



Mission 2 - Green revolution and ecological transition

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Mission's main objectives:



Sustainable agri-food systems



Achieve a sustainable agri-food chain, improve the competitiveness of farms and their climate-environmental performance, strengthen the logistics infrastructure of the sector



Circular economy



Make the waste management system performant, stressing the production of secondary raw materials reducing waste disposal in industrial sectors.

Implement the circular economy paradigm, minimizing environmental and climate impact, reducing pollutants and CO2 and creating jobs in the green economy.

Circular economy principle should be applied also to the agricultural sector implementing conversion of waste into biogas and biomethane.

Mission's financing snapshot:

M2 - Green revolution and ecological transition

	Resources (euro/mln)				
	Existing (a)	New (b)	Total (c) = (a)+(b)	REACT-EU (d)	TOTAL NGEU (e) = (c) + (d)
M2C1- Sustainable agriculture and circular economy	-	5.90	5.90	1.10	7.00
M2C2 Renewable energy, hydrogen and local sustainable mobility	2.95	14.58	17.53	0.69	18.22
M2C3 - Energy upgrading and renovation of buildings	16.36	12.88	29.23	0.32	29.55
M2C4 - Protection of land and water resources	10.85	3.97	14.83	0.20	15.03
TOTAL	30.16	37.33	67.49	2.31	69.8

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

1 M2C1 - Sustainable agriculture and circular economy

1. Description of the component

Summary box

Policy area: European strategy "Farm to fork", infrastructures relating to the logistics of the agri-food sector, waste management, circular economy, environmental sustainability.

Objectives: The objectives of this component are:

- a) Achieve a sustainable agri-food chain, improve the competitiveness of farms and their climate-environmental performance, strengthen the logistics infrastructure of the sector.
- b) Make the waste management system performant, with emphasis on production of secondary raw materials to be used in different industrial sectors minimizing waste disposal.
- c) Implement the circular economy paradigm, minimizing environmental impact also regarding the global warming (reduction of pollutants and CO₂) and creating jobs linked to the green economy.

Circular economy principle should be applied also to agricultural sector implementing practice on conversion of waste into biogas and biomethane.

Reforms and investments:

Outcome 1: Sustainable agriculture.

Investment 1.1: Initiatives for sustainable agriculture

- a) Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture, and plant nursery sectors.
- b) Agri-solar Park.
- c) Logistics plan for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sector sectors.

Outcome 2: Circular economy and enhancement of the integrated waste cycle.

Reform 2.1: National strategy for the circular economy: definition of specific legislation aimed at the ecological transition and implementation of the European action plan for the circular economy;

Investment 2.1: New plants and revamping of existing waste treatment plants.

Investment 2.2: Circular economy projects.

Investment 2.3: Ecological transition in the South of Italy (*projects to be defined*)

Estimated costs:

EUR 5.90b to be covered by RRF (7.0b total NGEU)

M2C1- Sustainable agriculture and circular economy

	Resources (euro/mld)				
	Existing (a)	New (b)	Total (c) = (a)+(b)	REACT-EU (d)	TOTAL NGEU (e) = (c) + (d)
1. Sustainable agriculture	-	2.50	2.50	-	2.50
2. Circular economy and enhancement of the integrated waste cycle	-	3.40	3.40	1.10	4.50
- <i>New recycling plants and modernisation of existing ones</i>	-	<i>1.50</i>	<i>1.50</i>	-	<i>1.50</i>
- <i>Circular Economy projects</i>	-	<i>1.90</i>	<i>1.90</i>	<i>0.30</i>	<i>2.20</i>
- <i>Ecologic transition in Southern Italy</i>	-	-	-	<i>0.80</i>	<i>0.80</i>
TOTAL	-	5.90	5.90	1.10	7.00

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

2. Main challenges and objectives

a) Main challenges

The Covid-19 pandemic has underlined the importance of a solid and resilient food system that works under all circumstances and which is able to ensure citizens have a sufficient supply of food at affordable prices. Furthermore, the transition to sustainable food systems also represents a huge economic opportunity, both for farmers, fishermen and producers in the aquaculture sector as well as for food processors and catering services. This transition will allow them to make sustainability their distinctive trait and to ensure the future of the Italian and EU food supply chain.

In connection with the agro-food issue, but not only, the need to reduce the production of waste has emerged, with attention to unsorted urban waste as well as to the development of effective models of separate collection. One of the main challenges is, in fact, to increase the "quality" of the waste produced also to close the circular economy cycle.

The "**Farm to Fork**" strategy, at the heart of the European Green Deal, comprehensively

addresses the challenges posed by achieving sustainable food systems, recognizing the inseparable links between healthy people, healthy societies and a healthy planet. Moving to a sustainable food system can bring environmental, health and social benefits, deliver economic benefits, and ensure that recovery from the crisis leads us on a sustainable path.

The strategy therefore constitutes a comprehensive approach to the value that citizens attribute to food sustainability. An opportunity to improve lifestyles, health and the environment. Creating a supportive food environment that facilitates the choice of healthy and sustainable diets will benefit consumers' health and quality of life and reduce health costs for society.

In line with the Action Plan for the circular economy (COM/2020/98), more emphasis will be placed on reducing waste production, reducing the quantities of unsorted municipal waste, and developing effective models of separate collection

The development of the **circular economy paradigm** is part of the provisions of the new Action Plan for the circular economy (COM/2020/98), one of the pillars of the Green Deal, approved on March 11th, 2020. The plan provides for a strategic framework, characterized by measures to ensure the design of sustainable products, the accountability of producers and consumers towards more sustainable choices, the increase of circularity in production processes (with particular reference to sectors that use more resources: electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and construction, food).

Italy in September 2020 has already implemented the directives of the "Circular Economy Package" with the recycling targets¹ or urban waste: at least 55% by 2025, at least 60% by 2030, at least 65% by 2035 and a restriction on their disposal in landfills of no more than 10% by 2035². In line with this reference framework, Italy's project proposals about circular economy aim to fill the structural gaps that hinder the development of the sector.³

The main criticalities were identified in:

- plant deficiencies, for the treatment and valorisation of the organic fraction of waste;
- shortcomings of existing plants in relation to the need to reduce the production of new waste and consequent need for modernization of existing plants;

¹ Legislative Decree 3 September 2020, n. 116, on "*Implementation of directive (EU) 2018/851 amending directive 2008/98/EC on waste and implementation of directive (EU) 2018/852 amending directive 1994/62/EC on packaging and packaging waste*", published in the O.J. of 11 September 2020.

² Legislative Decree 3 September 2020, n. 121, on "*Implementation of Directive (EU) 2018/850, amending Directive 1999/31/EC on landfills of waste*", published in the O.J. of 14 September 2020.

³ All percentages are expressed in terms of "weight".

- inadequacy of separate collection systems, in relation to the new challenges to achieve recycling targets also through technological innovation;
- need to support local administrations (Regions, Municipalities) with governance at a central level that allows for strengthening local policies in the implementation of infrastructure for the creation of circular supply chains.

b) Objectives

The component is in line with the country-specific recommendations for Italy for 2020 (CSR-3), which suggest focusing investments on the green and digital transition, in particular on clean and efficient energy production and use, on research and innovation, on sustainable public transport, on the management of waste and water resources.

The objectives of the interventions of this component are different:

1. **Promote the green transition of the agri-food supply chains.** Italy, in line with the EU strategy (Farm to Fork), aims to reduce the environmental and climatic footprint of its food system and strengthen its resilience, guarantee the security of food supply in the face of climate change and loss of biodiversity, lead the global transition towards competitive sustainability from producer to consumer and exploit new opportunities. This means pursuing the following specific objectives:
 - ensuring that the food supply chain has a neutral or positive environmental impact, preserving and restoring the land, marine and freshwater resources on which the food system depends, helping to mitigate climate change and adapt to its effects, protect soils, soil, water, air, plant health and animal health and welfare and reverse biodiversity loss;
 - provide with security of food supply, nutrition and public health by ensuring that everyone has access to nutritious and sustainable food in sufficient quantities that meet high standards of safety and quality, plant and animal health, and that at the same time satisfy nutritional needs and food preferences;
 - preserve the economic affordability and sustainability of food while generating more equitable economic returns in the supply chain.
2. **Improve the management of urban solid waste and implement the circular economy paradigm.** This component aims to adopt new legislation defining the national strategy for the circular economy and regulating the organisation and operation of the waste/recycled material traceability system. This objective must also be achieved through targeted interventions on the territory which, on one hand, make it possible to solve critical situations in metropolitan areas in difficulty through the construction of new plants and, on the other, aim at the implementation of new projects with a high innovative content, allowing adequate collection and recovery of Waste Electrical and Electronic Equipment (WEEE), the closure

of the management cycle of the sewage sludge produced by wastewater treatment, as well as the creation of poles for waste produced by large users (ports , freight villages, health sector, etc.).

In particular, in the context of waste recovery and circular economy models, the production of environmentally sustainable biomethane will be increased - obtained from the organic fraction of the separate collection of urban solid waste, or from waste of plant and animal origin - and allocate it to transport, to cover the current share of fossil methane in transport equal to approximately 1 bcm (billion cube metres). This use can also make use of the existing methane gas infrastructure and the largest Italian fleet of methane vehicles in Europe (approximately 1 million vehicles). To this end, it is necessary to promote the increase of urban separate waste collection in harmony with national objectives, in order to allocate the organic fraction to new biomethane production plants, possibly built at local level (Regions, Provinces and Municipalities), to be used also in the fleets of vehicles for waste collection, providing for their gradual renewal in line with the provisions of the aforementioned Deployment of Alternative Fuels Infrastructure - DAFI directive. At the same time, there is a positive impact on the automotive industry and on the component industry for biogas plants.

The proposed interventions then have, more generally, the aim of contributing to the creation of new jobs linked to the green economy, stimulating local investments and their positive spill over effects on the local economy. In fact, the proposed investments represent an opportunity in terms of improving the knowledge and skills of workers and service providers as well as the potential creation of a pool of new employment and development of new qualified professions.

3. Description of the reforms and investments of the component

1) Sustainable agriculture.

The investment program consists of three main lines of intervention for the competitiveness, energy requalification and logistical capacity of the Italian agricultural sector.

