with the limits imposed by current legislation, in order to dimension the mitigation measures necessary to bring the acoustic climate and any vibration emissions within the standard deadlines. For vibrations, in particular, reference is made to the standard indications (UNI standards) concerning the disturbance to people. |
| 1. **Protection and restoration of biodiversity and ecosystems** | D. None of the above: the measure requires a background assessment for this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures.  According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  For the new infrastructure designed promoted by RFI, the analysis of the reference context in terms of biodiversity is one of the main tools for the prevention of potential significant impacts on the environment, already in the phase of choosing the corridor and the route.  In fact, starting from a study of a large area, and in the context of route choices that respect the geometric and functional constraints of the work, the solution is identified that has the greatest characteristics of sustainability also minimising interference with parks, protected areas and Natura 2000 sites.  Evidence of this design focus and of all the actions aimed at mitigating the construction and operation phase of the infrastructure, is provided in the Environmental Impact Study and, if necessary, in the Incidence Report.  With regard to Natura 2000 sites, if the design solution as selected above in any case directly or indirectly (5 km range) concerns a Site of Community Interest/Special Conservation Areas and/or a Special Protection Area, the Impact Assessment procedure Environmental is integrated by the Environmental Impact Assessment Procedure.  The Incidence Report examines all possible alterations on the habitats and on the protected animal and plant species, also by means of precise surveys in the field. |

## Diagonal connections

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **5. Diagonal connections** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 065) have a Coefficient for calculating support for climate change targets equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:  by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe;  by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.  At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment)  Italian railway lines are 72% electrified. The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen traction.  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.    *Passenger transport*  In 2019, limited to land transport only (road + rail), equal to 938 billion pax.km, the modal split was:   | Transport mode | Modal share | | --- | --- | | Railway transport | 6% | | Extra-urban public transport | 10% | | Urban public transport | 2% | | Private road transport | 82% |   *Source: CNIT 2018-2019*  At 2030, with the entry into operation of the investments presented in the Recovery Fund, the modal share is estimated to be:   | Transport mode | Modal share | | --- | --- | | Railway transport | 10% | | Extra-urban public transport | 11% | | Urban public transport | 2% | | Private road transport | 77% |   This modal shift is reflected in terms of CO2 saved by passenger road vehicles for a value of approximately **2.3 million tonnes per year**.  *Freight Transport*  In the case of freight transport, the traffic data for 2019 were considered, which indicate the total value and the following modal breakdown at approximately 200 billion tonnes km   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 10.7% | | Coastal maritime navigation | 29.3% | | Inland waterways | 0.0% | | Air navigation | 0.6% | | Road transport (> 50km) | 54.5% | | Oil pipelines (> 50km) | 4.8% |   *Source: CNIT 2018-2019*  By applying a prudential shift of about 10% from road to rail by 2030 (the long-term targets include 50% road transport, 50% rail transport by 2050 excluding transport by sea and air and excluding transport on routes shorter than 300km), the following modal share was estimated:   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 16.5% | | Coastal maritime navigation | 30% | | Inland waterways | 0.1% | | Air navigation | 0.6% | | Road transport (> 50km) | 47.7% | | Oil pipelines (> 50km) | 5.1% |   This breakdown makes it possible to quantify the CO2 savings from heavy road vehicles from 2030 equal to approximately **400,000 tonnes per year**.  Overall, therefore, starting from 2030 it is reasonable to assume that the eligible investments in the Recovery Fund will contribute to the achievement of the long-term targets both in terms of modal share and in terms of CO2 savings (approximately 2.8 million tonnes of CO2 from transport passenger and freight road).  These forecasts have been developed considering all the investments envisaged in the NNRP and constitute a challenging target but which is deemed achievable, if the hypotheses relating to the response of the Railway Companies for the services offered, to the demand for railway mobility and to the situation are also confirmed with specific regard to economic conditions, transport policies, technological innovations and transformations in progress (energy mix, electric mobility, hydrogen mobility).  The cluster of investments relating to *Diagonal Connections* includes interventions programs for the strengthening of the Rome-Pescara, Orte-Falconara and Taranto-Metaponto-Potenza-Battipaglia connections.  These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.  In particular, the strengthening of the Rome-Pescara itinerary represents a strategic intervention that aims to create a real metropolitan and capillary system in the territory with travel times between the two cities that would go from the current 3h 20’ to about 2h.  In this way, the railway system would be very competitive with respect to the current services insured by road (private and public) with undoubted environmental advantages in terms of saving on polluting emissions.  In the same way, the strengthening of the Orte-Falconara route has the aim of both improving passenger connections between the Tyrrhenian regions and those on the Adriatic side and creating an alternative freight route for north-south connections.  Finally, the upgrading works along the Taranto-Metaponto-Potenza-Battipaglia line will ensure a reduction in travel times along the Naples-Taranto route from the current 4h to about 3h 30’ with an increase in the competitiveness of the railway sector compared to the road sector.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GhG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014).  It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional sections planned in the *Diagonal Connections* area during project development and therefore provide evidence of the further expected benefits in relation to this environmental target. |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | In case of new project, a specific vulnerability and climate risk assessment, related to flooding, snow, arising sea level, rainfalls, etc. will be performed in order to identify, to select and to implement the relevant adaptation measures, accordingly to the EU framework.  The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  RFI is among the main beneficiaries of the National Operational Program financed by the ERDF.  As part of the National Operational Program (NOP), the systematic completion of "Form A" - Indicator 6 "Studies/Works of adaptation to climate change" is envisaged, in which some "Soft", Green", Gray” actions in the design or used in the context of sharing design choices with the territory are identified. |
| 1. **Sustainable use and protection of water and marine resources** | D. None of the above: the measure requires a background assessment for this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For the new infrastructure projects promoted by RFI, the Environmental Impact Study and the Environmental Project of the Construction Site represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The Environmental Monitoring Project is also drafted from the design phase to identify the points to be monitored on potentially critical factors as resulting from the results of the Environmental Impact Study.  In fact, said Monitoring verifies and controls the impact of the construction of the work also on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with  the highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble. The treatment and management of excavated earth and rocks has been subject, over the last few years, to various regulatory changes, up to the implementation of article 5 of Directive 98/2008/EC, implemented with the introduction of art. 184-bis in the Consolidated Environmental Law. The Directive governs measures and criteria to be met to establish whether specific substances or objects can be considered by-products or waste. The implementation of the principle outlined in article 184-bis has therefore given rise to Ministerial Decree 161/2012 which then evolved into the current Presidential Decree 120/2017 containing the simplified regulation of the management of excavated earth and rocks. This regulation establishes that earth and rocks coming from excavations in the construction sector can sometimes present themselves as materials to be considered as real "products" to be reused to replace the natural resources deriving from quarry "exploitation". RFI therefore proceeded to adapt its procedures (design manuals and tender specifications) to proactively respond to EU principles, achieving very high standards in the European construction landscape. As part of the RFI Civil Works Design Manual, the procedural system to be adopted both in the design phase and in the execution phase of the interventions aimed at maximising the reuse of excavated earth and rocks in the same works of origin or, alternatively, in other works or industrial processes was defined so as to reduce, on the one hand, the production of special waste and, on the other, the need to procure virgin quarry material, promoting the transition towards the circular economy.  Only in the event that the material does not meet the environmental characteristics or performance criteria, RFI admits its management as waste. Also in this case the procedural system is such as to promote the delivery of waste for recovery rather than disposal with the aim of promoting its circularity in order to guarantee its re-entry into the product cycle.  By-products not intended for re-use in railway works are instead intended for environmental redevelopment and restoration interventions identified in synergy with local administrations, in order to identify degraded or abandoned areas or interventions of public interest and of priority importance in the areas impacted/affected by the Design. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | D. None of the above: the measure requires a background assessment for this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    It will be possible to draw up and complete the traffic studies and the Cost Benefit Analysis of the additional sections planned in the *Diagonal Connections* area during project development and therefore provide evidence of the further expected benefits in relation to this environmental target.  As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water.  As part of the design of new railway infrastructures and in particular those to be subjected to Environmental Impact Assessment (EIA), all the necessary studies are carried out to verify the conditions of minimum interference with the components defined by the EIA regulations, including air , water, soil, biodiversity, raw materials, acoustic and vibrational climate, etc. The environmental studies for the interventions subjected to EIA are completed by the Environmental Design of the Construction Site and by the Environmental Monitoring Plan.  The studies also include the identification of the possible presence of contaminated sites in order to guide the route choices, limit interference and, if possible, redevelop and reclaim the areas.  The Environmental Design of the Construction Site aims to identify, describe and assess the significance of the direct and indirect environmental problems that can be generated and define mitigation measures and operational procedures to contain the environmental impacts connected to the construction phase of the work.  