Mission 3: Infrastructures for a sustainable mobility

Contents

Mission's main objectives:

Boost freight and passenger rail transport and introduce the European Rail Transport Management Systems (ERTMS)

Speed-up connections along the country's TEN-T axes: North-South and East-West

Increase capacity in key national lines and nodes, in particular in the South, and implement the ERTMS

Implementation of an advanced digital monitoring system

Application of an integrated system of risk classification and management of bridges, viaducts and tunnels on national network

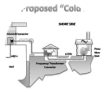
Seismic safety of the A24-A25 highway

Environmental sustainability and energy efficiency of ports

"Green Ports" integrated with "Cold Ironing" dock electrification projects.

Reduce the impact of vessels on the maritime and environmental ecosystem

Reduce energy consumption related to goods handling



Land and sea side accessibility

Develop infrastructure

Dams and dredging

Last mail rail/road connections

Capacity adaptations

Digitalization of Italian logistics systems

Digitalization of the logistic chain

Digitalization of air traffic management

Mission's financing snapshot:

M3 - Infrastructures for a sustainable mobility	Resources (euro/mld)				
	Existing	New	Total	REACT-EU	TOTAL NGEU
	(a)	(b)	(c) = (a)+(b)	(d)	(e) = (c) + (d)
M3C1 - High speed railways and safe roads 4.0	11.20	17.10	28.30	-	28.30
M3C2 Intermodal connections and integrated logistics	0.48	3.20	3.68	-	3.68
TOTAL	11.68	20.30	31.98	-	31.98

Note: (b) includes existing resources under national FSC, to be devoted to specific measures.

1 M3C1 - High speed railways and safe roads

Summary box

Policy area: National rail and road mobility

Objectives: The objectives of this component are: (i) the decarbonization and reduction of emissions through the shift of passengers and freight traffic from road to rail; (ii) the increased territorial connectivity and cohesion by reducing travel times; (iii) the digitalization of transport networks and improved security of bridges, viaducts and tunnels; (iv) the increased competitiveness of the productive systems in the South by improving railway links. These objectives are in line with the nationwide strategy on mobility of the Ministry of Infrastructure and Transport outlined in "#ItaliaVeloce".

The component is focused on the rail network known as Integrated National Transport System of 1st level (SNIT), with a clear priority on the TEN-T network (core and comprehensive). The implementing entity is primarily the public national company "Rete Ferroviaria Italiana" (RFI), besides some works to be carried out by regional railways.

In the railway sector the interventions are focused on: (i) High-speed railway connections to the South for passengers and freight; (ii) High-speed lines in the North connecting to Europe; (iii) Diagonal connections; (iv) Introducing the European Rail Transport Management System (ERTMS); (v) Strengthening metropolitan nodes and key national links; (vi) Strengthening regional railway lines; (vii) Upgrading, electrification and resilience of railways in the South; (viii) Upgrading railway stations in the South; (ix) Renewal of the rolling stock.

In the road sector the focus will be on the digitalization and smart maintenance of numerous bridges, viaducts and tunnels on the A-24/A25 highways (crossing Italy from west to east) and on parts of the ANAS network.

This component is linked to the one on "Smart districts and integrated logistic inter-modality", since it includes railway connections to ports and airports.

Twin transition:	by supporting the transfer of passengers and freight from road to rail (RFI expects an increase of +10% passenger kilometres by rail in the long run and of +20% in freight), and investing in the digitalization of rail traffic and road maintenance to ensure safety and climate resilience, this component promotes both the green and the digital transition.
Jobs and growth:	a more connected, safe and environmentally sustainable national rail and road transport network will boost the competitiveness of businesses, territories and cities, supporting the presence and growth of production sites and commercial activities. Overall, RFI has estimated that its investment programme up to 2026 could create on average an employment level of around 60,000 people per year.
Social resilience:	the increase of capacity at key railway nodes in metropolitan areas will have positive spill-over effects on regional trains, making the city centres more accessible and improving the quality of life of commuters. Also, the railway investments establishing links with and/or within the South of Italy will reduce the railway infrastructure gap and travel times, improving social cohesion.

Reforms and investments:

Outcome 1:	Transfer passengers and freight traffic from road to rail, increase rail speed/capacity/connectivity and improve service quality along key national and regional links, strengthen cross-border connections and EU railway interoperability
Reform 1.1:	Simplify the approval process of the 5-yearly and annual updates of the *Contratto di Programma* between the MIT and RFI
Reform 1.2:	Acceleration of the project authorization process
Investment 1.1:	High-speed railway connections to the South for passengers and freight;
Investment 1.2:	High-speed lines in the North connecting to Europe;
Investment 1.3:	Diagonal connections;
Investment 1.4:	Introducing the European Rail Transport Management System (ERTMS);
Investment 1.5:	Strengthening metropolitan nodes and key national links;

Investment 1.6: Strengthening regional lines;

Investment 1.7: Upgrading, electrification and resilience of railways in the South;

Investment 1.8: Upgrading railway stations in the South;

Investment 1.9: Renewal rolling stock.