Investment 1.1a: Supply chain and district contracts for the agri-food; fishing and aquaculture; forestry, floriculture, and plant nursery sectors.

Challenges:

Despite Italy's good performance in terms of quality and controls in the agri-food, forestry and fisheries and aquaculture supply chains, production methods remain to be reviewed in light of the new objectives of the Farm to fork⁴ strategy in terms of reducing production

⁴ Farm to Fork Strategy – for a fair, healthy and environmentally-friendly food system COM (2020) 381 final, 20.05.2020

inputs. The strategy plans to:

- reduce dependence on pesticides and antimicrobials, reduce excessive use of fertilizers, enhance organic farming, improve animal welfare and reverse the loss of biodiversity;
- ensure that agriculture, fisheries, aquaculture and the food value chain contribute adequately to climate objectives;
- ensure the sustainability of food production (including fish production), develop renewable energy production and improve energy efficiency in the agricultural and food sectors;
- ensure the security of food supply;
- reduce food losses and waste.

There is a lack of efficiency in the Italian production chains in the agricultural, forestry and fisheries and aquaculture sectors, for which the development of supply chain and district contracts can improve the sustainability of production processes, transformation, marketing and recycling and reuse of waste, also avoiding practices that are not sustainable at the environmental level, with evident repercussions also on the strengthening of the productivity and profitability of the sectors.

Objectives:

The proposed intervention aims to strengthen the instrument of supply chain and district contracts for the agri-food, forestry, fishing and aquaculture and horticultural sectors, through integrated investment programs throughout the country.

The supply chain and district contracts implement investment programs aimed at the green and circular transition of companies, at the growth of employment and the rate of innovation for these production sectors.

In particular, the creation and strengthening of supply chain and district contracts aim to achieve the following specific objectives:

- for the agri-food sector, to reduce the environmental impact of the food processing and retail trade sectors;
- for the fisheries and aquaculture sector, to promote the ecological sustainability of the product through incentives for "blue growth" as a system approach to the economy of the sea.
- for the forestry sector, to promote the efficient use of forest resources, enhancing business aggregation and associations, business agreements and networks;
- floriculture and plant nursery sectors, to increase the autochthonous and certified tree and forest production, to replace obsolete and inefficient greenhouses from an energy point of view and / or to make the related heating systems more efficient.

Implementation:

The managing Authority is the Ministry of Agricultural, Food and Forestry Policies, which is responsible for identifying priority strategic lines for the investment framework, defining the legal framework, selecting beneficiaries, as well as monitoring and reporting on interventions.

For each of the sectors affected by the initiative, the expected *milestones* are:

- a) Identification of intervention priorities (by Q2 2021)
- b) Publication of the call for the selection of investment programs (by Q4 2021)
- c) Approval of the final rankings of public calls for the granting of aid (by Q2 2023)

The *targets* set for 2026 are represented by the number of new supply chain contracts signed and are quantified in:

- n. 35 contracts for the agri-food sector
- n. 20 contracts for the fisheries and aquaculture sector
- n. 20 contracts for the forest sector
- n. 20 contracts for the floriculture and plant nursery sectors

It is estimated that by the third quarter of 2026 all investment projects, financed through the signed contracts, will be fully realized

Target population: Companies that directly contribute to the production, collection, transformation and marketing of products from the identified supply chains and companies that provide services and means of production.

Timeline: 2021-2026 (see Table 2 for details).

Investment 1.1b: Agri-solar Park.

Challenges:

From an analysis conducted on the National Data Bank of the Zootechnical Registry, a total of 201,782 zootechnical structures opened before 1990 are registered in the country. The use of asbestos was prohibited only in 1992 (with Law no. 257 of 27 March 1992 - *Rules relating to the cessation of the use of asbestos*), therefore until then the adoption of Eternit/asbestos for the construction of the roofs of agricultural and agro-industrial buildings was prevalent. Of all the structures built before 1990, around 69% are currently active, while the remaining 31% refer to companies that have ceased or merged into other activities.

The agricultural sector is also responsible for 10.3% of the EU's greenhouse gas emissions and 68% of the total agricultural area is used for livestock production⁵. In order to help reduce the environmental and climatic impact of animal production, the challenge that

⁵ Eurostat 2019 (UE-27).

this initiative wants to address is to develop the production of renewable energy while at the same time reclaiming the structures from asbestos (rural houses and warehouses are often ideal for placing solar panels).

The proposed interventions contribute to achieving the objectives set for 2030 by the Integrated National Plan for Energy and Climate (PNIEC) in terms of energy production from renewable sources in gross final consumption (30% share of the total).

Objectives:

The proposed intervention aims to modernize the roofs of buildings for productive use in the agricultural, livestock and agro-industrial sectors, thus increasing the sustainability, resilience, green transition and energy efficiency of the sector.

The project aims to incentivize the installation of solar energy panels, exploiting the useful surfaces of agricultural and agro-industrial production buildings. The specific goals are:

- improve insulation, thermal insulation and comfort of reared animals;
- remove the Eternit/asbestos present in the roofs of livestock facilities;
- install photovoltaic panels, creating a network of micro-power plants, spread throughout the territory, without soil consumption;
- improve the energy efficiency of buildings and support the transition towards self-consumption of energy from renewable sources;
- develop decentralized models of energy.

The project also makes it possible to improve the competitiveness of farms by reducing energy supply costs, which together represent more than 20% of farms' variable costs. In this way, the initiative allows agricultural businesses to be economically more resilient, while improving their climate and environmental performance.

Implementation:

The managing Authority is the Ministry of Agricultural, Food and Forestry Policies. For the implementation of the interventions, two widely tested and used procedures are currently under analysis (I.S.I. Call, Sabatini), in order to identify the most appropriate solution to the timing imposed by the RRF Regulation and more responsive to the needs of the sector.

For the purposes of implementation, the proposing Authority recommends the amendment of current legislation, providing for specific exceptions to the provisions relating to municipal urban planning (provided that the interventions do not lead to changes in cubature).

The expected **milestones** are:

- a) Preparation of the procedure for submitting applications (by Q3 2021)
- b) Start of the application procedure (by Q4 2021)

The **targets** set for 2026 are represented by:

- Surface covered with photovoltaic panels: 13,250 sq. m;
- Energy produced by the photovoltaic panels installed: 1,300 - 1,400 GWh (Gigawatt hour at full capacity);
- Increase of solar energy produced in Italy: + 5% compared to the baseline of 24,000 GWh⁶.

Target population: All the companies in the livestock sector that intend to modernize the roofs of the company production sheds.

Timeline: 2021-2026 (see Table 2 for details).

Investment 1.1c: Logistics plan for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors.

Challenges:

Italy ranks eighteenth in the world ranking in terms of infrastructure competitiveness, defined by the "infrastructure" indicator of the *World Economic Forum 2019*⁷, highlighting an infrastructural gap - albeit improving - compared to the standards achieved by other developed economies. The proposed project intends to fill this gap in the country, focusing on the logistics of the agri-food, horticultural, fishing and aquaculture sectors, which are characterized by strong specificities throughout the supply chain.

Furthermore, the Logistics Plan aims to reduce the environmental impact of the transport system in the agri-food sector, by reducing traffic in the most congested areas and times, and to express the potential, in terms of exports, of Italian agri-food SMEs, improving accessibility to freight villages and hub services, the logistical capacity of wholesale markets and the traceability of products.

The improvement of sustainability (environmental, economic and social) is ensured through the reduction of emissions, the reduction of traffic in more congested areas and times, the reduction of waste and the reuse of by-products

These interventions are in line with the guidelines of the *Farm to Fork strategy*, with the general objective of "reducing the environmental and climatic footprint of the food system and strengthening its resilience, guaranteeing the security of food supply in the face of climate change and loss of biodiversity, lead the global transition towards competitive sustainability from producer to consumer and exploit new opportunities".

Objectives:

⁶ Fonte: GSE, Rapporto delle attività 2019

⁷ Fonte: *WEF The Global Competitiveness Report 2019*.

The plan for the logistics of the agricultural sector consists of contributions to companies and organizations that support investments aimed at achieving the following objectives:

- improve the storage capacity of cereals and agricultural raw materials, and accessibility to freight villages and hub services;
- strengthen the infrastructure of the food, floriculture and plant nursery markets;
- develop an integrated logistic system for fish industry supply chains;
- improve the logistical capacity of wholesale food markets, to ensure sustainable products at a low environmental and economic cost;
- increase rail freight transport and interconnections between ports, freight villages and logistic structures serving metropolitan areas;
- encourage a more equitable distribution of value along the supply chain to avoid food waste and promote social agriculture, through the application of emerging and innovative technologies in production processes, in precision agriculture and in product traceability.

Implementation:

The managing Authority is the Ministry of Agricultural, Food and Forestry Policies.

The expected **milestones** are:

- a) Identification of intervention priorities
- b) Preparation of the measure and levels of aid and publication of the “expressions of interest”
- c) Opening of the call
- d) Approval of the rankings and granting of aid

The **target** set for 2026 is equal to 60 interventions carried out, considering an average of three interventions per region.

Target population: Individual and associated companies (freight villages and wholesale market management companies), producer organizations, cooperatives and consortia, transport operators, port authorities, public administrations, local authorities.

Timeline: 2021-2026 (see Table 2 for details).

2) Circular economy and enhancement of the integrated waste cycle.

This line intervenes on the revamping of existing installations and the construction of new waste treatment plants for the enhancement and closure of the waste cycle, on the reconversion, through tender interventions, of industries such as chemistry towards the replacement of more polluting raw materials with recycled materials, and on the ecological transition of the South.

Reform 2.1: National strategy for the circular economy

Challenges: Despite the commitment and initiatives at EU and national level, the amount of waste generated is not decreasing. The annual production of waste from all economic activities in the EU amounts to 2.5 billion tonnes. To cancel the link between economic growth and the consequent increase in waste production, a considerable effort must be made along the entire value chain that includes production activities as well as private citizens⁸.

The implementation of sustainable products policy and its translation into specific legislation is essential to make progress in preventing waste generation. It is also necessary to build, further strengthen and better implement EU waste laws.

Furthermore, at the national level, the development of the circular economy varies considerably between regions, often leading to the initiation of EU infringement procedures and consequent fines⁹.