The measures essentially consist of direct and indirect interventions in the construction site areas, on the roads used for the construction of the work (movements between the construction site areas, roads to/from quarries and landfills, storage sites, etc.), in land storage areas, contributing to the protection of surface and deep waters, soil, biodiversity, the need for raw materials, the acoustic climate, vibrations, air quality, waste and waste materials, water discharges, harmful substances and the landscape.  The attention to the environment, which characterises the model for the construction of sustainable railway infrastructures, is also concretely applied in the adoption, in the contract assignment phase, of specific contractual clauses which provide for the obligation for the companies carrying out the works to ensure constant and timely supervision of the environmental aspects of the construction site also through the implementation of specific environmental management systems that comply with the requirements of the international standard by the contractor.  The Environmental Monitoring Design is drawn up in accordance with the current legislation on environmental matters, and in compliance with the guidelines in force and in compliance with the provisions of the pertinent bodies for the supervision of the various environmental components. It defines the objectives, requirements, methodological criteria, methods and timing for Before - During - After Work Monitoring, taking into account the territorial and environmental reality in which the design of the work is inserted and the potential impacts it determines both in positive and negative terms, as a result of the assessments that emerged in the analyses carried out on environmental factors as part of the drafting of the Environmental Impact Study.  The proponent, through Environmental Monitoring activities, verifies the impact of the work on the environmental matrices by carrying out measurement campaigns in the ante-construction phase (for the characterisation of the site), during work (for the construction phase) and after (for the operating phase).  The campaigns include investigations on the components of surface and groundwater, soil and subsoil, acoustic and vibrational climate, air quality, social environment and vegetation, flora, fauna and ecosystems.  Monitoring data are entered and organised through a geographic information database, which constantly provides updates on the environmental status of the areas affected by the works, to the bodies responsible for the control and validation process of the environmental data, through specific alerting tools.  As regards the verification of the acoustic and vibrational impact, specific forecast studies are drawn up in which the receptors present in the design's range or influence are identified and the post-work climate is characterised by means of simulations conducted with specific specialised software that take into account the characteristics of the design, territory, infrastructure and traffic planned both during the day and night. Downstream of this activity, the post-construction emission scenario is compared with the limits imposed by current legislation, in order to dimension the mitigation measures necessary to bring the acoustic climate and any vibration emissions within the standard deadlines. For vibrations, in particular, reference is made to the standard indications (UNI standards) concerning the disturbance to people. |
| 1. **Protection and restoration of biodiversity and ecosystems** | D. None of the above: the measure requires a background assessment for this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures.  According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  For the new infrastructure designed promoted by RFI, the analysis of the reference context in terms of biodiversity is one of the main tools for the prevention of potential significant impacts on the environment, already in the phase of choosing the corridor and the route.  In fact, starting from a study of a large area, and in the context of route choices that respect the geometric and functional constraints of the work, the solution is identified that has the greatest characteristics of sustainability also minimising interference with parks, protected areas and Natura 2000 sites.  Evidence of this design focus and of all the actions aimed at mitigating the construction and operation phase of the infrastructure, is provided in the Environmental Impact Study and, if necessary, in the Incidence Report.  With regard to Natura 2000 sites, if the design solution as selected above in any case directly or indirectly (5 km range) concerns a Site of Community Interest/Special Conservation Areas and/or a Special Protection Area, the Impact Assessment procedure Environmental is integrated by the Environmental Impact Assessment Procedure.  The Incidence Report examines all possible alterations on the habitats and on the protected animal and plant species, also by means of precise surveys in the field. |

## Introducing the European Rail Transport Management System (ERTMS)

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **6. Introducing the European Rail Transport Management System (ERTMS)** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | A. The measure has no or negligible impact on this target | EU regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "European rail traffic management system (ERTMS)” (code 071) have a Coefficient for calculating support for climate change targets equal to 40%.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The European Rail Traffic Management System (ERTMS) is the traffic management and train running protection system chosen by the European Commission to implement the single transport market in the Union, so as to promote the interoperability of national railway networks and cross-border rail transport.  The Italian railways have adopted, among the first in Europe, the Level 2 ERTMS System on the new High Speed/High Capacity network lines.  The strategic objectives of long-term planning for the development of the European railway sector are defined by Regulation (EU) No. 1315/2013. The guidelines established by this regulation for the development of a trans-European transport network (TEN-T) set, for the infrastructure, ERTMS among the requirements for the development of a "Comprehensive network" to be completed by 2050 and a “core network” to be created by 2030.  Italy, to comply with the priority program contained in Reg. UE 2017/6, is implementing ERTMS, in superimposed mode on the national system for train speed control, on the priority sections of the core network corridors (Breakthrough Program).  The analyses and experiences carried out so far have highlighted all the advantages associated with the use of ERTMS which, in addition to the interoperability of European networks, also makes it possible to achieve an improvement in the performance of the railway system in terms of safety, capacity and maintainability. This led to the definition of an Accelerated ERTMS implementation plan extended to the entire railway infrastructure which anticipates the time objectives set by the European Commission.  The Accelerated Plan aims to extend the implementation of ERTMS to the entire Italian railway infrastructure (16,800 km against the 10,400 required by law: TEN-T network) and significantly accelerate the ERTMS implementation times to complete the equipping of the entire network by 2036 (instead of only the TEN-T network by 2050), while simultaneously and consistently envisaging the decommissioning of the national system starting from 2022 and therefore the progressive and coherent equipping of the trains (about 5000 those in circulation today), providing for the necessary resources to be made available to the Railway Companies, which have expressed their favourable opinion on the proposed plan, through various sources of financing.  The ERTMS system improves the performance of the railway infrastructure, ensuring numerous benefits in terms of safety, efficiency, transport capacity, interoperability, etc.  ERTMS contributes in two ways to the reduction of GHG emissions:   1. The large metropolitan nodes constitute the elements of the railway network which, before any other component, reach conditions of saturation of the transport capacity. In these highly urbanized realities, it is difficult to foresee and build new railway lines or quadruple them. The implementation of the ERTMS High Density system is envisaged on the large metropolitan nodes, which allows an increase in train frequencies and therefore in the transport capacity of the infrastructure, without occupying new land, with extremely low costs if compared with those of a new railway infrastructure and much shorter construction times. With these interventions it is possible to give a prompt response to the growing demand for rail transport for the main nodes of the network and thus to support the modal diversion from road to rail. Very briefly, it should be remembered that in terms of C02 emissions, various scientific studies have compared the different modes of transport, highlighting the reduced CO2 emissions of the railway carrier on electrified lines. These considerations are the basis of the strategy of the European Commission which set the following targets already in 2011 with the White Paper on transport: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050. More recently, the goals of the New Green Deal foresee the reduction of CO2 and climate-altering gas emissions by at least 55% by 2030 (compared to the 1990 level), and climate neutrality by 2050. The 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.   Below is an effective representation of the competitiveness of the railway carrier in terms of GHG emissions.     1. ERTMS constitutes the technological substrate for the future development of Automatic Train Operation (ATO). The ATO system allows the functions of management, supervision and optimisation of the circulation, for train speed regulation. The ATO system makes it possible to optimise train speed regulation with an average energy saving estimated at around 10%. This energy saving results in lower GHG emissions into the atmosphere.  |  |  | | --- | --- | | **Electricity consumption** | **Net spending** | | GWh | € | | 5,680 | 157,000,000 |   *Source: FS Group “Sustainability Report”*  Assuming an energy saving of about 10%, it can be seen that in the case of operation carried out with ERTMS + ATO, there is an energy saving of 568 GWh which is associated with a potential reduction in CO2 emissions equal to 179,710 tonnes CO2/year. As previously indicated, this reduction is not only due to the ERTMS system. |
| 1. **Adaptation to climate change** | A. The measure has no or negligible impact on this target | The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The investment plan for the accelerated implementation of the ERTMS system on the entire national railway network contributes to the construction of a more resilient transport infrastructure.  In fact, the ERTMS traffic management system is composed of fewer components than the current national systems.  This entails both a lower vulnerability with respect to the risks deriving from extreme weather events, and a greater ability of the system to respond to exceptional stresses: in conclusion, fewer failures and interruptions. Furthermore, the reduced number of components allows for greater ease of recovery in the event of failure and therefore shorter duration of outages.  The quantification of shorter delays for greater reliability of the ERTMS system compared to current traffic technologies was estimated by comparing the number of failures relating to faults in the spacing system attributable to infrastructure management in the case of lines equipped with ERTMS to different technological equipment, in particular: Automatic Block + Train Speed Control System, Axle Counter Block + Train Speed Control System.  The lines analysed were:  1. Rome – Florence DD (AB +TSCS);  2. Ferrara – Rimini (ACB + TSCS);  3. Milan – Bologna HS (ERTMS).  The analysis, which concerned delays on approximately 1,500 trains, led to the following results:   |  |  |  |  | | --- | --- | --- | --- | | **Line** | **Faults/km** | **Trend/fault** | **Delay in minutes** | | TSCS + AB | 0.62 | 6 | 11 | | TSCS + ACB | 0.35 | 3 | 21 | | ERTMS | 0.22 | 9 | 8 |   It follows that the implementation of the ERTMS system leads to a significant reduction in breakdowns and therefore to a greater resilience of the railway infrastructure. |