Outcome 2: Improve the safety and climate/seismic resilience of bridges, viaducts and tunnels

Reform 2.1: Implementation of the recent "D.L. Semplificazioni" (converted into Law n.120 dated 11 September 2020) by issuing a decree concerning the adoption of "Guidelines for the classification and management of risks, the evaluation of security and the monitoring of existing bridges"

Reform 2.2: Transfer the property of the bridges and viaducts from the lower level ranking roads to the higher ranking ones (highways and main national roads), in particular to ANAS

Investment 2.1: Implementation of a technological monitoring system to remotely control the bridges, viaducts and tunnels of the highways A24 and A25 and perform extraordinary maintenance investments into their resilience and safety

Investment 2.2: Implementation of a technological monitoring system to remotely control the bridges, viaducts and tunnels of the roads infrastructure of ANAS and plan extraordinary maintenance investments

Estimated costs:

Cost of EUR 28,300 million to be covered by RRF

M3C1 - High speed railways and safe roads 4.0					
	Risorse (euro/mld)				
	Existing	New	Total	REACT-EU	TOTAL NGEU
	(a)	(b)	(c) = (a)+(b)	(d)	(e) = (c) + (d)
Railways works for the mobility and the fast connection in the country	**11.20**	**15.50**	**26.70**	**-**	**26.70**
- High-speed railway for passengers and freight, to increase the frequency and the capacity of existing railway connections	*8.66*	*6.13*	*14.79*	*-*	*14.79*
- European Rail Transport Management Systems (ERTMS) programs	*0.27*	*2.7*	*2.97*	*-*	*2.97*
- Strengthening metropolitan nodes, diagonal connections and key national links - Infastructural and technological development and upgrading.	*2.27*	*0.7*	*2.97*	*-*	*2.97*
- Renewal rolling stock and freight transport infrastructures	*-*	*0.2*	*0.2*	*-*	*0.2*
- Strengthening regional lines - Integration of High Speed railways with regional transport (interconnected railways), including some urban connections	*-*	*2.67*	*2.67*	*-*	*2.67*
- Upgrading, electrification and resilience of railways in the South	*-*	*2.4*	*2.4*	*-*	*2.4*
- Upgrading railway stations in the South	*-*	*0.7*	*0.7*	*-*	*0.7*
Improve the safety and climate/seismic resilience of bridges, viaducts and tunnels	**-**	**1.60**	**1.60**	**-**	**1.60**
- Implementation of a technological monitoring system to remotely control bridges, viaducts and tunnels of the highways A24 and A25 and perform extraordinary maintenance investments into their resilience and safety	*-*	*1.15*	*1.15*	*-*	*1.15*
- Implementation of a technological monitoring system to remotely control bridges, viaducts and tunnels of the roads infrastructure of ANAS and plan extraordinary maintenance investments	*-*	*0.45*	*0.45*	*-*	*0.45*
TOTAL	**11.20**	**17.10**	**28.30**	**-**	**28.30**

2. Main challenges and objectives

a) Main challenges

Current passenger traffic in Italy is heavily skewed towards roads

- At present passenger traffic in Italy is 90% on roads (860 billion passenger kilometres per year), while the railway represents only 6% of passengers (vs. 7.9% in Europe). The national transport sector is hence responsible for significant GHG emissions, with fossil fuels still representing the main source of energy.
- Most railway lines (72%) are electrified, while some diesel lines remain mainly at the regional level.

Freight volumes by road are concentrated in the North and at cross border links

- Freight volumes travel 51% on roads (1.05 billion tons in 2019) and 13% by rail (vs. 18.7% in Europe). Most of the freight volume (65%) is concentrated in Northern Italy (20% in Lombardy). As a result, in the North the traffic of heavy vehicles exceeds 30% of total vehicles in circulation, creating congestion and security problems.
- Road transport is especially relevant for Italy-EU imports (80% share) and exports (90% share), passing through the following key border links: Italy-France with 92% of freight volume on roads; Italy-Switzerland with 30% of freight on roads; Italy-Austria with 72% of freight on roads; and Italy-Slovenia with 94% of freight on roads.
- The total freight traffic crossing the Alps represents 223 million tons, whereby the situation of congestion is particularly critical along the Brenner cross border link, which handles 25% of the Italian trade through the Alps.
- In order to increase freight volumes by rail, an increase in the capacity of the network and nodes is necessary. Also the connectivity of railways to ports and airports needs to be increase. In the long run (by 2050) Italy aims to raise the share of freight traffic by rail up to 50% (for trips exceeding 300 km).

Limited railway connectivity to and within the South and in the Centre

- The high-speed network of Italy runs primarily from North to the South (along the Scandinavian-Mediterranean corridor), until Naples/Salerno.
- The population living south of Salerno is hence disconnected from the high-speed network. Overall in the South the capacity, reliability and frequency of the railway services is limited, resulting in long travel times.
- Also in the Centre of the country, West-East rail connections (e.g. from Rome to Pescara and from Orte to Falconara) are in need of upgrading, and the population living in the internal areas does not have access to a modern rail network.

Limited climate-resilience and poor status of maintenance of bridges, viaducts and tunnels along the road network

- There is insufficient knowledge of the status of the bridges, viaducts and tunnels along the national road network (of ANAS and/or of highway Concessionaires). In addition, the property and responsibility for the maintenance of the bridges and viaducts is not clearly allocated. An in-depth analysis and evaluation, the transfer of the responsibility for all bridges and viaducts to highway operators, and the setting up of maintenance guidelines and a maintenance plan are hence necessary to ensure the resilience of the infrastructure versus climate and seismic risks.
- The situation is particularly critical along the A24 and A25 highways (from Rome to Ancona and to Pescara), which include numerous bridges, viaducts and tunnels that are in danger, since they are located in a seismic area. These highways are

operated by a private concessionaire, but are amongst the most expensive ones in Italy. The required extraordinary maintenance works could hence not be financed through an increase of highway tariffs. Public financing is proposed given the public good nature of the proposed investments in security.

b) Objectives

The objectives of the component are:

(i) the decarbonization and reduction of emissions through the passage of passengers and freight traffic from road to rail;
(ii) the increased territorial connectivity and cohesion by reducing travel times (an objective of the national strategy is that 80% of the population should be at most 1 hour away from a high-speed connection);
(iii) the digitalization of transport networks and improved security of bridges, viaducts and tunnels;
(iv) the increased competitiveness of the productive systems in the South by improving traffic links.