Objectives:

The reform aims at creating a national strategic framework to strengthen the coherence and effectiveness of circular economy policies, also in line with European provisions and in synergy with other national policies/strategies (National Strategy for Bioeconomy, Industrial Policies and Transition 4.0, Integrated National Plan for energy and climate, Cohesion policies implemented through the European Structural and Investment Funds).

The reform will pursue the reduction of the use of non-renewable raw materials, the decrease in the volume of waste, the reuse and recycling of waste, through the introduction of traceability systems of material flows, technological innovation, the diffusion of good practices and the adoption of tools to foster synergy between the public and private sectors and plan infrastructures to close the waste cycle.

The primary and secondary legislation will be modified for the recognition of the end of the waste qualification for numerous types of materials produced in the recycling chain and to speed up the authorization procedures for plants and their operation.

In particular, the Reform wants to act through two lines of intervention:

1. Define the national strategy for the circular economy:

- i. Establish, monitor and periodically update national objectives for the transition to an economic and environmental model based on the efficient use and management of resources and on the extension of the life of prod-

⁸ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A new action plan for the circular economy - For a cleaner and more competitive Europe. Brussels, 11.3.2020

⁹ 2020 European Semester: Country Report - Italy

ucts and materials in all phases of the value chain (design, production, distribution, consumption and end of life management), in urban and industrial areas and throughout the territory.

- ii. Identify the strategy to improve the reduction of the use of non-renewable raw materials, the prevention of waste production, the reuse and recycling of waste, through the introduction of traceability systems for material flows, technological innovation, dissemination of good practices and the adoption of tools that can foster synergy between the public and private sectors.
- iii. Plan waste infrastructures.

The **milestones** and the **targets** are currently being defined.

2. Regulate the organization and functioning of the traceability system, simplifying and making administrative processes more timely and homogeneous:

- i. Regulate the organization and operation of the traceability system by allowing dialogue with the management systems of users, public and private, through specific interfaces, favouring administrative simplification, ensuring a preliminary period of experimentation and the sustainability of costs borne by the components of the system.
- ii. Promote the digitization of business systems.
- iii. Guarantee the traceability of material flows and their quality to the advantage of the development of circular supply chains and to counteract environmental dumping

The **milestones** and the **targets** are currently being defined.

Implementation:

The responsibility for the reporting and implementation of the Reform in question lies with the Ministry of the Environment and the Ministry of Economic Development.

The proposed Reform plans to address the following points:

- **Coordinate, promote, control and monitor the circular economy in Italy:** define and promote a National Strategy for the Circular Economy by defining the European Action Plan for the Circular Economy; draw up an annual report on the implementation at national level of the actions resulting from the strategy for the transition to the circular economy; strengthen and promote the activities of the Italian Platform for the Circular Economy (ICESP); create a national technical coordination and integrated control structure; set up a communication and promotion program for consumers and businesses, with particular attention to SMEs; define a strengthened control and surveillance system for safety, efficiency and sustainability in the circular economy sectors by fully systematising and integrating

existing structures and, where necessary, strengthen them, ensuring efficiency and simplification; implement regulatory reform and transposition programs based on the European Action Plan for the Circular Economy.

- **Sustainability of products and processes:** introduce regulatory measures to favour the reparability and durability of products; define regulations and/or mechanisms that encourage the sharing economy, collaboration, leasing/rental instead of purchase, forms of local reuse/recovery of resources, the development of integrated production-distribution-customer chains; implement the community legislation relating to the sustainability of categories of products with high environmental impact (AAE, vehicles, waste oils, packaging, plastic products, etc.).
- **Waste reduction and enhancement:** implement waste reduction objectives and adopt waste prevention measures including, for example, the implementation of the recently adopted obligations for extended producer responsibility schemes; adopt the harmonized model at EU level for separate waste collection and labelling to facilitate separate collection; implement the legislation relating to the "End of Waste" and by-products, integrated and intelligent implementation of other European regulations (REACH, SCIP, SUP, etc.) to strengthen sustainable production.
- **Make the production system more circular:** create a national technological hub and territorial competence centers for the circular economy to support the production system; create tools for the diagnosis of company resources (to be made in a mandatory perspective) and for the monitoring and traceability of companies in terms of circularity; define tools to promote eco-design in sectors with a high environmental impact; implement on an Italian scale the European strategic agenda for research and innovation in the circular economy (project H2020 - Cicerone) and strengthen Italian participation in European actions; develop other innovative market and/or financial tools for the circular economy (e.g. reward mechanisms, tax deductibility of leasing / rental costs for durable goods, VAT rate reductions, etc.), possibly integrated with the principles of energy efficiency and other sectors.
- **More circular urban, industrial and rural areas:** develop policy tools to make smarter services and industries for recycling and reuse, data science based and digital, starting new trials both at the scale of large cities and in rural areas; work for the revision of the rules on state aid for the environment and energy; develop policy tools for promotion actions for the integrated development of creative industries for well-being, health, and the green and digital transition, including improvements in circular and sustainable water management; develop policy tools to develop forms of circular industrial districts for the green conversion of traditional industrial sites into "zero emission" sites by implementing processes of industrial symbiosis also through the definition of specific rules.
- **Monitor and evaluate progress:** define a monitoring plan, indexes and national indicators for measuring progress towards the implementation of the Circular Economy, including the assessment of socio-economic and environmental impacts, also for the purpose of achieving climate neutrality objectives for the transition to the

circular economy and the implementation of the United Nations Sustainable Development Goals for 2030. The monitoring plan must include two independent assessment reports to verify the progress of the planned actions, including any critical issues that have emerged, and guide the updating of the strategy.

Target population: Whole national territory.

Timeline: The timing is currently being defined.

Investment 2.1: New plants and revamping of existing waste treatment plants

Challenges:

There is an extreme heterogeneity between regions in the North and South of the country as regards plant equipment for waste management. The location of the plants, mainly concentrated in the North, involves significant flows of waste from the Center-South to the North: the Center exports about 550,000 tons, corresponding to 38% of the quantities collected and the Peninsular South about 420,000 tons, or 30% of the waste collected.

The strengthening of the plant equipment is necessary not only to bridge the gap between the Central and Southern regions but also that existing between the same Northern regions and the lack of service in some large metropolitan areas of Central and Southern Italy and beyond (e.g. metropolitan areas of Roma Capitale, Naples, Bari, Reggio Calabria and Palermo): overall, about 1.3 million tons have been processed in plants in regions other than those of production and this quantity represents about 18% of organic waste from separate collection.

The management of organic waste and unsorted urban waste are the two main supply chains of intervention for achieving the objectives set out in the circular economy package directives by 2035.

The quantity of organic sorted waste collected in 2018 amounts to about 7 million tons – corresponding to 40% of sorted waste and 23% of total urban waste – of which about 3.7 million in the North, 1.4 million in the Center and in the Peninsular South, 0.3 in Sicily and 0.2 in Sardinia.

With regard to the management of unsorted urban waste and plants needed for the closure of the circular economy cycle, the emergency linked to national non self-sufficiency in the management of urban waste and special waste deriving from urban waste is known, including the management of waste resulting from the recycling of materials.

In addition to pursuing the circular economy and the recycling objectives deriving from European regulations, it is equally urgent to equip the Country with plants that allow the closure of the recovery cycle, with the aim of national and regional self-sufficiency.

The use of landfill as a waste cycle closure plant is the prevailing system in the central and southern regions, which makes it more difficult to achieve the target of landfill disposal, equal to a maximum of 10% by 2035, identified by Europe. In these regions, in fact, urban waste undergoes treatments in Mechanical Treatment (MT) and Mechanical Biological Treatment (MBT) plants, from which special waste originates, whose destination is mainly the landfill or transport of waste to the north.

Compared with the objectives of the circular economy (actual recycling equal to 65% of the total urban waste and use of landfill equal to 10% of the total urban waste) a further 25% of total urban waste, consisting mainly of non-recyclable residual urban waste, sorted waste from the selection of dry fractions (packaging waste, bulky waste, textile waste, WEEE) and from waste intercepted at the entrance to the organic fraction treatment plants, still remains to be managed.

Objectives:

The intervention involves investments for the enhancement and closure of the waste cycle. The focus will be on the upgrading of existing plants and the construction of new plants for the closure of the waste cycle with the production of secondary raw materials. The investments will also be aimed at strengthening separate waste collection with investments in new generation vehicles and implementing the logistics for waste fractions.

The investment plan has two macro-objectives:

- 1) **Address particularly critical situations in the metropolitan cities of Roma Capitale, Napoli, Palermo, Bari and Reggio Calabria.**

The main objectives to be achieved are autonomy in the management of urban waste at the regional level:

- Reduction of waste production through strong communication activities and the promotion of collection and reuse centers for waste as well as of goods and materials that the owner has decided to discard. (*The project selection criterion is the guaranteed percentage reduction in waste production compared to the average of the last 5 years*).
- Adaptation of the plant equipment to close the urban waste cycle according to the principles of proximity while minimizing the shipment of waste deriving from treatment outside the region, even if destined for recovery. (*The project selection criterion is the guaranteed percentage reduction of waste deriving from the treatment of municipal waste destined outside the region*).
- Rapid increase of separate collection up to 55% of overall urban waste collected (targeting the goal of 65% by 2035), with subsequent maximization of preparation for reuse and recycling to achieve the objectives of Directive 2018/851 and that is to prepare for reuse and to recycle at

least 65% of collected urban waste by 2035. (*The project selection criterion is the achievement of the 70% separate collection targets - targeting the 82% target by 2035 - and the preparation for reuse and recycling of 55% of municipal waste from separate collection*).

- Progressive reduction in landfill disposal of residues from the treatment of unsorted municipal waste, maximizing material recovery and filling. The percentage of waste recovered with the production of materials and/or destined for filling with replacement of virgin resources must be at least 50% of the unsorted waste collected by 2025. (*The project selection criterion is the guaranteed percentage of unsorted municipal waste recovered after treatment*).
- Re-naturalization of areas heavily impacted by waste disposal through the adoption of innovative techniques for accelerating biological degradation processes and conversion of landfill biogas also to produce biomethane to be used in transport, further reducing flare disposal. (*The project selection criterion is the relevance of the re-naturalization intervention for environmental context and extension*).