| 1. **Sustainable use and protection of water and marine resources** | A. The measure has no or negligible impact on this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  The accelerated implementation of the ERTMS system on the entire national railway network can be classified in the context of investments of a technological nature that do not produce impacts on water resources. |
| 1. **The circular economy, including waste prevention and recycling** | A. The measure has no or negligible impact on this target | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with the highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble.  The accelerated plan for equipping the entire Italian railway network with the ERTMS system involves the gradual abandonment of the current implementation strategy which provides for the addition of the ERTMS system to the existing ground traffic management systems and therefore imposes the need that the rolling stock is equipped for both systems: existing and ERTMS (dual on board logic). The accelerated plan focuses on the progressive replacement of the ground traffic management systems (dual on track logic).  The implementation of the ERTMS system involves the upgrade/installation of the following technological components:  • eurobalise, to transmit information to the train;  • RBC (Radio Block Centre), to acquire the status of the line (free/occupied sections, routes), calculate train spacing, send the Travel Authorisations to the train via the GSM-Railways network, set slowdowns, send emergencies, etc.;  • BTS (Base Transceiver Station): radio signal transceiver subsystem, equipped with antenna, to manage communications between the train and the Radio Block Centre;  • audio frequency track circuits;  • interfacing with the Station Equipment (Central Equipment): components capable of managing the exchange of commands and controls of the line and yard bodies (switches, level crossings, Bushing Thermal Detection, Axis Counter Block or track circuits).  These are technological components that will replace the current components of the spacing and traffic management system made up of more important technologies in terms of components. Consider the presence of lateral signalling which is no longer necessary with the ERTMS system.  It follows that the transition to the digital ERTMS system determines a reduction in the components of the railway infrastructure and a lower commitment of resources in its implementation. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | A. The measure has no or negligible impact on this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    Consistent with what has already been illustrated, ERTMS contributes to the reduction of pollutant emissions in two respects:  a) Through the implementation of the ERTMS High Density system in large urban nodes which supports the objective of modal diversion from road to rail.  b) Through the possibility that, once the ERTMS system has been built, the development of Automatic Train Operation (ATO) can be envisaged, which allows an average energy saving estimated at around 10%. This energy saving results in lower pollutant emissions into the atmosphere.  There is no impact of the investment on other environmental systems: soil and water. |
| 1. **Protection and restoration of biodiversity and ecosystems** | A. The measure has no or negligible impact on this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures.    According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  The investment program relating to the accelerated ERTMS plan is a substantially technological program that is installed on the existing railway infrastructure. Therefore it does not produce impacts on biodiversity and ecosystems in terms of disturbance to ecological permeability or on the presence of fauna.  The devices, mainly digital technology, comply with European regulations and therefore produce limited effects on the habitat. |

## Strengthening metropolitan nodes and key national links

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **7. Strengthening metropolitan nodes and key national links** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 065) have a Coefficient for calculating support for climate change targets equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:   * by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe; * by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.   At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (<https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment>)  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  The Italian railway lines are 72% electrified and, for these, the GHG emission is indirect, as it is connected to the production of electricity.  The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen traction.  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.  *Passenger transport*  In 2019, limited to land transport only (road + rail), equal to 938 billion pax.km, the modal split was:   | Transport mode | Modal share | | --- | --- | | Railway transport | 6% | | Extra-urban public transport | 10% | | Urban public transport | 2% | | Private road transport | 82% |   *Source: CNIT 2018-2019*  At 2030, with the entry into operation of the investments presented in the Recovery Fund, the modal share is estimated to be:   | Transport mode | Modal share | | --- | --- | | Railway transport | 10% | | Extra-urban public transport | 11% | | Urban public transport | 2% | | Private road transport | 77% |   This modal shift is reflected in terms of CO2 saved by passenger road vehicles for a value of approximately **2.3 million tonnes per year**.  *Freight Transport*  In the case of freight transport, the traffic data for 2019 were considered, which indicate the total value and the following modal breakdown at approximately 200 billion tonnes km   | Transport mode | Modal share | | --- | --- | | Railway transport | 10.7% | | Coastal maritime navigation | 29.3% | | Inland waterways | 0.0% | | Air navigation | 0.6% | | Road transport (> 50km) | 54.5% | | Oil pipelines (> 50km) | 4.8% |   *Source: CNIT 2018-2019*  By applying a prudential shift of about 10% from road to rail by 2030 (the long-term targets include 50% road transport, 50% rail transport by 2050 excluding transport by sea and air and excluding transport on routes shorter than 300km), the following modal share was estimated:   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 16.5% | | Coastal maritime navigation | 30% | | Inland waterways | 0.1% | | Air navigation | 0.6% | | Road transport (> 50km) | 47.7% | | Oil pipelines (> 50km) | 5.1% |   This breakdown makes it possible to quantify the CO2 savings from heavy road vehicles from 2030 equal to approximately **400,000 tonnes per year**.  Overall, therefore, starting from 2030 it is reasonable to assume that the eligible investments in the Recovery Fund will contribute to the achievement of the long-term targets both in terms of modal share and in terms of CO2 savings (approximately 2.8 million tonnes of CO2 from transport passenger and freight road).  These forecasts have been developed considering all the investments envisaged in the NNRP and constitute a challenging target but which is deemed achievable, if the hypotheses relating to the response of the Railway Companies for the services offered, to the demand for railway mobility and to the situation are also confirmed with specific regard to economic conditions, transport policies, technological innovations and transformations in progress (energy mix, electric mobility, hydrogen mobility).  In the cluster of investments related to *Strengthening metropolitan nodes and key national links*, the interventions to upgrade existing lines are included, which can be grouped into the following categories:  a) Electrification (i.e. Civitanova-Macerata-Albacina electrification, Como - Molteno - Lecco electrification, Cinisi-Alcamo Dir- Trapani electrification, Ivrea-Aosta electrification, Veneto lines electrification, Belluno ring electrification, Casarsa - Portogruaro electrification)  b) Infrastructural and technological upgrading (i.e. Bologna - Padova technological upgrade, technological upgrade of the Florence node, technological upgrade of the Rome - Naples line, completion of the technological upgrade of the Adriatic line, technological upgrade of the DD Florence - Rome line, upgrading of the Ovada line, upgrading of the Pontremolese line, technological and infrastructural upgrading of the Genoa-Ventimiglia line, technological upgrading of the Rome node, ACC Milano c.le and Milano Certosa, General Regulatory Plan and new technological device of Venice Santa Lucia, technological upgrade of the Turin node and related lines, modernisation of the Sardinian network, Traffic Technologies (ACC), Udine node)  c) Variants/Doubling/Acceleration (i.e. Riga Variant, Bolzano Node: Virgolo Tunnel, Falconara Variant Doubling Length-Guidonia, Doubling Ogliastrillo-Castelbuono, Doubling Campoleone-Aprilia, Doubling Adriatica: Termoli-Ripalta-Lesina, 1st phase Genoa-Turin acceleration, Genoa-Milan acceleration, Tortona-Voghera quadrupling priority works, Bari Sud node)  d) Railway connections with airports (i.e. Venice airport railway connection, Bergamo airport railway connection, Catania Fontanarossa airport new stop, first phase)  e) Connection with ports and terminals (i.e. adaptation and upgrading of the Vado Ligure industrial area, Port of Ravenna, Port of Trieste: railway interventions for the upgrading of the Trieste Campo Marzio station)  f) Improvement of accessibility (i.e. Accessibility to the new Belfiore HS station and new Belfiore - Florence SMN connection, Foggia Cervaro HS station, Montemarciano stop)  These investments are all aimed at significantly improving the competitiveness of the railway carrier compared to other modes of transport, through:  • Improvement of traffic regularity;  • increase in capacity from 4 to 10 trains/h on the suburban sections of access to the nodes being doubled;  • improvement of accessibility and interchange  • improvement of the last mile connections to the main ports and inter-modal terminals of the network with the aim of increasing the capacity of the plants and making shunting operations more efficient and promoting self-production;  • strengthening of existing connections and creation of new connections to the main airports in the network;  • creation of the conditions for speeding up services on the catchment lines;  • performance adjustment (module, shape, axial weight);  • increase in capacity and reduction of travel times;  • elimination of interference between passenger traffic and freight traffic thanks to the specialisation of the flows on the lines;  • increase in the capacity of lines close to saturation.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GHG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014). |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  RFI is among the main beneficiaries of the National Operational Program financed by the ERDF. As part of the National Operational Program (NOP), the systematic completion of "Form A" - Indicator 6 "Studies/Works of adaptation to climate change" is envisaged, in which some "Soft", Green", Gray” actions in the design or used in the context of sharing design choices with the territory are identified.  