In particular, in order to increase the attractiveness and competitiveness of the railway network, the focus of this component will be on:

- High-speed railway connections to the South for passengers and freight: three high-speed railway lines will be extended towards the South of Italy, i.e. the Naples-Bari (funded so far from ERDF), the Palermo-Catania and some functional lots of the Salerno-Reggio Calabria (the completion of which could be funded from national funds and ERDF). These lines will also increase the capacity to transport freight from the ports of the South.
- High-speed lines in the North connecting to Europe: the freight transport capacity of the Brescia-Verona-Padova line will be increased, in parallel to an increase of freight capacity of the Verona-Brenner link. In addition, the freight transport capacity from Genoa and its port through the Alps will be strengthened.
- Diagonal connections across Italy: investments are foreseen in the following three lines crossing Italy west to east: Orte-Falconara (focused on freight traffic, linked to the ports of Ravenna and Ancona); Rome-Pescara (mainly passenger traffic along the line, including commuters); and Salerno-Battipaglia-Taranto (focused on passenger traffic in internal areas of Basilicata and Puglia regions and on freight traffic from the port of Taranto).
- Introducing the European Rail Transport Management System (ERTMS) to ensure interoperability and security: the focus will be on the TEN-T network, starting with passenger traffic lines and then extending the ERTMS also to freight traffic lines.
- Strengthening metropolitan nodes and key national links: a nationwide investment programme of RFI will be dedicated to improve the capacity, reliability, safety and

service levels at 12 metropolitan nodes and along key railway links.

- Strengthening of regional railway lines: upgrading investments will also concern a series of regional railway lines (both transferred to RFI and/or owned by regional operators), including some "urban connections" used by numerous commuters.
- Upgrading railway stations in the South of Italy by improving their accessibility. In the road sector the focus of the interventions proposed under the Recovery Fund will be exclusively on climate and seismic resilience and on the safety and security levels of critical infrastructures (bridges, viaducts and tunnels).

The investments foreseen in the railway and road sectors are in line with the 2020 and 2019 Country Specific Recommendations (CSR) for Italy. In particular, 2020 CSR mention the need to "front-load mature public investment projects and promote private investment to foster the economic recovery, focusing investments on the green and digital transition, including sustainable public transport".

Also the 2019 CSR mention that "investment is needed to raise the quality and sustainability of the country's infrastructure" and that "in the transport sector, Italy has not delivered on its infrastructure investment strategy (Connettere l'Italia)", with the result that "the EU transport scoreboard shows that the quality of Italy's infrastructure is below the EU average".

Twin transition:

By supporting the shift of passengers and freight traffic from road to by rail and reducing road congestion, the component will reduce GHG emissions. In particular, RFI estimates that an increase of the share of passengers using the railway from 6% to 10% could result in annual CO2 saving of 2.3 million tons by 2030.

In addition, the digitalization of railway services through the ERTMS and of bridges, viaducts and tunnels on the A-24/A25 highways and on the ANAS network will increase the safety levels of these transport modes, allowing to improve the planning of effective maintenance activities and reducing life cycle maintenance costs, while increasing the resilience of the network.

Jobs and Growth:

In an increasingly connected world with raising trade flows, a digitalized, green and efficient transport network is a necessary condition for economic growth. The investments in smarter, quicker and safer connectivity across Italy will hence improve the competitiveness and productivity of the connected territories.

People will spend less time traveling for work, including commuters. Tourist flows will be able to move more quickly across the country, discovering new areas of cultural interest and reducing the pressure on the main tourist centres.

Freight transport services will be more competitive, facilitating imports and exports of

goods, and attracting companies to locate their production sites and/or services close to efficient transport nodes. The increase of rail connectivity to ports in the North, Centre and South of the country will improve the competitiveness and environmental sustainability of the logistic corridors across Italy.

Social resilience:

The investments in national and regional railway networks and nodes in the South of Italy (including the accessibility of railway stations) will reduce the gap in terms of the existing railway infrastructure, reducing travel times and improving social cohesion. The increase of the capacity of key railway nodes in 12 metropolitan areas will have positive spill-over effects on regional trains, making the city centres more accessible and improving the quality of life of commuters. In addition, some investments will be directly targeted at regional/urban lines that are primarily used by communters.

c) National strategic context

The component is fully aligned with the priorities of the national strategy for mobility, which are outlined in the document "#ItaliaVeloce". The proposed investments and related reforms focus on the key links of the rail network of national and international interest, known as the Integrated National Transport System of 1st level (SNIT). A priority is given to the TEN-T network.

In the rail sector, the 1st level SNIT covers 8,800 km (around 50% of the national network) and 48 lines. The focus of the component is on the following TEN-T corridors:

- the Mediterranean Corridor crossing Northern Italy from West to East (Lyon-Turin-Milan-Verona-Venice-Trieste).

- the Rhine-Alpine Corridor from Genova to the Alps;

- the Scandinavian-Mediterranean corridor connecting Italy from North to South (Brenner-Trento-Florence-Rome-Naples-Bari-Messina-Palermo).