The interventions that involve the construction of new recovery plants must preferentially be already hinged in the required authorization procedures, with exceptions to be assessed according to the social acceptability of the intervention, and the construction site must be demonstrated so that the objectives indicated above are achievable in the expected times. Projects must therefore be provided for these interventions with the level of detail, according to the type of interventions, which allows for the precise verification of the paths indicated above.

2) Implement highly innovative “flagship” projects throughout the national territory.

The main objectives to be achieved are:

- Collection and recovery of Waste Electrical and Electronic Equipment (WEEE) aimed at the pursuit of a collection of 70% of the weight of such waste placed on the market and the simultaneous recovery of 100% of the waste collected. (*The project selection criterion is the guaranteed percentage of WEEE collected, guaranteed percentage of WEEE collected and sent for recovery*).
- Closure of the management cycle of the purification sludge produced by the treatment of urban waste water according to the principles of proximity with innovative recovery techniques, with reference to nitrogen and phosphorus. Maximize the exploitation of outgoing flows by creating synergies with the treatment of other types of waste for which there is an unsatisfied demand for recovery. (*The project selection criterion is*

the minimization of the quantity of sludge destined outside the region to treatment and/or agronomic recovery platforms, compared to the quantities thus managed in 2020).

- Creation of treatment centers for the recovery of waste produced by large users (ports, airports, railway stations, hospitals, school buildings), such as packaging waste, kitchen and canteen waste, WEEE, bulky items, mattresses, road sweeping waste, hazardous municipal waste, waste from the health and veterinary sector. (*The project selection criterion is the innovativeness of the proposal with reference to the totality of the types of waste intercepted*).

Milestones and the **targets** are currently being defined.

Implementation:

For the implementation of the national strategy on the circular economy and, in particular, to support local authorities in the implementation of the planning objectives regarding the reduction of waste production and the effective construction of treatment, recovery and recycling plants, the Ministry of the Environment introduced the “National Program for waste management” (art. 198bis of Legislative Decree 152/06) implementing EU directives. The program, which must be approved within 18 months of the entry into force of the Directive (26.09.2020), defines the criteria and strategic lines to which the Regions (competent bodies in the field of waste management planning) must comply. The definition of the National Program began on November 12th, 2020 with the establishment of the institutional table. The consultation phase on the program outline (which must be subjected to Strategic Environmental Assessment) will see the involvement of all the main stakeholders to ensure maximum transparency of the process.

It should then be noted that both the Ministry of the Environment, with the creation of the General Directorate for the Circular Economy, and the Ministry of Economic Development, with the Circular Economy Division, have ad hoc structures for the management and monitoring of interventions

The implementation of the National strategy for the circular economy will be accompanied by a communication, education and information program aimed at strengthening citizens’ cognitive tools and guiding the architecture of choices towards sustainable models. The communication, education and information program will be developed by the Ministry of the Environment in collaboration with the Ministry of Economic Development, and with other departments interested in sectorial competence, and will see the involvement of the National Association of Italian Municipalities (ANCI), associations of category and NGOs with the aim of ensuring consistency in the actions implemented for the development of the circular economy in our country. Action will be taken on the reduction of waste production, on food waste and on information to citizens, starting from school age, relating to the construction of plants and infrastructures serving the circular supply

chains.

The communication schemes will also be developed with innovative tools such as those borrowed from behavioural sciences (*nudging*).

Target population: Regional administrations, Municipalities, citizenship.

Timeline:

The timing of the realization of the investments foresees a 2026 horizon, starting from available projects proposed by Metropolitan Cities, already present in the regional planning, verified by the Regulatory Authority for Energy, Networks and Environment (ARERA) for the tariff profiles and, in any case, verified for financial sustainability profiles, indicating any leverage effect for the share borne by private implementing bodies.

Investment 2.2: Circular economy projects

This group of interventions is financed through a Fund specifically intended to achieve the objectives of the circular economy with the aim of reducing the use of raw materials in industrial processes, gradually replacing them with materials produced from scraps, residues, waste.

The interventions must be consistent with the European Plan for the circular economy (Circular Economy Action Plan) with the aim of reducing the net production of waste and the landfilling of all process waste (under this purpose all the actions aimed at the valorisation of waste and the production of intermediate products to be allocated to the various production sectors by progressively reducing the supply of raw materials from abroad). Interventions will be financed on the Fund by activating, where possible in relation to the implementing body and the economic and financial sustainability of the intervention, financial instruments aimed at maximizing the leverage effect and the contribution of private capital and lenders such as the EIB.

Timing: An implementation period of 5 years is estimated (2021-2026).

The estimated cost on the RRF amounts to € 1.90 billion. An additional cost of € 0.30 billion is expected from REACT-EU. The total cost therefore amounts to € 2.20 billion.

a) Development of biomethane according to criteria promoting circular economy

Challenges:

In the Italian context, biomethane plays a strategic and central role for the purposes of decarbonization and circular economy, as it allows to maximize energy recovery from organic residues of agricultural, agro-industrial matrix and organic waste related to the agricultural process.

Agriculture is responsible for about 9% of the GHG emissions of the country Italy. The animal husbandry has an important part of this responsibility (CH₄, N₂O emissions). In this context, anaerobic digestion, a process underlying the production of biomethane, applied to livestock effluents is indicated as a solution to improve the situation (ISPRA, 2020) without reducing the size of the livestock.

In recent years, Italy stood out among European countries for having the largest number of active biogas plants. This result was facilitated by the economic support issued by the GSE to produce electricity, obtained from the combustion of the biogas produced.

In order to fulfil the requirements of the NECP 2030, especially for the achievement of the objectives on the share of biofuels among fuel mix, in the coming years, with the help of this project, the incentive process will be focused on supporting the production of biomethane, valid both for self-consumption uses in the place of production, and for injection into the existing network infrastructures. This last application generates an overall saving of greenhouse gases compared to the life cycle of fossil methane between 80 and 85%.

In addition to reducing CO₂ emissions deriving from the transport and consumption of fossil methane, this project will contribute to reducing CH₄ and ammonia emissions related to the storage and distribution of livestock effluents that are normally produced during the breeding and agriculture process.

Objectives:

This project mainly contributes to solving two issues of great interest for the Italian country: the green transition towards a circular economy with reduced CO₂ emissions and the creation of jobs in areas far from industrial centers or cities. A more detailed analysis of the benefits, that would be obtained by the implementation of the project, are as follow:

- *green transition*: reduction of GHG emissions as methane, nitrous oxide and ammonia from agriculture; increase in soil fertility through a recycling of bio-nutrients; valorisation of the by-products of the agro-industrial sector; encourage the conversion of diesel-fuelled mechanical vehicles to biomethane-fuelled vehicles, improving efficiency and emissions.
- *job creation*: the biogas supply chain is a short and highly integrated supply chain in the territory, allowing the mitigation of the economic and social impacts of the crisis even in rural areas. It has been estimated that the project could create around 90.000-100.000 hires¹⁰ in the period 2021-2026.

¹⁰based on publication “Gas for Climate Job creation by scaling up renewable gas in Europe; Navigant Netherlands BV, Reference No: 203997, Date: 18 November 2019” and using prudential and proportional criteria with respect to the impacts generated in 2012-2017 period, by the first biogas plants.

This Investment aims at the following 5 specific objectives:

1. Reconversion and efficiency improvement of existing agricultural biogas plants towards the total or partial production of biomethane to be allocated in the industrial heating and cooling sector and residential as well as in the tertiary sector and construction of structures for proper management input biomass and digestate (storage coverage, etc.).
2. Support to the construction of new facilities to produce biomethane, for the same uses.
3. Dissemination of agro-ecological practices in the biogas production phase (minimum soil working sites, innovative low-emission systems for the distribution of digestate) to improve the efficiency of nutrient use with a clear reduction in the use of synthetic fertilisers and an increase in organic matter in soils, as well as the creation of centralized treatment clusters for the valorisation of digestate and effluent with the production of organic fertilisers.
4. Replacement of obsolete and low-efficiency mechanical vehicles with methane/biomethane powered vehicles. This scrapping measure shall be integrated with the investments planned for conversion under the first objective 1 or extended to all the agricultural holdings concerned, contributing to the modernisation of the fleet of Italian farms while creating a greater diffusion and demand for methane-powered vehicles with a positive impact even in an industrial sector in which Italy is a world leader.
5. Promotion of investments for efficiency (use of heat in the farm and reduction of emissions) of existing small-scale plants for which it is not possible to access the conversion measures.

Implementation:

The development of biomethane generation is expressly provided for by the NECP, which provides an important contribution of it to achieve the set goal of renewables contribution in the transport sector. The NECP also provides for the possibility of imposing mandatory quotas of renewable methane also in sectors different from transport. The proposed project joins the existing financial support, for the promotion of biomethane in the transport sector (already present in the Italian system) and the possibility to convert existing plants in the agricultural sector which, due to the constraints on the materials that can be used, often encounter difficulties in using of the benefits provided by the authorities.

To achieve the first target (T1), this project provides a granting contribution -in compliance with the limits of grants and loans provided for in the European framework the investment required (40%)- for the partial or total conversion of an existing biogas plant (efficiency of biomass management infrastructures, upgrading system, network connection costs, purchase of agricultural machinery for use by the producer fuelled by biomethane) or for a new plant. In this case (T2), the incentive is added to the incentive forms already

available (Certificate of Consumption - CIC but of a lower value than that foreseen in the case of biomethane advanced by the Ministerial Decree of 2 March 2018). Depending on the technology and size of the plant, the average costs for the purchase of equipment (assembly, piping and civil works excluded) and the management of a plant can vary considerably. Therefore, especially in small plants, financial support is very often necessary.

For the purpose (T5) of replacing obsolete and low-efficiency diesel-fuelled vehicles with biomethane-fuelled ones, the strategy will involve both the self-consumption of biomethane producing farms and farms which want to scrap a diesel tractor. Estimates for the replacement of an agricultural tractor with a power of about 130 kW show a unit cost of 25-30% higher than a comparable diesel one: about 120 k€ each. These actions would be supported by a contribution equal to 40-50% (depending on the different conditions) to make the purchase advantageous compared to a similar diesel one. As a result of this project, a positive effect on the national mechanical industry, which is potentially the world leader in the production of bio-methane agricultural tractors, will be generated.