In the cluster of investments related to Strengthening metropolitan nodes and key national links, the interventions to upgrade existing lines are included, which can be grouped into the following categories:   * Electrification (i.e. Civitanova-Macerata-Albacina electrification, Como - Molteno - Lecco electrification, Cinisi-Alcamo Dir- Trapani electrification, Ivrea-Aosta electrification, Veneto lines electrification, Belluno ring electrification, Casarsa - Portogruaro electrification) * Infrastructural and technological upgrading (i.e. Bologna - Padova technological upgrade, technological upgrade of the Florence node, technological upgrade of the Rome - Naples line, completion of the technological upgrade of the Adriatic line, technological upgrade of the DD Florence - Rome line, upgrading of the Ovada line, upgrading of the Pontremolese line, technological and infrastructural upgrading of the Genoa-Ventimiglia line, technological upgrading of the Rome node, ACC Milano c.le and Milano Certosa, General Regulatory Plan and new technological device of Venice Santa Lucia, technological upgrade of the Turin node and related lines, modernisation of the Sardinian network, Traffic Technologies (ACC), Udine node) * Variants/Doubling/Acceleration (i.e. Riga Variant, Bolzano Node: Virgolo Tunnel, Falconara Variant Doubling Length-Guidonia, Doubling Ogliastrillo-Castelbuono, Doubling Campoleone-Aprilia, Doubling Adriatica: Termoli-Ripalta-Lesina, 1st phase Genoa-Turin acceleration, Genoa-Milan acceleration, Tortona-Voghera quadrupling priority works, Bari Sud node) * Railway connections with airports (i.e. Venice airport railway connection, Bergamo airport railway connection, Catania Fontanarossa airport new stop, first phase) * Connection with ports and terminals (i.e. adaptation and upgrading of the Vado Ligure industrial area, Port of Ravenna, Port of Trieste: railway interventions for the upgrading of the Trieste Campo Marzio station) * Improvement of accessibility (i.e. Accessibility to the new Belfiore HS station and new Belfiore - Florence SMN connection, Foggia Cervaro HS station, Montemarciano stop)   These investments are all aimed at significantly improving the competitiveness of the railway carrier compared to other modes of transport, through:   * Improvement of traffic regularity; * increase in capacity from 4 to 10 trains/h on the suburban sections of access to the nodes being doubled; * improvement of accessibility and interchange * improvement of the last mile connections to the main ports and inter-modal terminals of the network with the aim of increasing the capacity of the plants and making shunting operations more efficient and promoting self-production; * strengthening of existing connections and creation of new connections to the main airports in the network; * of the conditions for speeding up services on the catchment lines; * adjustment (module, shape, axial weight); * increase in capacity and reduction of travel times; * elimination of interference between passenger traffic and freight traffic thanks to the specialisation of the flows on the lines; * increase in the capacity of lines close to saturation. |
| 1. **Sustainable use and protection of water and marine resources** | A. The measure has no or negligible impact on this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For the new infrastructure projects promoted by RFI, the Environmental Impact Study and the Environmental Project of the Construction Site represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The Environmental Monitoring Project is also drafted from the design phase to identify the points to be monitored on potentially critical factors as resulting from the results of the Environmental Impact Study.  In fact, said Monitoring verifies and controls the impact of the construction of the work also on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with the highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble. The treatment and management of excavated earth and rocks has been subject, over the last few years, to various regulatory changes, up to the implementation of article 5 of Directive 98/2008/EC, implemented with the introduction of art. 184-bis in the Consolidated Environmental Law. The Directive governs measures and criteria to be met to establish whether specific substances or objects can be considered by-products or waste. The implementation of the principle outlined in article 184-bis has therefore given rise to Ministerial Decree 161/2012 which then evolved into the current Presidential Decree 120/2017 containing the simplified regulation of the management of excavated earth and rocks. This regulation establishes that earth and rocks coming from excavations in the construction sector can sometimes present themselves as materials to be considered as real "products" to be reused to replace the natural resources deriving from quarry "exploitation". RFI therefore proceeded to adapt its procedures (design manuals and tender specifications) to proactively respond to EU principles, achieving very high standards in the European construction landscape. As part of the RFI Civil Works Design Manual, the procedural system to be adopted both in the design phase and in the execution phase of the interventions aimed at maximising the reuse of excavated earth and rocks in the same works of origin or, alternatively, in other works or industrial processes was defined so as to reduce, on the one hand, the production of special waste and, on the other, the need to procure virgin quarry material, promoting the transition towards the circular economy.  Only in the event that the material does not meet the environmental characteristics or performance criteria, RFI admits its management as waste. Also in this case the procedural system is such as to promote the delivery of waste for recovery rather than disposal with the aim of promoting its circularity in order to guarantee its re-entry into the product cycle.  By-products not intended for re-use in railway works are instead intended for environmental redevelopment and restoration interventions identified in synergy with local administrations, in order to identify degraded or abandoned areas or interventions of public interest and of priority importance in the areas impacted/affected by the Design. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | A. The measure has no or negligible impact on this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    In the cluster of investments related to Upgrading, electrification and resilience of railways South the interventions to upgrade existing lines in the south are included, which can be grouped into the following categories:  a) Electrification (i.e. Electrification and modernisation of the Barletta-Canosa line, Electrification and acceleration of Roccaravindola-Isernia-Campobasso, Electrification of the Ionian line, Catanzaro Lido - Crotone - Sibari line, Potenza - Foggia railway line - modernisation and electrification)  b) Infrastructural and technological upgrading (i.e. Venafro upgrade - Campobasso - Termoli, Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme upgrade, Pescara-Foggia upgrade, Palermo - Agrigento - Porto Empedocle lower upgrade, Taranto-Brindisi technological upgrade)  c) Variants/Doubling/Acceleration (i.e. Doubling Codogno-Cremona-Mantova 1st phase, Doubling Decimomannu-Villamassargia 1st phase, New Ferrandina-Matera La Martella Line)  d) Railway connections with airports (i,e, Arechi-Pontecagnano Airport section, Brindisi airport railway connection, Olbia airport railway connection)  e) Connection with ports and terminals (i.e. New Cagioni station and connection with new Logistic Plate, Bari Lamasinata freight terminal, Brindisi inter-modal hub, Trapani Birgi inter-modality and accessibility, Port connection and Augusta bypass)  f) Improvement of accessibility (i.e. Taranto station underpass)  g) South line resilience plan.  These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.    As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water.  As part of the design of new railway infrastructures and in particular those to be subjected to Environmental Impact Assessment (EIA), all the necessary studies are carried out to verify the conditions of minimum interference with the components defined by the EIA regulations, including air , water, soil, biodiversity, raw materials, acoustic and vibrational climate, etc. The environmental studies for the interventions subjected to EIA are completed by the Environmental Design of the Construction Site and by the Environmental Monitoring Plan.  The studies also include the identification of the possible presence of contaminated sites in order to guide the route choices, limit interference and, if possible, redevelop and reclaim the areas.  The Environmental Design of the Construction Site aims to identify, describe and assess the significance of the direct and indirect environmental problems that can be generated and define mitigation measures and operational procedures to contain the environmental impacts connected to the construction phase of the work.  The measures essentially consist of direct and indirect interventions in the construction site areas, on the roads used for the construction of the work (movements between the construction site areas, roads to/from quarries and landfills, storage sites, etc.), in land storage areas, contributing to the protection of surface and deep waters, soil, biodiversity, the need for raw materials, the acoustic climate, vibrations, air quality, waste and waste materials, water discharges, harmful substances and the landscape.  The attention to the environment, which characterises the model for the construction of sustainable railway infrastructures, is also concretely applied in the adoption, in the contract assignment phase, of specific contractual clauses which provide for the obligation for the companies carrying out the works to ensure constant and timely supervision of the environmental aspects of the construction site also through the implementation of specific environmental management systems that comply with the requirements of the international standard by the contractor.  The Environmental Monitoring Design is drawn up in accordance with the current legislation on environmental matters, and in compliance with the guidelines in force and in compliance with the provisions of the pertinent bodies for the supervision of the various environmental components. It defines the objectives, requirements, methodological criteria, methods and timing for Before - During - After Work Monitoring, taking into account the territorial and environmental reality in which the design of the work is inserted and the potential impacts it determines both in positive and negative terms, as a result of the assessments that emerged in the analyses carried out on environmental factors as part of the drafting of the Environmental Impact Study.  The proponent, through Environmental Monitoring activities, verifies the impact of the work on the environmental matrices by carrying out measurement campaigns in the ante-construction phase (for the characterisation of the site), during work (for the construction phase) and after (for the operating phase).  The campaigns include investigations on the components of surface and groundwater, soil and subsoil, acoustic and vibrational climate, air quality, social environment and vegetation, flora, fauna and ecosystems.  Monitoring data are entered and organised through a geographic information database, which constantly provides updates on the environmental status of the areas affected by the works, to the bodies responsible for the control and validation process of the environmental data, through specific alerting tools.  As regards the verification of the acoustic and vibrational impact, specific forecast studies are drawn up in which the receptors present in the design's range or influence are identified and the post-work climate is characterised by means of simulations conducted with specific specialised software that take into account the characteristics of the design, territory, infrastructure and traffic planned both during the day and night. Downstream of this activity, the post-construction emission scenario is compared with the limits imposed by current legislation, in order to dimension the mitigation measures necessary to bring the acoustic climate and any vibration emissions within the standard deadlines. For vibrations, in particular, reference is made to the standard indications (UNI standards) concerning the disturbance to people. |