In terms of cross-border links, the ones included under the RFF are Italy-Switzerland (Genoa-Alps) and Italy-Austria (the Brenner). The Lyon-Turin line has not been included, since its completion is envisaged beyond 2026.

In terms of interoperability to favour the EU Single Market, priority will be given to the roll out the ERTMS along 3,400 km of the railway lines.

In terms of investments in regional railway lines, a distinction has to be made between lines that will be transferred to "Rete Ferroviaria Italiana" (RFI), and those that will remain regional, with regional companies as counterparts. In terms of operations, the services on these lines will be allocated following open, non-discriminatory and competitive procedures, as established by the access rules and monitored by the National Authority for Transport ("Autorità di Regolazione dei Trasporti" - ART).

Overall, railway investments in the South of Italy under the RRF are estimated to amount to around 45-50% of total investments. The decision on the use of additional ERDF funds for the railway sector in the South has to be taken, but will in any case be complementary to the RRF (e.g. to finance other regional railway lines).

In the road sector the focus proposed under the RRF is on the digitalization, safety and climate resilience of bridges, viaducts and tunnels in seismic areas. In particular, priority will be given to the A-24 and 25 highways in central Italy, which are considered to be in a critical status. In addition, a digitalization and maintenance plan will be launched also for bridges and viaducts in critical areas of the ANAS network.

Most of the investments proposed under the RRF are based on the Investment plans of the two key national public companies in the rail and road sectors, respectively "Rete Ferroviaria Italiana" (RFI) and the National Authority for Roads (ANAS). Both companies operate under "Contratti di Programma" with the Italian Ministry of Infrastructure and Transport (MIT), which are renewed at regular intervals. In order to accelerate the start of the investments, it is being considered that all works inserted in the Recovery Plan should be automatically included in the "Contratti di Programma" with RFI and ANAS, without the need for a separate approval process.

3. Description of the reforms and investments of the component

1) High speed/capacity railway network.

Reform 1.1: Acceleration of the approval process of the Planning Agreement (*Contratto di Programma*, CdP) between MIT and RFI

Challenges: The current long approval times of the CdP between MIT and RFI do not allow for adequate scheduling-planning-implementation of the interventions by RFI in set times.

Objectives: This reform provides for the acceleration of the five-year CdP approval procedure between MIT and RFI and subsequent annual updates, with the consequent speeding up of the implementation of the interventions.

Implementation: The MIT will propose a legislative amendment by 2021. A possible proposal provides that the competent Parliamentary Commissions express an opinion on the strategic guidelines of the CoP, prior to the opinion of the CIPE, and that the Court of Auditors (*Corte dei Conti* carries out, at the request of the Government or the competent Parliamentary Commissions, the concomitant control over the CoP (as recently introduced by the "DL Semplificazioni" 2020).

Target population: RFI and railway users.

Timeline: the legislative change for the acceleration of the approval procedures of the Planning Agreement between MIT and RFI will be presented by the end of 2021.

Reform 1.2: Acceleration of the project authorisation process.

Challenges: The uncertainties concerning the duration of the authorisation processes of projects, as well as the time required for the adaptation of the final project design to the prescriptions made by the various administrations, cause delays and cost increases.

Objectives: The MIT will propose a regulatory change, in order to allow to anticipate the geographic location of the works at the time of the "Progetto di fattibilità Tecnica Economica" (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.

The following positive effects are expected from the proposed regulatory change:

- all the observations of the various administrations will be collected at the stage of the PFTE, allowing to incorporate them, with savings in terms of time and resources, in the subsequent phases of the project design process;

- the land affected by the works will be reserved from the urban planning point of view, inhibiting building activities by third parties and allowing economic savings for future expropriations;

- the overall time for the authorization process of projects would be reduced from currently 11 months to 6 months.

Implementation: The MIT, in coordination with the Ministry of the Environment (MATTM) and the Ministry of Cultural Goods (MiBACT), will propose a legislative amendment of art. 13 of Law no. 120/2020 (Simplification Decree Law), and of related regulations included in the Code of Contracts, in the Environmental Code and in administrative procedures.

Target population: RFI and rail users.

Timeline: Legislative amendment to expedite permitting process will be proposed by mid 2021.

Investment 1.1: High-speed railway connections to the South for passengers and freight

Challenges: In order to ensure territorial cohesion and equity, there is a need to improve the connection of the inhabitants in the regions of the South to the high-speed railway network.

Objectives: The proposed investments in the High Speed Network (AVR) allow to develop the long-distance railway passenger and freight services in an effective manner, consistent with the structure of the Italian territory and with the connectivity needs of the southern regions. The proposed interventions will be integrated with the regional transport systems, which play a primary role in supporting the demand of local mobility, and also feed the system of High Speed connections at the national level.

In particular, the High-speed network interventions planned in the South will make it possible to reduce journey times and increase capacity, as illustrated below:

Naples-Bari: upon completion of the project the Naples-Bari section will be covered in 2 hours, instead of the current 3hours 30 minutes; there will be an increase in capacity from 4 to 10 trains/hour on the sections with double tracks, and an adjustment of the performance to allow the transit of freight trains;

Palermo-Catania: upon completion of the entire project there will be a reduction in the journey time of 60 minutes on the Palermo-Catania section, and an increase in capacity from 4 to 10 trains/hour on the sections being doubled;

Salerno-Reggio Calabria: upon completion of the entire project, the journey time will be reduced by 60 minutes on the Rome-Reggio Calabria section, with a recovery of up to 40 minutes on the priority lots of the Salerno-Battipaglia-Paola section; in addition, there will be a performance upgrade to allow the transit of freight trains.