Milestones and targets

- T1: By Q2 2026, conversion of at least 70% of the 800 existing Biogas plants (for an overall number of 560 biomethane plants), characterized by electric power generation between 0.6-1MW; considering a possible increasing in production capacity in 50%
- T2: By Q2 2026, production of 0,7 bcm/y (billion cubic metres/year) of biomethane from new plants built by single or consortium farms
- T3: By Q2 2026, optimization of soil tillage and organic fertilization through the purchase of equipment for minimum tillage and for digestate distribution
- T4: By Q2 2026, creation of centralized poles for the enhancement of digestate
- T5: By Q2 2026, conversion process of the existing agricultural vehicle fleet, with the distribution of 250 mechanical vehicles powered by biomethane
- T6: By Q2 2026, efficiency interventions to recover the heat from biogas plant, characterized by sizes that do not allow conversion to biomethane

Target population: Municipalities, DSOs, biogas power producers and different industrial sectors. In particular, the project will to be focused on the transport and agricultural sectors and will enhance the industrial and agricultural sectors (such as the animal husbandry and dairy sector), both excellence of "Made in Italy".

Timeline: The implementation period is estimated to be 5 years (2021-2026).

b) Other circular economy projects

In progress ...(Projects to be defined)

Investment 2.3: Ecological transition in the South of Italy

In progress ...(Projects to be defined)

There are no costs related to the RRF. An amount of € 0.80 billion is expected from REACT-EU.

The intervention provides essential investments for the ecological transition of the southern marginal areas and in particular for the smaller islands, also in order to transform the latter into "100% green" territories as practical examples of ecological development models and real attractors green investments, as well as to support the development of the environmental economic zones located in Southern Italy.

4. Green and digital dimensions of the component

a) Green Transition:

b) Digital Transition:

Table 1. Green and digital impact

Short title	Green objectives				Digital objectives	Transition challenges	
	Climate	Environmental	Intervention field	DNSH		Green	Digital
	Tag	Tag					
Reform 1.1: Define the national strategy for the Circular Economy							
Reform 1.2: Regulate the organization and functioning of the traceability system, simplifying and making administrative processes more timely and homogeneous							
Investment 1: Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors	40%	40%	047	yes	0	yes	no
Investment 2: Agri-solar Park	100%	40%	029	yes	0	yes	no
Investment 3: Logistics plan for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sector sectors	40%	40%	026	yes	0	yes	no
Investment 4: New plants and revamping of existing waste treatment plants	40%	100%	042	to be defined	0	yes	no
Investment 5: Circular Economy Projects	100%	40%	032	to be defined	0	yes	no
Investment 6: Ecological transition in the South of Italy	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined

6. Financing and costs

Component (name)	Investment/Reform (short description or cross-reference)	Relevant time period	Total estimated costs for which RRF is requested (mn/EUR)	If available: Total estimated cost by year (mn/EUR)							Funding from other sources (as requested by Art. 8 in the Regulation)			COFOG level 2 category / or type of revenue (if relevant, e.g. tax expenditure)		
				2020	2021	2022	2023	2024	2025	2026	from other EU programmes		from the national budget		Other sources (please specify)	
				specify the EU programmes and breakdown by programme if relevant (e.g. regional operational programme)		ma.bn nat. currency										
Green enterprises and circular economy	Reform 1.1: Define the national strategy for the Circular Economy	2020-2021	-	0	0	0	0	0	0	0						
Green enterprises and circular economy	Reform 1.2: Regulate the organization and functioning of the traceability system, simplifying and making administrative processes more timely and homogeneous	2020-2021	-	0	0	0	0	0	0	0						
Green enterprises and circular economy	Investment 1: Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors - Support for the Agri-food sector	2021-2026	2,500	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined						
Green enterprises and circular economy	Investment 1: Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors - Support for the Fishing sector	2021-2026		to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined					Agriculture, forestry, fishing and hunting
Green enterprises and circular economy	Investment 1: Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors - Support for the Forestry sector			to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined					
Green enterprises and circular economy	Investment 1: Supply chain and district contracts for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors - Support for the Floriculture and plant nursery sector	2020-2026		to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined					Economic Affairs - Agriculture, forestry, fishing and hunting
Green enterprises and circular economy	Investment 2: Agri-solar Park	2021-2026		to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined		To be defined with the regional managing authorities under the European Structural Investment Funds	ISI Call (National Institute for the Insurance against Accidents at Work - INAIL)		
Green enterprises and circular economy	Investment 3: Logistics plan for the agri-food, fishing and aquaculture, forestry, floriculture and plant nursery sectors	2021-2026		to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined	to be defined					
Green enterprises and circular economy	Investment 4: New plants and revamping of existing plants			1,500												
Green enterprises and circular economy	Investment 5: Circular Economy Projects	2021-2026	1,923	-	18	246	324	550	653	133	300	REACT-EU			04.3	
Green enterprises and circular economy	Investment 6: Ecological transition in the South of Italy		0								800	REACT-EU				

2 M2C2 - Renewable energy, hydrogen and local sustainable mobility

1. Description of the component

Summary box

Policy area: Energy policy, climate policy, sustainable local transportation, industrial policy

Objectives: The overall objective of this component is **to achieve the strategic goals established in The European Green Deal strategy (COM/2019/640 final) and in the Italian National Energy and Climate Plan in force**, leveraging reforms and investments in two main sectors (energy, transportation) which are responsible, when combined, of around the 50% of the total GHG emissions in Italy.

Reforms, duly transposing all EU Directives in the two domains, create the proper regulatory framework to pursue climate objectives while investments, stimulated by additional resources coming from the Recovery and Resilience Facility, provide a direct stimulus to the economy, by greening the industrial system and promoting new low carbon technologies go-to-market.

Twin transition: Altogether, the measures proposed in this component address priorities identified in the 2021 Annual Sustainable Growth Strategy (COM/2020/575 final), primarily to the:

a) Green transition by:

- accelerating the reduction of emission through **fast deployment of renewable energy and hydrogen** and
- **investing in sustainable mobility** through renewal of public transport fleet with zero- and low-emission vehicles, and investment in the development of mass transit systems.

b) Digital transition, with reference to more advanced and resilient energy infrastructures which generate a demand for digital technologies, their design, adoption and use.

Jobs and growth: All the actions foreseen in this component of the National Recovery and Resilience Plan are aimed at stimulating job creation and growth. The renewable energy and hydrogen component provides investments in research and development (R&D), in innovative low carbon technologies production plants and, last but not least, in new renewable energy generation innovative plants, with a significant contribution to reinforcing competitiveness of companies and labour skills and to maintaining technology leadership.

Reforms and investments:

Reform 1.1: Simplification of authorization procedures for renewable onshore and offshore plants and new legal framework to sustain the production from renewable sources and time and eligibility extension of the current support schemes.

Reform 1.2: New legislation providing a quota obligation system to use renewable gas for importers and producers of natural gas.

Reform 1.3: Smarter procedures for project evaluation in the local public transport systems sector with fixed installations and in the rapid mass transport sector.

Reform 1.4: Adoption of national programs on air pollution control (in accordance with Directive (EU) 2016/2284 and with the Climate Decree Legislative Decree no. 111/2019).

Outcome 1: Development and support for the supply chain of renewables

Investment 1.1: Renewable Energy Sources (RES);

- a) Support for the development of the authorization of projects such as floating and wind farms offshore, projects that are developed on PA sites (disposed in the last 3 years), or are low ground consumption or combined with storage technology;
- b) Support to the development of innovative integrated offshore renewable plants;
- c) Promotion of RES for collective and individual self-consumption.

Investment 1.2: Development of an Italian supply chain for renewable technologies production(PV cells and panels, and medium-large size wind turbines);

Investment 1.3: Projects at local level (Municipalities)

Investment 1.4: Reinforcement and digitalisation of power grid infrastructure

- a) Installation of thermal energy storage systems;
- b) Interventions for “smarter” electricity distribution networks (Smart Grid);
- c) Interventions to increase the resilience of the distribution network;
- d) Installation of integrated EV charging stations

Outcome 2: Promotion of clean hydrogen production and use.

Investment 2.1: Production of Hydrogen in brownfield sites.

Investment 2.2: Production of Electrolysers and Development of an Italian Hydrogen Supply Chain.

Investment 2.3: Hydrogen Use in Hard-to-abate industry.

Investment 2.4: Hydrogen Use in Heavy Goods Transport on Wheel.

Investment 2.5: Hydrogen Use in Railway Mobility.

Investment 2.6: Hydrogen Research & Development.

Investment 2.7: Hydrogen Combustion Technology Development for green power generation.

Outcome 3: Promote the use of alternative fuels and smart mobility

Investment 3.1: Investment in soft mobility (National cycle path Plan).

Investment 3.2: Green local public transport and Rapid Mass Transport:

- 3.2.1. Strengthening of the green transport industry, the related national supply chains and smart mobility
- 3.2.2. Renewal of the regional public transport bus fleet with clean fuels vehicles
- 3.2.3. Renewal of the regional public transport railway fleet with clean fuels trains
- 3.2.4. Renewal of the regional public transport naval fleet with clean fuels naval units
- 3.2.5. Digitalisation of local public transport
- 3.2.6. Development of Rapid Mass Transport systems
- 3.2.7. Sustainable mobility: *“Affrettati lentamente”*

Estimated costs:

EUR 17,530 million to be covered by RRF

M2C2 – Renewable energy, hydrogen and local sustainable mobility

	Resources (euro/mld)				
	Existing	New	Total	REACT-EU	TOTAL NGEU
	(a)	(b)	(c) = (a)+(b)	(d)	(e) = (c) + (d)
1. Production and distribution of renewable energy and support to the supply chain	-	7.98	7.98	0.69	8.66
- <i>Renewable Energy Sources (RES)</i>	-	4.00	4.00	-	4.00
- <i>Supply chain for RES technology production</i>	-	0.36	0.36	-	0.36
- <i>Reinforcement and digitalisation of power grid infrastructures</i>	-	2.72	2.72	0.18	2.90
- <i>Municipalities' projects in line with the National Energy and Climate Plan (NECP)</i>	-	0.90	0.90	0.51	1.41
2. Support to the hydrogen supply chain and transition towards green steel through DRI (direct reduced iron)	-	2.00	2.00	-	2.00
3. Sustainable local transport, cycling paths and rolling stock renewal	2.95	4.60	7.55	-	7.55
TOTAL	2.95	14.58	17.53	0.69	18.22

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

2. Main challenges and objectives

a) Main challenges

Between 2005 and 2018, greenhouse gases (GHG) emissions in Italy, in sectors not covered by the ETS legislation, have decreased by 18% and emissions per capita are at a level below the European average. The Integrated National Energy and Climate Plan (NECP) provides that greenhouse gas emissions are reduced by 43% for the ETS sectors compared to 2005, and by 33% for sectors not covered by the ETS regulation, by 2030. The new European Climate Law provides for an even more ambitious target of reducing emissions, which according to the recent Commission Communication should be at EU level of 55% to 2030 compared to 1990 levels. The new EU target will have to be translated into new national targets for Member States and the NECP will be revised accordingly.