| 1. **Protection and restoration of biodiversity and ecosystems** | A. The measure has no or negligible impact on this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures. I    According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  For the new infrastructure designed promoted by RFI, the analysis of the reference context in terms of biodiversity is one of the main tools for the prevention of potential significant impacts on the environment, already in the phase of choosing the corridor and the route.  In fact, starting from a study of a large area, and in the context of route choices that respect the geometric and functional constraints of the work, the solution is identified that has the greatest characteristics of sustainability also minimising interference with parks, protected areas and Natura 2000 sites.  Evidence of this design focus and of all the actions aimed at mitigating the construction and operation phase of the infrastructure, is provided in the Environmental Impact Study and, if necessary, in the Incidence Report.  With regard to Natura 2000 sites, if the design solution as selected above in any case directly or indirectly (5 km range) concerns a Site of Community Interest/Special Conservation Areas and/or a Special Protection Area, the Impact Assessment procedure Environmental is integrated by the Environmental Impact Assessment Procedure.  The Incidence Report examines all possible alterations on the habitats and on the protected animal and plant species, also by means of precise surveys in the field. |

## Strengthening regional lines - Upgrading of regional railways (management RFI)

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **8. Strengthening regional lines - Upgrading of regional railways (management RFI)** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 065) have a Coefficient for calculating support for climate change targets equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:   * by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe; * by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.   At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (<https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment>)  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  Regional railway lines are 43% electrified and, for these, the GHG emission is indirect, as it is connected to the production of electricity.  The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen traction.  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.  The cluster of investments relating to Strengthening regional lines includes interventions for the infrastructural and technological upgrading of existing lines (i.e. electrification). These investments are all aimed at increasing safety levels and significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network. In particular, benefits are expected for the passenger segment due to the increase in the speed of the new railway lines and the elimination of the subjection to the formation of the timetable connected to the presence of the limitations on line speed Added to these are the foreseeable benefits associated with improving the accessibility of areas that are not currently served by the railway carrier.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GHG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014). |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  The cluster of investments relating to Strengthening regional lines includes interventions for the infrastructural and technological upgrading of existing lines (i.e. electrification). These are investments that involve the construction of railway lines according to the best technical standards. Consider of the verification and adjustment of the free railway bridge sides over rivers with changed hydraulic regime. |
| 1. **Sustainable use and protection of water and marine resources** | A. The measure has no or negligible impact on this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For work on regional railway lines, where necessary, the Environmental Impact Study and the Environmental Project of the Construction Site will be drafted to represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The components in question are usually subjected to Environmental Monitoring in order to verify that, as planned, they are adequate for the protection of the resource itself. In fact, the Environmental Monitoring Plan verifies and controls the impact of the construction of the work on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with the highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  With the aim of maximising the resources already available, the hypothesis is being studied of reusing the armament material dismissed by the National Railway Infrastructure (off-site) in the regional lines that are less stressed in terms of traffic and speed while safeguarding safety standards. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | A. The measure has no or negligible impact on this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    The cluster of investments relating to Strengthening regional lines includes interventions for the infrastructural and technological upgrading of existing lines (i.e. electrification). These investments are all aimed at increasing safety levels and significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of pollutant emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014).  As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water. |
| 1. **Protection and restoration of biodiversity and ecosystems** | A. The measure has no or negligible impact on this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures. I    According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines. |

## Upgrading, electrification and resilience of railways South

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **9. Upgrading, electrification and resilience of railways South** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | B. The measure appears to support this target 100% | EU regulation 2021/241 of 12 February 2021, which established the Recovery and Resilience Facility, establishes in Annex VI "Climate control methodology" that the interventions relating to "Newly built or refurbished railway lines - TEN core network -T "(code 065) have a Coefficient for calculating support for climate change targets equal to 100%.  Article 10 of EU regulation 2020/852, known as the "Taxonomy regulation” provides that:  "An economic activity is considered to make a substantial contribution to climate change mitigation if it substantially contributes to stabilising greenhouse gas concentrations in the atmosphere to the level that prevents dangerous anthropogenic interference with the climate system in line with the long-term temperature target of the Paris Agreement by avoiding or reducing greenhouse gas emissions or increasing the absorption of greenhouse gases, including through innovative products or processes by:  *a) ... (omission)*  *b) ... (omission)*  *c) the increase in clean or climate-neutral mobility;*  *d) ... (omission)*”.  **Green House Gases** (GHG) are those gases that are transparent to solar radiation entering the Earth, but are able to consistently retain the infrared radiation emitted by the Earth's surface, the atmosphere and clouds. The most impacting GHGs for the increase in the greenhouse effect are: CO2, N2O, CH4 and emissions from the aviation sector.  The green transition and sustainability are the cornerstones for Europe's recovery towards a zero-emissions society.  In 2011, the White Paper on transport set the following targets: by 2030, rail, together with waterways, will have to attract 30% of road freight transport on distances over 300 km and 50% by 2050.  As part of the European Green Deal, with reference to Climate Actions, the European Commission in September 2020 proposed to raise the goal of reducing CO2 and climate-altering gas emissions from 40% to 55% by 2030 (compared to 1990 levels), and climate neutrality by 2050.  Furthermore, the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final], an integral part of the Green Deal agenda, published by the EC in December 2020, requires the transport sector to transform towards a net 90% drop in emissions by 2050.  The targets of the SSMS are particularly challenging:   * by 2030, collective line transport of less than 500 km must be zero-emission, inter-modal transport by rail and inland waterway must be able to compete with road transport in the EU, rail freight traffic must increase by 50% while high-speed traffic will have to double across Europe; * by 2050: high-speed rail traffic must triple, rail freight traffic must double, the multi-modal trans-European transport network (TEN-T) will be fully operational for sustainable and intelligent transport with high-speed connectivity, all external intra-EU transport costs must be covered by transport users.   At the basis of the Commission's attention to the development of rail transport is the recognition that the development of the railway mode contributes to the reduction of Green House Gas (GHG) emissions and that CO2, N2O, CH4 are among the most impacting for the increase of the greenhouse effect.  In fact, according to the Commission's estimates, rail transport produces only 0.5% of the overall GHG emissions emitted by the European transport sector (EU-28, 2017 data).  In fact, as stated by The European Environment Agency, railway emissions (albeit calculated for diesel trains only), constitute only a small percentage of total transport emissions.    Source: (<https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases-7/assessment>)  The National Recovery and Resilience Plan foresees huge investments for the railway sector aimed at the design and construction of new infrastructures within the core and global TEN-T network that will contribute to improving the efficiency and competitiveness of the railway carrier and promote the shift from other modalities that produce higher amounts of GHG.  The Italian railway lines are 72% electrified and, for these, the GHG emission is indirect, as it is connected to the production of electricity.  The investments envisaged in the NRRP concern: upgrading of already electrified lines, electrification of diesel traction lines, upgrading of lines for the planned transition to hydrogen traction.  In terms of C02 emissions, various scientific studies have compared the different modes of transport.  Below is an effective representation of the lower impact in terms of CO2 emissions by the railway carrier compared to other modes of transport.    The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for land transport (EU28 average).    As an example, the following average values were compared:  - passenger car (petrol) = 1.22 €-cent/pkm  - passenger train diesel = 0.34 €-cent/pkm  The costs of climate change for electric trains are only attributable to emissions from the production of electricity from non-renewable sources.  The commitment of the Ferrovie dello Stato Italiane Group (FS Group), of which RFI is a part, for the fight against climate change has always characterised the modus operandi of the Group itself and, in 2019, led to the definition of the target of achieving carbon neutrality by 2050.  In 2020, the FS Group's correct management of climate issues was formally recognised by the Carbon Disclosure Project (CDP- a non-profit organisation that is responsible for evaluating the environmental performance of the largest industrial groups) by obtaining an "A-" rating. ("Leadership" range) and being above the average of the global, European and sector level companies analysed by the organisation. The FS Group, in particular, was recognised for the implementation of current best practices in the fight against climate change, positively evaluating the completeness of the information, the awareness and management of environmental risks and the activation of the associated best practices. environmental leadership, which includes setting ambitious goals.  The achievement of the targets set by the European Commission requires a great commitment for the transport sector and in particular the railway sector if we consider that, according to the National Account of Infrastructures and Transport (CNIT), passenger traffic in Italy is 91.5 % on road (882 billion passenger-kilometres in terms of private road transport, extra-urban public transport and public urban transport), while rail represents about 6% of passengers against 7.8% in Europe (COM (2021) 5 final , EU).  At the same time, 54.5% of goods travel by road (about 100 billion tonne-km) and about 11% by rail compared to 18.7% in Europe (COM (2021) 5 final, EU).  The railway investments eligible for the Recovery Fund will contribute significantly in terms of modal shift from road transport to rail transport and consequently will produce a reduction in CO2 emissions.  *Passenger transport*  In 2019, limited to land transport only (road + rail), equal to 938 billion pax.km, the modal split was:   | Transport mode | Modal share | | --- | --- | | Railway transport | 6% | | Extra-urban public transport | 10% | | Urban public transport | 2% | | Private road transport | 82% |   *Source: CNIT 2018-2019*  At 2030, with the entry into operation of the investments presented in the Recovery Fund, the modal share is estimated to be:   | Transport mode | Modal share | | --- | --- | | Railway transport | 10% | | Extra-urban public transport | 11% | | Urban public transport | 2% | | Private road transport | 77% |   This modal shift is reflected in terms of CO2 saved by passenger road vehicles for a value of approximately **2.3 million tonnes per year**.  *Freight Transport*  In the case of freight transport, the traffic data for 2019 were considered, which indicate the total value and the following modal breakdown at approximately 200 billion tonnes km   | Transport mode | Modal share | | --- | --- | | Railway transport | 10.7% | | Coastal maritime navigation | 29.3% | | Inland waterways | 0.0% | | Air navigation | 0.6% | | Road transport (> 50km) | 54.5% | | Oil pipelines (> 50km) | 4.8% |   *Source: CNIT 2018-2019*  By applying a prudential shift of about 10% from road to rail by 2030 (the long-term targets include 50% road transport, 50% rail transport by 2050 excluding transport by sea and air and excluding transport on routes shorter than 300km), the following modal share was estimated:   |  |  | | --- | --- | | Transport mode | Modal share | | Railway transport | 16.5% | | Coastal maritime navigation | 30% | | Inland waterways | 0.1% | | Air navigation | 0.6% | | Road transport (> 50km) | 47.7% | | Oil pipelines (> 50km) | 5.1% |   This breakdown makes it possible to quantify the CO2 savings from heavy road vehicles from 2030 equal to approximately **400,000 tonnes per year**.  Overall, therefore, starting from 2030 it is reasonable to assume that the eligible investments in the Recovery Fund will contribute to the achievement of the long-term targets both in terms of modal share and in terms of CO2 savings (approximately 2.8 million tonnes of CO2 from transport passenger and freight road).  These forecasts have been developed considering all the investments envisaged in the NNRP and constitute a challenging target but which is deemed achievable, if the hypotheses relating to the response of the Railway Companies for the services offered, to the demand for railway mobility and to the situation are also confirmed with specific regard to economic conditions, transport policies, technological innovations and transformations in progress (energy mix, electric mobility, hydrogen mobility).  In the cluster of investments related to *Upgrading, electrification and resilience of railways South* the interventions to upgrade existing lines in the south are included, which can be grouped into the following categories:  a) Electrification (i.e. Electrification and modernisation of the Barletta-Canosa line, Electrification and acceleration of Roccaravindola-Isernia-Campobasso, Electrification of the Ionian line, Catanzaro Lido - Crotone - Sibari line, Potenza - Foggia railway line - modernisation and electrification)  b) Infrastructural and technological upgrading (i.e. Venafro upgrade - Campobasso - Termoli, Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme upgrade, Pescara-Foggia upgrade, Palermo - Agrigento - Porto Empedocle lower upgrade, Taranto-Brindisi technological upgrade)  c) Variants/Doubling/Acceleration (i.e. Doubling Codogno-Cremona-Mantova 1st phase, Doubling Decimomannu-Villamassargia 1st phase, New Ferrandina-Matera La Martella Line)  d) Railway connections with airports (i,e, Arechi-Pontecagnano Airport section, Brindisi airport railway connection, Olbia airport railway connection)  e) Connection with ports and terminals (i.e. New Cagioni station and connection with new Logistic Plate, Bari Lamasinata freight terminal, Brindisi inter-modal hub, Trapani Birgi inter-modality and accessibility, Port connection and Augusta bypass)  f) Improvement of accessibility (i.e. Taranto station underpass)  g) South line resilience plan.  These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.  As a result of the greater competitiveness of the railway carrier, a shift from other methods is expected, which are more impacting in terms of GHG emissions.  For more precise assessments relating to individual investments, it is necessary to develop a multi-modal traffic analysis that compares the "project situation" with the "reference situation" and arrive at a quantification of the new modal distribution and the foreseeable shift towards the railway mode , as required by European regulations for the preparation of Cost-benefit Analysis (Guide to Cost-benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 - December 2014). |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | The adoption of the "European Strategy for Adaptation to Climate Change" in 2013 aimed at making Europe more resilient, promoting greater awareness on the issue, for example through the implementation of the Climate-Adapt platform and supporting the actions taken by member States on adaptation.  The target of improving the ability to react to the impacts of climate change at EU level requires the progressive integration of adaptation to climate change into EU policies, especially in priority sectors such as energy and transport.  In 2015, the Ministry of the Environment and Land and Sea Protection (MATTM) defined the "National Strategy for Adaptation to Climate Change" (NSAC) to be implemented through the adoption of an action plan/sectoral action plans that define the schedules and methods of implementation.  In this sense, in 2016, the Ministry of the Environment commissioned the Euro-Mediterranean Centre on Climate Change (CMCC) to draft the National Plan for Adaptation to Climate Change (NPACC), in order to contain the vulnerability of natural, social and economic systems, increase their adaptability and resilience and promote the coordination of actions at different levels of government. In particular, the NPACC, currently being approved, provides for a process of integration (mainstreaming) on the issues of adaptation (and therefore also in transport) organised over several levels in an attempt to translate the more general objectives of climate policies into operational guidelines and actions on the territory, also through the involvement of RFI and ANAS.  With specific reference to transport infrastructures, adaptation strategies take the form of measures aimed at reducing vulnerabilities, increasing their resilience and consequently reducing the number and frequency of inefficiencies, repair and maintenance costs.  In response to the Next Generation EU (NGEU) initiative, on 12 January, the Government presented the National Recovery and Resilience Plan (NRRP) which sets the fight against and adaptation to climate change among its objectives. In particular, for Mission 3 the NRRP provides:  *"A better and more extensive railway network and a smart road network, safer thanks to the control and management of traffic flows and more resilient in the face of climate change and its ageing, are essential to help increase the competitiveness of the country, fill the gap between north and south, guaranteeing rapid and efficient connections between the east and west of the peninsula and standardising the quality of transport services throughout the national territory."*  The new railway works are designed to maximise the useful life of the infrastructure. In design terms, this is implemented with choices aimed at guaranteeing the durability of the expected performance, also through redundancy systems, which limit the need for extraordinary maintenance work. These principles are combined with criteria of resilience to climate change in order to reduce the risks related to them.  An "adaptation" approach of the design of railway infrastructures to climate change involves the use of the outputs produced by the weather-climatic models developed by the Intergovernmental Panel for Climate Change (IPCC), reported in the document "The future climate in Italy: analysis of the regional models "drawn up by the Higher Institute for Environmental Protection and Research (ISPRA) in 2015, in relation to climate change and extreme weather events in:  - hydraulic verification of river crossing works;  - hydraulic verification of the drainage systems of the railway and road platform.  RFI is among the main beneficiaries of the National Operational Program financed by the ERDF. As part of the National Operational Program (NOP), the systematic completion of "Form A" - Indicator 6 "Studies/Works of adaptation to climate change" is envisaged, in which some "Soft", Green", Gray” actions in the design or used in the context of sharing design choices with the territory are identified.  In the cluster of investments related to Upgrading, electrification and resilience of railways South the interventions to upgrade existing lines in the south are included, which can be grouped into the following categories:   1. Electrification (i.e. Electrification and modernisation of the Barletta-Canosa line, Electrification and acceleration of Roccaravindola-Isernia-Campobasso, Electrification of the Ionian line, Catanzaro Lido - Crotone - Sibari line, Potenza - Foggia railway line - modernisation and electrification) 2. Infrastructural and technological upgrading (i.e. Venafro upgrade - Campobasso - Termoli, Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme upgrade, Pescara-Foggia upgrade, Palermo - Agrigento - Porto Empedocle lower upgrade, Taranto-Brindisi technological upgrade) 3. Variants/Doubling/Acceleration (i.e. Doubling Codogno-Cremona-Mantova 1st phase, Doubling Decimomannu-Villamassargia 1st phase, New Ferrandina-Matera La Martella Line) 4. Railway connections with airports (i,e, Arechi-Pontecagnano Airport section, Brindisi airport railway connection, Olbia airport railway connection) 5. Connection with ports and terminals (i.e. New Cagioni station and connection with new Logistic Plate, Bari Lamasinata freight terminal, Brindisi inter-modal hub, Trapani Birgi inter-modality and accessibility, Port connection and Augusta bypass) 6. Improvement of accessibility (i.e. Taranto station underpass) 7. South line resilience plan.   These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network |
| 1. **Sustainable use and protection of water and marine resources** | A. The measure has no or negligible impact on this target | The use of water resources generally involves - or could lead to - negative impacts (i.e. negative externalities) on other potential users. The main negative externalities are linked to the impairment of the quality of the water contained in the water bodies from which it is withdrawn, due to polluting activities.  For the new infrastructure projects promoted by RFI, the Environmental Impact Study and the Environmental Project of the Construction Site represent the main tool for the identification, prevention, evaluation and identification of management and mitigation measures of potential impacts on the environment. related to the construction phase of the works, contributing to the principle of sustainable use, reuse and protection of the water resource. The Environmental Monitoring Project is also drafted from the design phase to identify the points to be monitored on potentially critical factors as resulting from the results of the Environmental Impact Study.  In fact, said Monitoring verifies and controls the impact of the construction of the work also on the superficial and deep hydro-geological system, in order to prevent alterations and possibly plan effective containment and mitigation interventions.  The risks of environmental degradation related to the protection of water quality and the prevention of water stress are identified and taken into consideration in accordance with the requirements of Directive 2000/60/EC (Water Framework Directive). |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | In the National Recovery and Resilience Plan (NRRP) it is recalled that investments in the Circular Economy intervene on a process aimed at producing secondary raw materials from waste materials to make Italy less dependent on the supply of raw materials and consequently stronger and competitive on international markets.  