Implementation: the interventions are part of the current RFI Investment Programme in the Contratto di Programma, approved by the MIT. The Naples-Bari intervention proposed for funding by the RRF (a section of 90 km) is under construction, with completion of approximately 32 km foreseen in December 2023. The Palermo-Catania intervention proposed under the RRF (a section of approximately 150 km) is mainly in design phase, while the Bicocca-Catenanuova section (approximately 37 km) is planned for completion by December 2023. The priority lot of the Salerno-Reggio Calabria intervention (approximately 50 km) is in design phase with completion in December 2026.

RFI has demonstrated over the years a strong capacity to implement investments, starting from the planning phase, design, obtaining the necessary permits, launching calls for tenders, selecting and supervising contractors. Furthermore, it is expected that for the works included in the RRF, which still need to start the authorization process, further simplifying procedures will be activated through specific legislative procedures, in order to compress the time required for the authorization procedures foreseen in the planning process (Conferenza dei Servizi - environmental authorizations - cultural heritage superintendence authorizations, etc.).

Target population: users of the indicated railway lines.

Timeline: by 2026.

Investment 1.2: High-speed lines in the North connecting to Europe

Challenges: In order to increase the freight traffic by rail and to ensure the modal shift from road to rail in the cross-border trade, it is necessary to increase the capacity of railway connections in the North of Italy and with the rest of Europe.

Objectives: The proposed High Speed Network (AVR) interventions will allow to strengthen freight transport services by rail, according to an intermodal logic and by establishing connections with the system of existing ports and airports. In particular, the planned High-speed interventions allow the reduction of travel times and the increase of capacity, as indicated below:

Brescia-Verona-Vicenza-Padua: the proposed interventions refer to the Brescia-Verona section (of 47 km) and the Verona-Bivio Vicenza section (of 44 km). Upon completion of the entire project up to Padua, the journey time on the Milan-Venice section will fall by 10 minutes. The main benefits will be an increase in capacity and in the regularity of traffic due to a specialisation of the services (traditional vs. HS), a significant improvement in the regional transport system due to the higher capacity on the historic line, and a better accessibility of the new station at Vicenza Fiera;

Liguria-Alpi: the intervention will allow the transit of freight trains with as length up to 750 meters. Upon completion of the entire project, journey times will be reduced by 60 minutes on the Genoa-Milan section (compared with the current time required of 1h 30 minutes) and on the Genoa-Turin section (compared with the current time required of 1h 35 minutes). In addition, capacity will be increased from 10 to 24 trains/hour on the sections subject to quadrupling close to the node of Milan (Rho-Parabiago and Pavia-Milano-Rogoredo). The proposed intervention will allow the elimination of bottlenecks at the node, due to the separation of long-distance passenger and freight traffic flows from metropolitan-regional flows, and due to the increase in the transport offer and of the frequency of regional and metropolitan trains (from 10 to 12 trains/hour on the Voltri-Brignone link);

Verona-Brennero - adduction works: the section that will be built is the Trento bypass. It is part of the project which includes the quadrupling of the Fortezza-Verona line, the bypass of Bolzano and Rovereto city centers and the rationalization of flows from the north entering the node of Verona. Upon completion of the entire project there will be a significant increase in the capacity of trains in transit at the Brenner connection (target 400 trains/day).

Implementation: The implementing entity is RFI. The Brescia-Verona-Vicenza line is in the implementation phase with completion foreseen in June 2026 for the Brescia-Verona section, and in December 2026 for the Verona-Bivio Vicenza section. The Liguria-Alpi project is under construction for the Genoa Node and Third Giovi Crossing section (of 53

km), with completion foreseen in August 2025, and in December 2026 for the remaining sections. The Verona-Brenner adduction works (of 15 km), related to the Trento bypass, are in design phase with completion expected in December 2026.

Target population: users of the indicated railway lines.

Timeline: by 2026.

Investment 1.3: Diagonal connections

Challenges: In the center-south of the country there is the need to improve the connectivity to the High speed railway network through diagonal lines.

Objectives: the objective of the proposed interventions is to reduce the time required to travel by rail and to transport freight from the Adriatic and Ionian seas to the Tyrrhenian Sea, through an improvement of the speed, frequency and capacity of existing diagonal railway lines. In particular, the envisaged upgrading interventions are expected to allow a reduction in travel times and increases in capacity that can be summarized as follows:

Rome-Pescara: upon completion of the entire project there will be a time saving of 80 minutes on the Rome-Pescara stretch and an increase in capacity from 4 to 10 trains/hour on the doubled stretches (with the possibility to set up metropolitan services between Chieti and Pescara); in addition, the performnace of the line will be adjusted to allow for the development of freight traffic;

Strengthening Orte-Falconara: upon completion of the entire project there will be a reduction in travel times of 15 minutes on the Rome-Ancona section and of 10 minutes on the Rome-Perugia section, an increase in capacity from 4 to 10 trains/hour on the sections subject to doubling of the tracks, and a performance adjustment to allow the transit of freight trains;

Taranto-Metaponto-Potenza-Battipaglia: upon completion of the entire project, journey times will be reduced by 30 minutes on the Naples-Taranto section (via Battipaglia) compared with the current time required of 4 hours, capacity will be increased from 4 to 10 trains per hour on the sections being upgraded, and the railway line will be adjusted to allow the passage of freight trains.