The NECP in force foresees an increase of the share of energy produced from renewable sources to 30% of the gross final consumption to 2030 (against a objective of 32% foreseen by the European targets), and to 22% of the gross final consumption of energy in the transports. The plan also provides for an increase in electricity storage capacity (39 Gwh, of which 24 to be connected to the grid and 15 to be coupled to the distributed generation).

Thus, energy and climate goals, made more ambitious by the recent Commission's commitments, are going to require an extraordinary effort in terms of public and private

financial resources, policy makers' work to provide reinforced measures, simplification of authorisation processes, industry players commitment on R&D and implementation streams, fast tracking new technologies.

A comparable effort is expected in the transport sector, where decarbonisation is crucial in order to achieve these objectives effectively, given that transport is responsible for 30% of the total national greenhouse gas emissions. To consider that almost 95% of these emissions is due to road transport while 45% of the existing car fleet (and in particular 59% of the public vehicle fleet) is made up of vehicles with standards not exceeding Euro 3.

Also due to the persistence of other types of pollutant emissions from road vehicles, it is estimated that about 2 million inhabitants in Italy live in areas where the minimum European air quality standards are not respected.

In this regard, three infringement procedures are currently open with regard to the exceedance of the PM10 limit values in Italy between 2008 and 2012 in 19 zones and agglomerations and with regard to the exceedance of the limit values for nitrogen dioxide (NO₂) between 2012 and 2014 in 15 zones and agglomerations. Many of the exceedances covered by these infringement procedures, however, affect most of the areas located in the regions of the Po Basin.

In this context, the role of hydrogen deserves a specific focus. Its prominent role was set forth in July 2020 in the EU Hydrogen Strategy, projecting a growth from the current <2% in the energy mix to 13-14% by 2050, with an underlying electrolyser capacity of 500 GW. Member states are in the process of adopting the EU strategic direction: some of them (such as France, Germany, Portugal, Spain and the Netherlands) have already established 2030 or 2050 targets (even above the EU direction) and identified main use cases in the most relevant sectors, e.g. industry and transport.

In Italy, the NECP outlines the role of hydrogen in achieving sustainability targets and identifies the potential application of H₂ in a number of energy sectors: for example, the transport sector, with fuel cell trucks and trains (outlining a 1% penetration target in renewable fuels transport), and the management of electricity overgeneration, with H₂ storage applications (e.g. power-to-gas).

In this Recovery and Resilience Plan, consistently, a number of interventions have been planned to enact the EU Hydrogen strategy, taking into account the need for 1) creating a strong supply chain (production, storage, distribution) 2) building industrial capacity to produce hydrogen generation technology 3) fostering hydrogen use in large emitting industries and in heavy transport.

b) Objectives

In line with the European Flagship 'Power Up' (COM(2020) 575), the 'Energy Transition

and Sustainable Mobility' component identified a sub-action "Investments for NECP implementation" with the following objectives:

1. **Increase the share of energy produced by Renewable Energy Sources (RES)** and, more specifically:
 - a. to promote the strengthening of the supply chains for the production of innovative and highly efficient technologies in the renewable sector;
 - b. supporting the creation of a pipeline of new greenfield renewable projects with the outcome of the authorization procedures in a certain time;
 - c. promote the collective self-production of renewable electricity;
 - d. facilitate the transition from biogas for electrical use to biomethane for transport.
2. **Promote the production and use of hydrogen as an energy carrier of the future**, by nominating Italy as a state-of-the-art country both in the development of innovative technologies and related infrastructures, promoting the establishment of a sector chain.
3. **Ensure the resilience of the electricity grid** to encourage increased penetration of energy from renewable sources through:
 - a. the development of storage capacity and the dissemination of new technologies (e.g. smart grids);
 - b. the greater ability to resist adverse weather phenomena, avoiding prolonged interruptions of the electrical service.
4. **Promote the use of alternative fuels and smart mobility** by supporting the production chain of smart & green mobility and the renewal of fleets by replacing the most polluting vehicles with zero and low emissions vehicles.
5. **Encourage the reduction of the use of polluting modes of transport** through:
 - a. the transfer to the collective mobility system ("shift"), in particular by enhancing mass rapid transport systems in order to improve their transport quality and capacity;
 - b. a greater development of "gentle" mobility, thus reducing the use of individual journeys by road ("avoid").

Overall, actions in this component are aimed at achieving the following NECP's targets:

- For **energy-related** actions: additional installed capacity from renewable energy sources of 11,2-15 GW by 2025 resulting in CO₂ reduction of 2-3 Mton/year till 2025.
- For **sustainable mobility** actions: CO₂ reduction of almost 1 Mton/year till 2025 mainly attributed to developments in shared/public mobility and the gradual roll-out of vehicles characterised by reduced energy consumption and very low or zero CO₂ emissions, as well as the gradual and natural renewal of the vehicle fleet.

3. Description of the reforms and investments of the component

REFORMS.

Reform 1: Simplification of authorization procedures for renewable onshore and offshore plants and new legal framework to sustain the production from innovative renewable sources and time and eligibility extension of the current support schemes.

Challenges:

The national energy policy targets for 2030 set by the National Integrated Energy and Climate Plan ("NECP 2030") require the installation of new capacity from RES of about 40 GW, of which about 30 GW from photovoltaic systems. In this domain, among others, policies shall support the creation of a steady pipeline of new greenfield renewable projects through proper stimulus and with fast and certain authorisation procedures.

The main challenges to be tackled to this purpose can be identified in the following:

1. **Timing of the authorization process is not foreseeable and uneven on the national territory.** In order to encourage investments in new renewable capacity and to allow the decarbonisation of the generation under safe conditions, it is necessary to develop a homogeneous and rapid authorization framework that allows the development of projects at certain times.
2. **Limited private investment and fragmentation of renewable capacity in small plants.** Need to extend the mechanism of RES auctions planned to date to support the development of power generation plants from renewable sources in line with the ambitious objectives of the NECP on the development of renewable energy in Italy limiting land consumption for other uses.
3. **Absence of adequate remuneration mechanisms for the development of storage capacity, in the scenario of strong increase of generation from renewable sources.** In order to develop the development of such RES capacities and to ensure network stability, it is necessary to introduce new remuneration mechanisms that allow for a reasonable return on investments and increase the interest of investors (not network operators) towards capacity for accumulations and other systems useful for the stability of the network.
4. **Limited dissemination of the Public Private Partnership Instrument to support investment contributing to achieve the NECP in 2030.** In order to increase such investment, it is necessary to promote the dissemination of the Public Private Partnership in all sectors, including through the temporary use of a majority of public contributions to support such initiatives.

In this context, some critical issues arise:

- There are no guidelines for the authorisation of the construction and operation of installations for the production of electricity from renewable sources, of particular relevance, in the offshore sector. Given the peculiarities of the offshore sector and the growing interest of the market and the Italian and European legislator, it is suggested to consider the adoption of guidelines also for the offshore sector on the basis of what has been done for onshore installations in relation to the procedure referred to in Article 12 of Legislative Decree no. 387/2003
- Rationalisation and simplification of Environmental Impact Assessment procedures. This is already partly addressed by Article 50 of Legislative Decree no. 76 of 16 July 2020 (i.e. Decree of simplifications) and can find full application with the publication of the relevant implementing decrees, thus helping to create the conditions for obtaining permissions in time for compliance with the deadlines set out in the Recovery and Resilience Facility.

Objectives:

In order to overcome such barriers and to support for the creation of a pipeline of new renewable greenfield projects, this Reform action mainly pursues the following objectives:

- To approve changes in law for simplified authorization processes for photovoltaic and onshore and offshore wind farms
- To modify the current RES support mechanisms in order:
 - a. to extend the area of eligibility of current incentives, including new offshore installations and repowering of existing plants;
 - b. to extend the grants availability period.

Implementation:

The implementation process will involve the Ministry of Economic Development as process owner, together with the Ministry of Environment which, in cooperation, shall set the following new regulations:

1. The reform of RES supporting mechanism, also completing the transposition process of the RED II Directive;
2. The reform of authorisation processes, mainly related to environmental impact evaluation and related tasks.

According to the reform plan designed by the responsible authorities, the first proposal draft of the reform is due by the first quarter of 2021. Such draft will be submitted to a public consultation to, then, proceed to the approval, which is planned to happen by mid-year 2021.

The implementation process will proceed with the design of the auction procedures under the new regulation, targeting the successful completion of auctions awarding up to 6 GW

by the end of 2023.

Therefore, this Reform does not undermine recourse to competitive bidding processes for the award of investment and/or operating aid, in particular for large-scale projects.

In parallel, simplification measures are expected to generate small-medium scale RES plants growth which is expected to add from 10,5 to 15 GW of additional capacity. This activity is planned to be implemented in order to reach the following intermediate targets:

- 0,5-1 GW in 2022
- 1,1-2 GW in 2023
- 2,2-3 GW in 2024
- 3,2-4 GW in 2025
- 4,2-5 GW in 2026

To this purpose, Reform 1 package is linked to Investment 1, as described in the related paragraph.

Target population: The reform process will involve:

- on the public side, national and regional administrations
- on the private side, renewable power producers, renewable energy production project promoters, infrastructure project developers, related investors.

Timeline: The implementation period, as detailed by the above description, is estimated to be 6 year.

Reform 2: New legislation providing a quota obligation system to use renewable gas for importers and producers of natural gas.