The NRRP also foresees a regulatory reform intervention, called “Circularity and traceability” aimed at promoting administrative simplification in the field of circular economy and the implementation of the European action plan for the circular economy. The latter will aim to improve the organisation and operation of the waste control and traceability system, to strengthen eco-design and industrial symbiosis, reducing waste production upstream and to strengthen Italy's position as a country with  the highest circular reuse rates in Europe.  The circular economy envisages reducing the consumption of resources and raw materials and is therefore also connected to the design principles of the railway infrastructure which, by maximising durability and useful life, reduce extraordinary maintenance interventions. The main environmental problems related to the waste sector are attributable to the consequences caused by the different types of disposal or recovery adopted: polluting emissions from landfills or incinerators, soil contamination, negative perceptual effects, pollution problems potentially associated with recycling or recovery, etc.  As a European reference, we recall the "Waste Strategy Review", in which waste management is placed in descending order of preference: Reduction at source; Reuse; Recovery; Incineration with energy recovery; Disposal in controlled landfills.  Rete Ferroviaria Italiana, operates in a sector oriented towards the sustainable development of the country and every day works for the construction of a new scenario of mobility and progress focused on people and the environment. In this context, RFI has cultivated an important tradition in favour of the development of policies and practices of circular economy and energy transition, capable on the one hand of minimising the impacts of production activities and on the other of maximising the utility and value of railway assets.  In the construction and maintenance of the infrastructure, RFI produces a large quantity of construction and demolition materials, mainly consisting of excavated earth and rocks and excavated railway rubble. The treatment and management of excavated earth and rocks has been subject, over the last few years, to various regulatory changes, up to the implementation of article 5 of Directive 98/2008/EC, implemented with the introduction of art. 184-bis in the Consolidated Environmental Law. The Directive governs measures and criteria to be met to establish whether specific substances or objects can be considered by-products or waste. The implementation of the principle outlined in article 184-bis has therefore given rise to Ministerial Decree 161/2012 which then evolved into the current Presidential Decree 120/2017 containing the simplified regulation of the management of excavated earth and rocks. This regulation establishes that earth and rocks coming from excavations in the construction sector can sometimes present themselves as materials to be considered as real "products" to be reused to replace the natural resources deriving from quarry "exploitation". RFI therefore proceeded to adapt its procedures (design manuals and tender specifications) to proactively respond to EU principles, achieving very high standards in the European construction landscape. As part of the RFI Civil Works Design Manual, the procedural system to be adopted both in the design phase and in the execution phase of the interventions aimed at maximising the reuse of excavated earth and rocks in the same works of origin or, alternatively, in other works or industrial processes was defined so as to reduce, on the one hand, the production of special waste and, on the other, the need to procure virgin quarry material, promoting the transition towards the circular economy.  Only in the event that the material does not meet the environmental characteristics or performance criteria, RFI admits its management as waste. Also in this case the procedural system is such as to promote the delivery of waste for recovery rather than disposal with the aim of promoting its circularity in order to guarantee its re-entry into the product cycle.  By-products not intended for re-use in railway works are instead intended for environmental redevelopment and restoration interventions identified in synergy with local administrations, in order to identify degraded or abandoned areas or interventions of public interest and of priority importance in the areas impacted/affected by the Design. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | A. The measure has no or negligible impact on this target | Emissions of air pollutants such as nitrogen oxides, sulphur dioxide or particulate matter, etc. have negative impacts on human health, generate material damage and losses in crops and adversely affect ecosystems.  Investments in transport can significantly affect air quality, affecting the decrease or increase in the level of emissions of air pollutants.  Activities that generate emissions of pollutants into the atmosphere (i.e. NOx, SOx, COVNM, PMtot) first of all have an impact in local terms, i.e. where the transport system being assessed is produced and managed.  There are mainly four types of impacts in terms of local emissions into the atmosphere related to the transport sector:  1. Effects on health: due to the risk of increased respiratory and cardiovascular diseases and the relative increase in the costs of medical treatment, loss of working hours due to illness and greater risk of death;  2. Damage to agriculture: due to potential damage to agricultural products by some pollutants (i.e. NOx, VOC, SOx) and the relative decrease in agricultural yields;  3. Damage to materials and buildings: due to damage to buildings and façades produced by dust or corrosion processes triggered by some polluting substances, this effect in our territory is considered insignificant;  4. Loss of biodiversity: due to damage to ecosystems due to some pollutants that could alter the balance of fauna and flora, this effect in our territory is considered insignificant.  In the EC Delft document "Handbook on External costs of transport" the main available studies have been collected and processed to evaluate these impacts and thus provide the two main input values for estimating the externalities connected to local emissions:  • cost factors, which express health and non-health costs in terms of €/ton of substance considered;  • emission factors, which express the unit values in terms of tonnes of substance considered for p-km or for v-km, or for t-km.  The EC Delft document - “Handbook on external costs of transport”, January 2019, provides the total and unitary costs of emissions with effects on climate change for passenger ground transport (EU28 average). For the sake of brevity, only the following average values are reported:  - passenger car (petrol) = 0.33 €-cent/pkm  - hight speed passenger train = 0.002 €-cent/pkm  The competitive advantage in terms of air pollution of the railway mode compared to the road mode is evident.    In the cluster of investments related to Upgrading, electrification and resilience of railways South the interventions to upgrade existing lines in the south are included, which can be grouped into the following categories:  a) Electrification (i.e. Electrification and modernisation of the Barletta-Canosa line, Electrification and acceleration of Roccaravindola-Isernia-Campobasso, Electrification of the Ionian line, Catanzaro Lido - Crotone - Sibari line, Potenza - Foggia railway line - modernisation and electrification)  b) Infrastructural and technological upgrading (i.e. Venafro upgrade - Campobasso - Termoli, Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme upgrade, Pescara-Foggia upgrade, Palermo - Agrigento - Porto Empedocle lower upgrade, Taranto-Brindisi technological upgrade)  c) Variants/Doubling/Acceleration (i.e. Doubling Codogno-Cremona-Mantova 1st phase, Doubling Decimomannu-Villamassargia 1st phase, New Ferrandina-Matera La Martella Line)  d) Railway connections with airports (i,e, Arechi-Pontecagnano Airport section, Brindisi airport railway connection, Olbia airport railway connection)  e) Connection with ports and terminals (i.e. New Cagioni station and connection with new Logistic Plate, Bari Lamasinata freight terminal, Brindisi inter-modal hub, Trapani Birgi inter-modality and accessibility, Port connection and Augusta bypass)  f) Improvement of accessibility (i.e. Taranto station underpass)  g) South line resilience plan.  These investments are all aimed at significantly improving the competitiveness of the railway carrier with respect to other modes of transport, by increasing the performance of the current railway infrastructure and improving the accessibility of transport demand to the railway network.    As reported by the "Handbook on the external costs of transport", the various negative effects that transport activities can cause in terms of soil and water pollution are considered to be, for example, those due to:  • Heavy metals. There are several transport-related processes that involve the emission of heavy metals, for example, brake abrasion (both for rail and road transport), track abrasion and fuel combustion residues. To date, there are limited studies that estimate the impacts deriving from the emission of heavy metals in transport in monetary terms. However, some research has shown that these can be considered as negligible (i.e. less than 1% of the total costs of externalities related to the transport sector).  • Toxic organic substances. Another consequence related to fuel combustion is the emission of toxic organic substances. However, their impact in terms of environmental pollution is relatively low.  • Poor waste water management. In the context of the activities carried out in the transport sector, in the infrastructure sector and in the real estate services sector, another form of potential pollution is represented by the discharge of waste water.  As part of the design of new railway infrastructures and in particular those to be subjected to Environmental Impact Assessment (EIA), all the necessary studies are carried out to verify the conditions of minimum interference with the components defined by the EIA regulations, including air , water, soil, biodiversity, raw materials, acoustic and vibrational climate, etc. The environmental studies for the interventions subjected to EIA are completed by the Environmental Design of the Construction Site and by the Environmental Monitoring Plan.  The studies also include the identification of the possible presence of contaminated sites in order to guide the route choices, limit interference and, if possible, redevelop and reclaim the areas.  The Environmental Design of the Construction Site aims to identify, describe and assess the significance of the direct and indirect environmental problems that can be generated and define mitigation measures and operational procedures to contain the environmental impacts connected to the construction phase of the work.  The measures essentially consist of direct and indirect interventions in the construction site areas, on the roads used for the construction of the work (movements between the construction site areas, roads to/from quarries and landfills, storage sites, etc.), in land storage areas, contributing to the protection of surface and deep waters, soil, biodiversity, the need for raw materials, the acoustic climate, vibrations, air quality, waste and waste materials, water discharges, harmful substances and the landscape.  The attention to the environment, which characterises the model for the construction of sustainable railway infrastructures, is also concretely applied in the adoption, in the contract assignment phase, of specific contractual clauses which provide for the obligation for the companies carrying out the works to ensure constant and timely supervision of the environmental aspects of the construction site also through the implementation of specific environmental management systems that comply with the requirements of the international standard by the contractor.  The Environmental Monitoring Design is drawn up in accordance with the current legislation on environmental matters, and in compliance with the guidelines in force and in compliance with the provisions of the pertinent bodies for the supervision of the various environmental components. It defines the objectives, requirements, methodological criteria, methods and timing for Before - During - After Work Monitoring, taking into account the territorial and environmental reality in which the design of the work is inserted and the potential impacts it determines both in positive and negative terms, as a result of the assessments that emerged in the analyses carried out on environmental factors as part of the drafting of the Environmental Impact Study.  