Implementation: The implementing entity is RFI. The selected interventions are in project design phase, with expected completion by end 2026: Rome-Pescara (about 32 km), the Orte-Falconara upgrading (about x km), and the priority lot of the Potenza-Metaponto section (around 35 km) of the Taranto-Metaponto-Potenza-Battipaglia line.

Target population: users of the indicated railway lines.

Timeline: by 2026.

Investment 1.4: Introducing the European Rail Transport Management System (ERTMS)

Challenges: At present the coverage of the ERTMS, which allows interoperability between European railway networks and an improvement of the performance of the railway systems in terms of safety, capacity and maintenance, is limited to a few railway sections.

Objectives:

- Upgrade of the existing safety and signalling systems to the European ERTMS standard;
- Guarantee of full interoperability with European railway networks;
- Increase and optimization of network capacity and performance;
- Higher efficiency of maintenance operations;
- Improvement of safety standards.

Implementation: RFI will proceed with the roll-out of ERTMS mainly in stand-alone mode, starting with the passenger transport sections, in order to allow freight operators time to adapt to the new standard. In particular, from 2022 to 2026 the ERTMS coverage is expected to be extended over 3,400 km of the RFI network. RFI has defined an accelerated plan for the extension of ERTMS, which envisages equipping the core trans-European railway network by 2030, anticipating the time objectives set by EU Regulation no. 1315/2013.

Target population: users of lines with ERTMS and related traffic catchment areas.

Timeline: by 2026.

Investment 1.5: Strengthening metropolitan nodes and key national links.

Challenges: Besides developing new railway sections (see investments 1.1-1.3 above), RFI also carries out a nationwide investment programme to upgrade its key railway nodes and national links. The railway nodes at 12 metropolitan cities require an increase of capacity to handle the connections between the national and the regional networks. In addition, existing key national railway links are also in need of upgrading, since they exhibit bottlenecks and low performance, due to reduced capacity and the interference between passenger and freight traffic.

Objectives: RFI envisages an 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.

As outlined in the national strategy in the document "Italia Veloce", the interventions on the nodes can be distinguished as follows:

- aim to enhance “metropolitan" or "suburban" connections, in order to guarantee capillary services with high frequencies, thereby supporting the demand for mobility expressed by large metropolitan cities (and also by medium-sized urban areas);
- focus on “fast regional” connections, capable to guarantee medium-range travel services, supporting the demand for mobility expressed by large diffuse urban areas, with competitive speed and comfort levels compared to the use of private cars;
- improve the accessibility and interchange between railway stations and other mobility systems.

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).

Implementation: The investment programme of RFI includes numerous works all over the country. RFI will closely follow the implementation of this national programme, including the phases of project design, works award and works supervsion.

Target population: mainly users in the 12 metropolitan cities and users throughout the country affected by the upgrading of key links.

Timeline: by 2026.

Investment 1.6: Strengthening of regional lines.

Challenges: There is a need to upgrade regional railway infrastructures in various areas of the country. Regional railway lines can be distinguished as follows: interconnected lines with the national network (as described in Annex 1 of Ministerial Decree dated 5 August 2016) and non-interconnected lines. The fragmented management of the regional rail networks has caused connection problems with the main national network. The separate management of the national and regional lines has led to the adoption of different technological and operating systems; this has created overall safety problems of the railway network and a potential risk of accidents.

Objectives: 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 upgrade the non-interconnected regional rail transport system, which plays a primary role in supporting the demand for local and metropolitan mobility;

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:

(i) Umbrian Central Railway (FCU): track renewal and replacement of the switches on the Perugia-Terni and Sansepolcro-Città Castello lines; improvement of safety standards for railway operations;
(ii) FCU: Implementation of the ERTMS: improvement of traffic performance, optimisation of capacity and performance, improvement of safety standards; 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.

As concerns the **non-interconnected regional railway lines**, some of which are connected to metropolitan lines, the following interventions are foreseen:

Lombardy: renewal of the rolling stock for the regional network;
Lazio: renewal of the rolling stock for the Roma Lido and Roma Viterbo lines;
Abruzzo: upgrading of safety standards for the Archi-Castel di Sangro section and renewal of the rolling stock on the regional network;
Campania: renewal of trains (underground lines, Linee Vesuviane, Linee Flegree, suburban line Naples-Piedimonte Matese) and technological development (Linee Vesuviane, Linee Flegree, EAV network);
Basilicata: upgrading of safety standards, renewal of equipment on several sections of the Appulo-Lucane railway lines;
Puglia: upgrading and modernisation works of the Ferrovie del Gargano and Ferrovie Appulo-Lucane;
Calabria: works to upgrade and modernise the regional railway lines of Cosenza-Catanzaro and Cosenza-San Giovanni in Fiore;
Sicily: upgrading of safety standards and renewal of the rolling stock on the Circumetnea line.

Implementation: In order to ensure the safety of the interconnected regional railway lines, regulatory provisions have identified RFI as the entity responsible for managing these lines and carrying out the technological interventions required to adapt these regional lines to the technological and safety standards of the national railway network.

So far, the FCU (Umbria) and the FSE Ferrovie del Sud Est (Puglia) have been transferred to RFI, while the other interconnected regional lines are still in the process of being

transferred from the Regions to RFI.