Challenges:

Biomethane is strategic for decarbonisation and the circular economy, maximising energy recovery from organic agricultural and agro-industrial waste. In fact, agriculture is responsible for about 9% of Italy's GHG emissions and animal husbandry has an important part of this responsibility (in particular CH₄, N₂O emissions). Anaerobic digestion applied to manure is indicated as a solution to improve the situation (ISPRA, 2020) without reducing the stock of livestock.

The development of biomethane production from manure, complying with the Do-No-Significant-Harm principle, is particularly interesting in order to make agricultural activity more sustainable and at the same time to produce an advanced biofuel, valid for both point-to-point uses at the place of production and for networking, through existing network infrastructures. If channelled into the gas network, biomethane can contribute

to the achievement of the European targets by 2030, with an overall saving of greenhouse gases compared to the fossil methane life cycle between 80 and 85%.

Italy has a leadership in the production of biogas both in terms of volumes and production sustainability that seem to encourage further investment. The technical potential of biomethane that can be produced in Italy is considerable, with estimates varying according to the raw materials that can be used and the final use consistent with RED II, but still in billions of cubic metres.

The potential contribution of biomethane to the Country's economic growth is also significant. Being a resource obtainable from a plurality of productive processes and from various fields makes the development of a specialised supply chain possible, with positive repercussions on the economic system under the profile of the technological innovation in the manufacturing fields, agriculture and urban public services.

In addition to reducing CO₂ emissions from fossil fuel consumption, biomethane-related investments will help reduce emissions of CH₄ and ammonia related to the storage and distribution of manure through their use for anaerobic digestion and the equipment of covered storage facilities and "precise" systems of distribution of organic fertiliser (effluent as such or digestate), to reduce N₂O, CH₄ and nitrate emissions, through the development of agronomic techniques that allow for increased soil coverage, the reduction of nutrient intake through mineral fertilisers, as well as the increase in soil organic matter resulting from increased photosynthetic activity, carbon recycling and nutrients.

Objectives:

To this extent, the Reform contributes to achieving the Green transition objectives, also complying with the NECP by:

- replacing fossil fuels with biogas;
- reducing GHG emissions (in particular, methane and nitrous oxide) and ammonia from agriculture
- encouraging the use of renewable gas distributed through existing networks;
- encouraging the conversion of diesel-fuelled mechanical vehicles with biomethane-fuelled vehicles by improving efficiency and emissions.

As well, biomethane production policies and related investments contribute to reducing the use of natural resources per unit of product and increasing soil fertility minimising the use of chemical fertilisers, in line with the objectives outlined in the "Farm to Fork" strategy.

From an economic perspective, this measure contributes to employment creation in short and strongly integrated supply chains in different territories, allowing the mitigation of the economic and social impacts of the crisis also in rural areas.

As a reference, between 2012 and 2017, biogas plants-related investments reached 3.1 billion euro and generated around 100.000 AWU (estimate including direct, permanent and temporary employment, as well as indirect considering also the induced generated by the entire chain).

[Source: Statistical reports/ activities of the GSE 2013-2018, paragraph 11.2].

Implementation:

The Reform proposal provides for the promotion of an additional production of biomethane compared to biomethane used in transport, encouraged under the Ministerial Decree of 2 March 2018 (which is expected to be confirmed for a further period of time and whose incentive target of about 1 billion m³ remains confirmed).

Change in law for a simplified authorization process and modification of the current grants mechanism in order (i) to widen the eligibility perimeter and (i) to extend the grants availability period are foreseen.

Aid is to be granted within the limits and intensity of the aid provided for in the European framework for the necessary investment (40%) for the partial or total conversion of an existing biogas plant (efficiency of biomass management infrastructure + upgrading system + costs of connection to the network + purchase of agricultural machinery for the use of the producer powered by biomethane) or for a new plant, plus an incentive (in the form of a Certificate of Release for Consumption - CIC but of lower value than that provided in the case of biomethane advanced by the DM 2 March 2018) on the actual production of biomethane for a period of 10 years and the recognition of the Guarantee of Origin (GO) to the producer for the same period.

Cost assessment of projects submitted to the foreseen support plan will be carried out leveraging available benchmarks. Depending on the different technological processes used, the average costs for the purchase of equipment (fittings, piping and civil works excluded) and the management of a small-to-medium size upgrading system can vary considerably. Below is a summary of the average purchase and management costs for small-medium size upgrading plants, representative of the case of Italy:

- "The chain of biomethane: tools, mechanisms of operation and opportunities" (Assolombarda, Research no. 1 of 2020) reports data related to two sizes of capacity plant, suitable to represent the small-medium range of potential applications with a production of 1.10 million Nm³ of biomethane per year. For a plant with a capacity of 1 million Nm³/year, the estimated total investment costs (Capex) is about 1-1,5 million €/ per million m³ capacity. Increasing capacity to 10 million Nm³/year the Capex drops to about 0.5 - 0.75 million €/ per million m³ capacity. The investment cost of the anaerobic treatment section can double or triple in the case of sludge, while it reaches a value even quadruple for FORSU.

The input matrix (sewage sludge, FORSU, livestock waste or agricultural waste) plays an important role in this assessment (think of the methane content in biogas) although substantial differences are to be related more to the stage of anaerobic digestion than to the removal of carbon dioxide.

- Operating costs for a capacity of 1 million Nm³/year are estimated between 120,000 and 150,000 € and for a capacity of 10 million Nm³/year in the range between 800,000 and one million euro. They include the costs of ordinary, extraordinary maintenance, reagents and those of electricity, referring to an operation not less than 8000 hours per year.
- These references appear to be usable for the evaluations of this project, also in view of the fact that the proposal only provides for the use of input matrices represented by livestock waste and agricultural and agro-industrial waste; it is not planned to use sewage sludge.

Target population: Farmers, renewable power producers, heat operators and district heating system owners, installers, renewable energy production project promoters, infrastructure project developers, investors in agricultural activities.

Timeline: The implementation period is estimated to be X years.

Reform 3: Smarter procedures for project evaluation in the local public transport systems sector with fixed installations and in the rapid mass transport sector.

Challenges:

The amendment made by the Simplifications Decree - which, up to the 31st of December 2021, attributes to the Superior Council of Public Works the responsibility of expressing an opinion on both the technical-economic feasibility of the project in the local public transport systems and on the final design leads to a duplication of activities. leads to a duplication of activities. The examination of technical-economic feasibility of projects (including choosing alternatives, transport analyses, cost-benefit analyses, etc.) is also carried out by the General Directorate for Fixed Transport Systems and Local Public Transport for financing the interventions, according to procedures, put in place in agreement with the Cabinet Office and the Technical Mission Structure and shared by the MEF, which since 2018 are used for the allocation of resources for rapid mass transport in the Investment Fund (Notice n. 1 and n. 2 for the presentation of applications in the sector of rapid mass transport).

The duplication of activities concerning the evaluation of sectoral projects, causes inevitable assessment discrepancies by the various bodies involved and the consequent need for reiterated assessment of one body on the changes proposed by the other body and the other way round. This leads to lengthy procedures with consequent delays in the activation of the works, as already noted by some Local Authorities benefiting from state

resources in the sector.

Moreover, other types of procedures can be simplified. The Covid-19 pandemic has generated multiple impacts for the transport and infrastructure sector, especially for the transport supply chain and the realization of public work. In some cases, the pandemic has caused a slowdown of the work and a consequent crisis of the suppliers and economic operators.

In this context, it is necessary to support the entire supply chain by guaranteeing immediate adequate liquidity to beneficiaries to boost the sector by speeding up the procedure for payment of grants by using a digitalised system to verify the progressive execution of interventions eligible for funding.

Objectives:

The reform aims at making the procedures aforementioned more efficient by eliminating duplication of competences within the same Administration and accelerating the payment processes and timing of interventions in the public transport systems.

Implementation:

For what concern the duplication of responsibility for project evaluation in the local public transport systems. A dedicated regulation will provide concrete responsibility allocations and project approval roadmap in line with the objectives of the Simplification Decree.

For what concern the simplification of the payment procedure, the measure consists in preparing, for each of the interventions eligible for a grant, a data form that must be filled in by the Single Proceedings Manager and the Manager of the beneficiary body, for the progressive disbursement of the grant.

The form in question will show the details of the invoices relating to the progress of the work with an indication of the items in the Economic Framework to which they refer to. After entering the data in the digital system, the Directorate General proceeds directly with the contribution payment, without any further preliminary analysis.

A second-level check by the Ministry will take place at an intermediate and final stages of the intervention: only a defined sample of payments will be analyzed.

The reform in question will be supported by the implementation of an IT Platform. To this extent, the MIT's Directorate General of Local Public Transport has already started, as part of its activities, to revise the Platform of the Observatory on the Policies of Public Transport. According to this review, it is understood that it is possible to implement an additional IT package on the existing platform in order to have a dedicated service for managing the payment procedures. The adoption of such IT package to support the reform will result in significant time savings since the MIT will be allowed to check the accounting documentation concerning any ongoing projects well in advance the beneficiary

local administrations present a request for disbursement associated with a grant.

Target population: The procedure related to the evaluation of local public transport refers to local Administrations acting as promoters of projects involving local public transport system projects with fixed installations. Citizens will also benefit from quicker development time for transport infrastructure for rapid mass transport services.

The procedure related to the payments acceleration refers to institutional bodies (Regions, Municipalities), local public transport service companies or subsidiary companies of institutional bodies. Citizens will also benefit from quicker development time for transport infrastructure for rapid mass transport services.

Timeline: This reform will be part of a forthcoming regulatory measures.

Reform 4: Adoption of national programs on air pollution control (in accordance with Directive (EU) 2016/2284 and with the Climate Decree Legislative Decree no. 111/2019).

Challenges:

The EU legislation promotes a progressive reduction in the concentrations of atmospheric pollutants to protect the environment and the health of citizens from possible damage caused by certain substances, as well as ambitious goals in terms of reduction of the climate-altering emissions, with clear reduction targets in both areas.

Italy has aligned its relevant national legislation with the approval of

- the legislative decree 30 May 2018, n. 81, transposing the directive, 2016/2284 setting National Emission Ceilings (NEC) for air pollutants;
- the law 12 December 2019, n. 141, converting the legislative decree 14 October 2019, n. 111 (“Climate legislative decree”), containing urgent measures for compliance with the obligations established by Directive 2008/50, on ambient air quality and cleaner air for Europe.