The proponent, through Environmental Monitoring activities, verifies the impact of the work on the environmental matrices by carrying out measurement campaigns in the ante-construction phase (for the characterisation of the site), during work (for the construction phase) and after (for the operating phase).  The campaigns include investigations on the components of surface and groundwater, soil and subsoil, acoustic and vibrational climate, air quality, social environment and vegetation, flora, fauna and ecosystems.  Monitoring data are entered and organised through a geographic information database, which constantly provides updates on the environmental status of the areas affected by the works, to the bodies responsible for the control and validation process of the environmental data, through specific alerting tools.  As regards the verification of the acoustic and vibrational impact, specific forecast studies are drawn up in which the receptors present in the design's range or influence are identified and the post-work climate is characterised by means of simulations conducted with specific specialised software that take into account the characteristics of the design, territory, infrastructure and traffic planned both during the day and night. Downstream of this activity, the post-construction emission scenario is compared with the limits imposed by current legislation, in order to dimension the mitigation measures necessary to bring the acoustic climate and any vibration emissions within the standard deadlines. For vibrations, in particular, reference is made to the standard indications (UNI standards) concerning the disturbance to people. |
| 1. **Protection and restoration of biodiversity and ecosystems** | A. The measure has no or negligible impact on this target | Transport infrastructures have different effects on nature, landscape and natural habitats.  The main effects reported in the literature are habitat fragmentation and disturbance of ecological permeability, habitat loss (loss of biocoenoses), negative effects on ecosystems due to the presence and operation of infrastructures and, finally, to the emission of atmospheric pollutants.  In the EC Delft document “Handbook on External costs of transport” the main studies available in literature have been collected and processed to evaluate these impacts.  The document sets out the cost factors for habitat loss and habitat fragmentation for the EU28 average. The cost factors derive from the Swiss study on the external costs of transport INFRAS en Ecoplan, 2018.  For example, the "Total habitat damage" expressed in costs € 2016 per km and year is equal to:  - 93,500 for motorway infrastructures  - 84,500 for high-speed railway infrastructures. I    According to the Biodiversity Strategies for 2030 foreseen for the United Nations Conference on Biodiversity 2020 (COP15), the European Parliament in terms of Biodiversity has defined the following objectives:  • ensure that at least 30% of the EU territory is made up of natural areas  • restore at least 30% of damaged ecosystems  • further integrate biodiversity into all policies  • set up a clear spending target for biodiversity integration in the 2021-2027 long-term budget of a minimum of 10%  Railway infrastructures also offer the opportunity to intervene on some of these points, for example the redevelopment of damaged ecosystems, through environmental mitigation and compensation, and the restitution of natural areas, for example, following the decommissioning of railway lines.  For the new infrastructure designed promoted by RFI, the analysis of the reference context in terms of biodiversity is one of the main tools for the prevention of potential significant impacts on the environment, already in the phase of choosing the corridor and the route.  In fact, starting from a study of a large area, and in the context of route choices that respect the geometric and functional constraints of the work, the solution is identified that has the greatest characteristics of sustainability also minimising interference with parks, protected areas and Natura 2000 sites.  Evidence of this design focus and of all the actions aimed at mitigating the construction and operation phase of the infrastructure, is provided in the Environmental Impact Study and, if necessary, in the Incidence Report.  With regard to Natura 2000 sites, if the design solution as selected above in any case directly or indirectly (5 km range) concerns a Site of Community Interest/Special Conservation Areas and/or a Special Protection Area, the Impact Assessment procedure Environmental is integrated by the Environmental Impact Assessment Procedure.  The Incidence Report examines all possible alterations on the habitats and on the protected animal and plant species, also by means of precise surveys in the field. |

## Upgrading railway stations in the South

|  |  |
| --- | --- |
| **DNSH ASSESSMENT** | |
| **Mission** | **3 - Infrastructures for sustainable mobility** |
| **Cluster** | **1. High-speed rail and road maintenance 4.0** |
| **Project/Reform** | **10. Upgrading railway stations in the South** |
| **Contact** | **MIMS/RFI** |
| **Date completed** | **28 April 2021** |

|  |  |  |
| --- | --- | --- |
|  | **Phase 1** | |
| **Environmental target** | **Does the measure have no or negligible impact on the target or is it considered compliant with the DNSH principle for the relevant target?** | **Motivation if indicated A, B, C** |
| 1. **Climate change mitigation** | A. The measure has no or negligible impact on this target | In accordance with the 'Sustainable and Smart Mobility Strategy' (SSMS) [COM (2020) 789 final)] proposed by the EC in December 2020, which defines the objectives to be achieved to contribute to the reduction of emissions by 90% by 2050, as envisaged by the European Green Deal, the Measure promotes the modal rebalancing of rail transport compared to private road transport.  The enhancement of accessibility, the smart integration between the territorial system and the railway network and the electrical upgrade of the station buildings guarantee a substantial contribution to the reduction of air pollution and road congestion in general, contributing to sustainable development. |
| 1. **Adaptation to climate change** | B. The measure appears to support this target 100% | The Measure sets out the individual interventions taking into consideration the potential threats due to climate change and responding adequately, with design and management actions of the construction and operating phases, both on the individual intervention sites and on the neighbouring areas, in coherence with the EU Strategy for Adaptation to Climate Change and in relation to the needs of the different territories involved.  Also thanks to the use of the National System for the Collection, Processing and Dissemination of Climatological Data of Environmental Interest (SCIA), drawn up by ISPRA, the interventions define the responses to be implemented with respect to potential threats according to an informed decision-making process. |
| 1. **Sustainable use and protection of water and marine resources** | A. The measure has no or negligible impact on this target | The foreseeable impact of the activity supported by the measure on this environmental objective is insignificant, given both the direct and primary indirect effects across the life cycle. No environmental degradation risks related to preserving water quality and water stress are identified. The investment does not affect water bodies or protected habitats and species  For new water utilities all relevant water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing cisterns, bathtubs) must be in the top 2 classes for water consumption of the EU Water Label.  The Measure provides for the management of water resources in compliance with the requirements of Directive 2000/60/EC (Water Framework Directive) and the Plan for the Protection of European Water Resources, a strategy aimed at ensuring adequate supply in the phases of construction and management of interventions and sustainable water management, oriented to the reuse and optimisation of networks and plants. |
| 1. **The circular economy, including waste prevention and recycling** | B. The measure appears to support this target 100% | With regard to new construction and demolition wastes (excluding the material in its natural state referred to the item 17 05 04 of the European List of Wastes established by Decision 2000/532 / EC) produced on the construction site, RFI is evaluating the possibility to introduce some specific award clauses in the tenders to ensure the maximum reuse, recycling and other types of material recovery to perform a selective demolition of materials.  The interventions of the Measure provide for adherence to the Certification Protocols of the Sustainability of Buildings (LEED protocol) and of Infrastructures (ENVISION protocol). On this basis, the interventions are oriented towards a perspective of "by-product synergy", both in the design phases and in those of implementation and operational management. With this approach, all excess resources or services are considered as potentially aimed at local use, outlining interconnected and more resilient systems and reducing waste and dependence on external sources.    Operators will limit the generation of waste during construction, in accordance with the EU protocol for the management of construction and demolition waste, taking into account best available techniques to facilitate high-quality reuse and recycling through selective removal of materials, using the sorting systems available for construction waste.  The procurement of construction materials according to the principles of "sustainable procurement" will constitute an incentive for the dissemination and strengthening of the principles of the circular economy.  During the operation phase, also thanks to an organisation of the physical spaces functional to the objective, the differentiation of waste produced by operators and users will be encouraged to promote its recovery and recycling. |
| 1. **Prevention and limitation of impacts on air, water and soil quality** | A. The measure has no or negligible impact on this target | The Measure promotes the modal rebalancing of rail transport compared to private road transport, thus contributing to the reduction of air pollution and road congestion in general.  In particular, the application of the Certification Protocols for the Sustainability of Buildings (LEED protocol) and Infrastructures (ENVISION protocol) and adherence to the Minimum Environmental Criteria (CAM) defined by art. 34 of Legislative Decree 50/2016 and subsequent amendments, direct interventions towards sustainable urban development and increase connectivity and integration of the public transport network, increasing the attractiveness and accessibility of the station spaces, both internal and external, and contributing to increase in the total number of users of the railway system.  Furthermore, the Sustainability Certification Protocols and the CAMs direct the Measure towards a significant increase in the energy efficiency of station buildings, also through the intensive use of renewable sources, and a sustainable supply of building materials, determining a substantial contribution to safeguarding of the air, water and soil matrices in the areas of intervention. |
| 1. **Protection and restoration of biodiversity and ecosystems** | A. The measure has no or negligible impact on this target | The Measure provides for the upgrading of existing railway stations, in terms of accessibility, energy efficiency, architectural quality and user comfort. As they fall into urban areas, the interventions are not localised in sites identified as areas of high ecological value. The Measure therefore does not directly interfere with biodiversity and ecosystems, maintaining an effective buffer zone around areas of high ecological value.  The interventions, albeit in an urban setting, will in any case be oriented towards the safeguarding and implementation of existing green areas and the creation of new green areas both outside and, where possible, inside the buildings. |