Pending the formal transfer of the above-mentioned interconnected lines to RFI, the interventions will be carried out through specific agreements between RFI, the Regions and the current infrastructure managers, with the exception of the interventions related to the Bari-Bitritto and Rosarno-San Ferdinando lines, which will be included in the MIT-RFI *Contratto di Programma*.

The upgrading of the non-interconnected regional lines and metropolitan lines will instead be the responsibility of the respective owners (Regions and/or Municipalities).

Target population: users of the lines indicated and their associated traffic areas.

Timeline: 2026

Investment 1.7: Upgrading, electrification and resilience of railways in the South.

Challenges: Several railway lines in the South of Italy are in need of upgrading and electrification, and present bottlenecks in their connection to the rest of the railway network and at key traffic nodes.

Objectives: 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: Rome-Venafro-Campobasso-Termoli;
- Apulia region:
- Upgrading of Bari – Lamasinata;
- electrification Barletta – Canosa;
- Pescara-Foggia.
- Calabria region: Upgrading Ionian Sibari-Catanzaro Lido-Reggio Calabria/Lamezia Terme
- Sicily:
  - Node of Catania
  - Ring road of Palermo
  - Upgrading Palermo - Agrigento - Porto Empedocle
  - Intermodality and accessibility to Trapani Birgi airport
  - Link to the port of Augusta
- Sardinia:
  - Olbia airport railway link
  - Track-doubling Decimomannu-Villamassargia

Implementation: RFI will implement the above investment plan, following the vari-

ous phases of project design, getting authorizations, tendering the works, awarding and supervising the works.

Target population: users of the upgraded railway lines.

Timeline: by 2026.

Investment 1.8: Upgrading railway stations in the South

Challenges: Numerous railway stations in the South present problems in terms of accessibility and integration with the territory. Investments are needed to upgrade the stations, improve the functionality of their buildings, the quality of the services provided to users and the energy efficiency levels.

Objectives: The proposed investment programme includes the following types of interventions:

Urban hubs and metropolitan lines (15 stations): interventions aim at the development, upgrading, accessibility and energy efficiency of individual stations and railway nodes, which act as mobility hubs (Messina, Villa S. Giovanni, Taranto, Salerno, Benevento, etc.) or metropolitan lines (e.g. the stations of the L2 metro line in Naples, etc.), which need to be upgraded/renovated in order to guarantee their centrality as a transport hub and service centres;

Enhancing the accessibility, attractiveness and energy efficiency of medium-large sized stations with high traffic volumes (30 stations): interventions related to stations of strategic importance from a transport and/or touristic point of view, described as Easy&Smart circuit stations (including Chieti (Abruzzo), Potenza Centrale and Potenza Superiore (Basilicata), Lamezia Terme, Cosenza, Sibari and Catanzaro Lido (Calabria), Sapri, Scafati, Nocera Superiore, Torre del Greco and Sarno (Campania), Termoli (Molise); Foggia, Polignano a Mare, San Severo and Barletta (Puglia), Macomer and Oristano (Sardinia), Palermo Notarbartolo, Acireale and Marsala (Sicily));

Functional requalification, improvement of accessibility and intermodality, and energy efficiency of small-medium sized stations (10 stations): all the interventions aim at improving the accessibility and attractiveness of the stations, as well as its energy efficiency and environmental sustainability.

Implementation: RFI will implement the above investment plan.

Target population: the users of the upgraded stations.

Timeline: by 2026.

Investment 1.9: Renewal of rolling stock.

Challenges: A part of the fleet of the rolling stock dedicated to freight transport is composed of old and polluting vehicles, which need to be substituted.

Objectives: The project foresees the renewal of obsolete freight wagons and locomotives, or their modernisation through revamping and retrofitting.

Implementation: The procedures to provide incentives for the replacement of the wagon fleet will be defined by the competent General Directorate for Railway transport of the Ministry of Infrastructure and Transport (MIT) and by the Rete Autostrade Mediterranee (RAM S.p.A. , an in- house company of the State, fully owned by the Ministry of Economy and Finance). For the renewal of a wagon, a contribution will be provided on the value of the new vehicle in exchange for the scrapping of an old vehicle, requiring proof of the freight traffic conducted with the old wagon. As part of the modernisation process, support will also be provided for the revamping and retrofitting of the existing rolling stock, introducing innovative and/or improved components.

Target population: rail freight operators.

Timeline: by 2026.

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2) Safe roads.

Reform 2.1 Fulfilment of the recent D.L. Semplificazioni (Law Decree no. 76 of 16 July 2020, converted into Law no. 120 of 11 September 2020) concerning the adoption of the "Guidelines for the classification and management of risk, safety assessment and monitoring of existing bridges". Reform 2.2: Transfer the ownership of the works of art (bridges, viaducts) related to lower type roads to the owners of higher type roads (motorways and main suburban roads), in particular from the Municipalities, Provinces and Regions to the State.

Challenges: in the absence of a binding standard for bridge safety assessments and classification, each operator applies non-homogeneous and non-standard criteria to classify the risk level of the bridges. A further issue is the unclear ownership of some overpasses of road infrastructures.

Objectives: The reform foresees:

- the adoption of "Guidelines", which will allow the application of common standards and methodologies on the entire national road network;
- the transfer of the ownership of the bridges, viaducts and overpasses from the lower type roads to the higher type roads (motorways and main suburban roads): this will allow an increase in the overall safety of the road network, as the bridges,

viaducts and overpasses will be maintained by ANAS and/or the motorway concessionaires, who have better planning and maintenance capacities than the individual municipalities or provinces.

Implementation: the transfer of the ownership of the works of art will have to take place within six months of the entry into force of Law 120/20. It is expected to be completed in 2021, with a special "handover report" according to the rules of the Codice della Strada (Legislative Decree 285/1992) and its Regulations (Presidential Decree 495/92), which dictate provisions on the transfer of ownership between road-owning entities.

Target population: entire national territory.

Timeline: the transfer of ownership of bridges and overpasses from lower type roads to higher type roads will take place by 2021.

Investment 2.1: Provision of a technological monitoring system for remote control and investments into major safety interventions on main structures (bridges, viaducts and tunnels) on the A24-A25 motorways.

Challenges: The A24 and A25 highways are key road connections crossing the center of Italy from Rome to Pescara. The bridges, viaducts and tunnels on the A24 and A25 motorways present significant static criticalities - due not only to the seismicity of the area, but also due to their age and consequent deterioration - which require investments for adaptation and safety.

Objectives: Preparation and implementation of a dynamic monitoring system for remote controls on the structures (bridges, viaducts, overpasses and tunnels) of the A24-A25 highways , necessary to plan the interventions in a cost effective way and to improve the levels of maintenance; Implementation of an extraordinary plan for checking and putting into security the structures on the A24-A25 motorways: initially a survey of the state of maintenance of the structures will be conducted, and subsequently the required investments into safety measures will be implemented.

Implementation: The interventions will followed by the MIT. The motorway concessionaire of the “Strada dei Parchi” will have no gain from these interventions, which are required for safety, but will not be included in the economic and financial plan of the concession.

Target population: road users.

Timeline: - in-depth surveys on 50% of the viaducts by 2022; - first tendering of safety works by 2022; - completion of works by 2026.

Investment 2.2: Setting up of a technological monitoring system on the ANAS network for remote control of engineering works (bridges, viaducts, overpasses and tunnels) and implementation of interventions at the most critical points

Challenges: At present there is insufficient information, data and knowledge about the state of maintenance of bridges, viaducts, overpasses and tunnels on the road network. This prevents cost-effective planning of the maintenance works required to ensure safe connections between the country's main economic centres.

Objectives: The project envisages the application of an integrated census, classification and risk management system to 11,000 bridges and 1,600 tunnels of the ANAS national network. On this basis, the structures in the most critical conditions will be selected, on which technological monitoring will be applied and for which repair, safety or replacement works will be designed. A number of pilot projects will be developed, characterised by the use of innovative intervention techniques and materials.

The main goals of the proposed intervention are:

- the preparation and implementation of a dynamic monitoring system with remote controls, necessary to improve the planning of maintenance interventions and to identify the most vulnerable points, considering seismic and landslide risks and the useful life;
- the management of the safety of the road infrastructure in a structural way and through an iterative process (analysis of the network, inspections, management of the digitalised system, classification of priorities, implementation of the interventions), resulting in a better knowledge of the status of network with a consequent improvement in its safety.

Implementation: The interventions will be included in the Contract of ANAS with the MIT (*Contratto di Programma*), and will then implemented by ANAS. The activities related to the census, data acquisition and data processing activities will feed into the national archive of public works (AINOP), set up at the MIT and that includes data from various administrations concerning the execution of public works. The survey campaigns will provide useful data and experiences, also for the monitoring and maintenance of bridges/viaducts/overpasses/gates of other road infrastructures.

Target population: road users throughout the country.

Timeline:

- Definition of the sample of bridges, viaducts, overpasses and tunnels to be monitored - by the end of 2021
- Definition of the integrated digital platform for risk management and completion of the risk classification - by the end of 2023;
- Assessments of the most critical elements, installation of the technological monitor-

ing systems, planning of the priority restoration/improvement/replacement/safety measures - by the end of 2024;
- Start-up of the integrated technological platform made available to the operators, implementation of some priority restoration/improvement/safety measures - by 2026.

4. Green and digital dimensions of the component

a) Green Transition:

The EU Regulation 2020/408 establishes, as a binding target, that at least 37% of the total budget of the PNRR must be allocated to the green transition.

This Action contributes significantly to the green transition, about 75% (see Table 1), by promoting a more efficient and sustainable use of transport and in particular of the railway mode.

n particular, investments 1.1, 1.2, 1.3 relating to the *High-speed railway network* and the intervention 1.5 *Strengthening metropolitan nodes and key national links* have a Green (climate) impact of 100%, while the remaining railway investments have a Green impact (climate) equal to 40%.

On the other hand, investments in the road sector have a green (climate) impact of 0%. With reference to the climate and environmental objectives defined in the EU Regulation 2020/852 (*Taxonomy Regulation*), this Action provides an important contribution to the prevention and reduction of pollution (in particular of atmospheric pollution, thanks to the important transfer of road traffic, both passengers and freight, to rail) and consequently on the mitigation of climate change.

b) Digital Transition:

The EU Regulation 2020/408 establishes, as a binding target, that at least 20% of the total PNRR allocation must be allocated to the digital transition.This Action contributes to the achievement of the aforementioned target, presenting a Digital impact of 16%.

In particular in the **railway sector**, only the investment 1.4 *Introducing the European Rail Transport Management System* (ERTMS) has a digital impact equal to 100%.

In the **road sector**, investment 2.1 *Implementation of a dynamic monitoring system to control remotely the bridges, viaducts and tunnels (A24-A25)* and investment 2.2 *Implementation of a dynamic monitoring system to control remotely the bridges, viaducts and tunnels (ANAS network*) both have a digital impact of 100%.