The full application of such reforms will require the adoption of some implementing acts, both at national and regional level, in order to develop the specific regulatory framework that is needed to translate the objective of the legislation into concrete measures.

Objectives:

The reform aims at aligning national and regional legislation, and introducing relevant accompanying measures, for the reduction of the emissions of the air pollutants (in compliance with targets set by Directive 2016/2284 on national emission ceilings) as well as the ones of climate-altering emissions.

Implementation: The reform proposed by the Ministry of Environment (MATTM) provides 5 measures, as detailed below:

- Adoption of a National air pollution control Program pursuant to EU Directive 2016/2284;
- Adoption of a Climate Legislative Decree with 4 implementing decrees;
- Implementation of a Reform Program for the Regions of the Po river basin;
- Implementation of legislative and financial initiatives through other regional agreements;
- Implementation of a monitoring system to support the implementation of measures included in the PNIEC.

The reform will be implemented through specific monitoring indicators, as follows:

- Spared emissions of the target pollutants of directive 2016/2284 expressed in t / y;
- Reduction of 33% CO2 emissions by 2030 compared to the target in 2005 in non-ETS sectors expressed in Mt CO2 eq.

Target population: Citizens, regional and local authorities, transport operators.

Timeline: The implementation period is estimated to be 2 years.

1) Development and support for the supply chain of renewables.

Investment 1.1: Renewable Energy Sources (RES).

1.1.1 *Support for the development of the authorization of projects such as project pv floating and wind farms offshore, projects that are developed on PA sites (disposed in the last 3 years), or are low ground consumption or combined with storage technology*

Challenges:

The NECP set the renewable energy production target in 2030 to the 30% in gross final energy consumption (moving from the 18,3% in 2017) and assigned to renewable electricity the most challenging objective to cover the 55% of final electricity consumption (34,1% in 2017). To this purpose, the NECP provides the following considerations:

- The significant technically and economically feasible growth potential of photovoltaic installations and wind parks, thanks also to the reduction in costs associated therewith, points to a major development of these technologies, the production of which should triple and more than double, respectively, by 2030.
- In order to attain the targets on renewables identified for 2030, it will not only be necessary to stimulate new production, but also to preserve existing production and, if possible, actually increase it, by promoting the revamping and repowering of installations. In particular, the opportunity to promote investments in the revamping and repowering of existing wind power plants with more developed and efficient machines, by exploiting the excellent wind conditions at well-known sites that are already being used, will also help to limit the impact on soil consumption.

- A similar approach, based on a reduction in soil consumption, will be followed in order to guide the expansion of the significant growth capacity of photovoltaics that is projected for 2030, by promoting their installation primarily on buildings, roofs, car parks, service areas, etc. In order to attain the 2030 targets, it is nevertheless still vital to promote large ground-mounted photovoltaic installations, with priority being given, however, to unproductive areas that are not earmarked for other uses, such as areas not usable for agriculture. In this light, installations in former artificial areas (with reference to the National System for the Protection of the Environment (Italian initials SNPA) classification), preference should be given to contaminated sites, waste disposal sites and areas along the infrastructure system.

When considering mature technologies (e.g. onshore wind, grounded PV), a grid parity condition can be expected.

To explore renewable energy production from wind offshore and floating PV (likely to be far from grid parity) is identified by the NECP as an option, within the boundaries of environmental sensitivity and sea transport safety constraints.

Objectives:

In order to foster investments in renewable energy production, consistently with the considerations reported above, the investment action presented here foresees the following contribution to RES development:

- financial support through grants to support the development of floating PV and offshore wind projects, projects carried out on sites owned by the PA or with low land consumption or combined with storage technologies;
- financial support through loans (senior/junior loan and/or credit enhancement) for grid parity systems.

From a market perspective, different roles are assigned to grants and loans, respectively:

- Grants: they shall help mitigating merchant risk.
- Loans: they shall facilitate project bankability and/or financial sustainability with a specific focus on grid parity initiatives potentially at merchant and/or off-taker's risk

When preparing this measure, the assumption made is that a 4x leverage factor can be assigned to such instruments.

The overall target is to generate an increase of 4,5-5 GW of installed capacity in 2026 in order to support the 2025 NECP's target.

As reported by the milestones planning, it is foreseen to complete the allocation process of related financial resources by the first quarter of 2022, so complying with the EU Offshore Renewable Energy Strategy which provided that Member States shall be able to present

a pipeline of mature projects by the end of 2023.

Implementation:

This investment action will be implemented by the Ministry of Economic Development, which will assign grants support through call for tenders, while loans will be intermediated by an implementing body to be identified. Such procedures will be designed in a coherent manner with State-aid rules and submitted to EC's competition authorities before the implementation.

The implementation plan is coherent with the NECP's provisions, that is to accelerate renewable electricity plants authorisation and construction from 2021 onwards, in order to achieve the ambitious objectives of the Plan (to be revised according to the new climate actions of the Commission).

Depending on further considerations on technology maturity and market readiness, deployment actions for wave and tidal energy will be explored.

Target population: Renewable energy production project promoters, infrastructure project developers, related investors, renewable energy technology providers.

Timeline: The implementation period is estimated to be 5 years.

1.1.2 *Support to the development of innovative integrated offshore renewable plants construction.*

Challenges: According to the Italian Integrated National Energy and Climate Plan (NECP), Italy has set targets for the installation of 300MW and 900MW of offshore wind by 2025 and 2030, respectively.

To meet these targets, it is crucial to encourage both national and foreign financing institutions to invest in Italy strengthening national infrastructures while increasing the production of clean energy. In order to attract all types of investors some challenges need to be overcome.

The first challenge is the length of the authorization process. To ensure more attractive and efficient conditions to market players, Italy has to streamline and simplify the permitting process.

Another challenge is to overcome the lack of attractive financing schemes related to emerging technologies such as floating offshore wind. Supporting such technologies is, in fact, crucial for coastal countries with high levels of urbanization such as Italy to meet renewable energy production targets.

Objectives: In light of the Offshore Renewable Energy Strategy and the Strategy on Energy System Integration, through the initiatives described below, this Investment aims

at creating the pre-conditions to foster ambitious projects such as the realization of energy hubs combining energy production from different renewable sources.

The ambition is to realize integrated systems, first of their kind in Italy and in the Mediterranean Sea. The renewable energy would mostly come from offshore wind, either on fixed or floating foundations depending on water depths, and floating solar PV.

While the energy production is known to be intermittent in case of offshore wind and solar PV, the intermittency can be removed with the implementation of a dedicated system for energy storage. This investment aims at contributing to the decarbonization of the EU energy mix and supporting the transition to carbon neutrality of the European Union. Furthermore, it will contribute to the creation of a dedicated supply chain and it will create new highly technical skilled jobs.

All authorisation procedures (see also Reform 1) will comply with the EU environmental *acquis* (Environmental Impact Assessment, Habitats Directives) for individual projects and base their deployment on Maritime Spatial Planning (EU Directive 2014/89/EU).

Depending on technology maturity and market readiness of related components, investments can be made relying on recycled blades and batteries.

Implementation: In order to implement such projects, we might expect a public procedure focusing on innovative and sustainable technologies, system integration capacity and impact on Italian value chain. The implementation might involve Academic Research Centres while supporting the interaction with innovative start-ups.

In order to achieve these results, it is necessary for every wind farm to start with a wind measuring campaign. Since wind resource is of crucial importance in reducing the uncertainty in the predicted energy production of a wind initiative, this project will see the implementation of 4 measurement campaigns. They will be performed by floating lidar devices that will permit to measure the wind resource at multiple heights from near ground to above typical wind turbine hub heights. The wind monitoring campaigns will take not less than 12 months and will enable us to have accurate knowledge in terms of wind energy potential in the investigated areas.

Lidar fixed solutions can also be installed on existing offshore infrastructure, such as oil and gas platforms, located close to the investigated area. In this case additional costs of lidar floating solution will be avoided.

It is also crucial to strengthen the electrical infrastructure. Grid stability and appropriate capacity are key factors to consider. The implementation of intermittent renewable energies requires energy storage systems to balance the intermittency and capacity. Thus, the project will also see the upgrade and building of the required electrical infrastructure.

To support emerging offshore renewable technologies, 100Mw Floating PV plants will be engineered and installed in an area with a high irradiation in order to support and

integrate with Offshore wind turbines, therefore increasing total energy production.

The Floating PV technology targeted is able to resist significant wind streams and significant waves up to 4 meters due to its flexible structures. An expected reduction of more than 70,000t CO₂t per year is expected. This quantity is equivalent to removing from the road approximately 15,000 cars.

Target population: All local administrations are involved from the early phases to review the projects. The best onshore sites for the location of the activities are in the process of being selected in accordance with ongoing consultations with stakeholders involved safeguarding the marine flora and fauna.

Transmission system operators (TSO) are involved to review together storage capacity and grid stability. Avoiding intermittency in the injected power is a priority for the project.

Scouting of EU providers will be performed involving small and medium companies as well as start-ups for the supply of highly technological components.

For the Floating lidar campaigns subcontractors will be selected for the:

- Provision of a local marine facilities at the selected port
- Execution of local marine operations for commissioning
- Provision of suitable vessels
- Data management
- Service and maintenance as necessary, including vessel mobilisations
- Decommissioning including vessel mobilisations upon the end of the campaign

Floating PV will be engineered and installation performed relying on the EU value chain.

Fabrication of wind foundations will take place in national yards, thus creating new jobs but also widening the competences of existing yards.

For the procurement of smaller components, both for wind and solar, EU suppliers will also be considered. This approach will allow EU manufacturers and suppliers to have their references for a market in continuous expansion.

TSO will also contribute with their innovative solutions to overcome typical challenges with respect to grid connection. The involvement of national Transmission System Operator (TSO) will allow to establish a sound and robust collaboration that will result in a faster approach towards grid capacity evaluation and connection which will benefit future projects to come. All works required to upgrade the electrical infrastructure will likely involve EU contractors.

Timeline: The timeline foreseen for the investment is approximately 4 years.

1.1.3 Promotion of RES for collective and individual self-consumption.

Challenges: Italy has signed a plan characterized by very ambitious goals regarding the development of renewable energy for the next few years. In particular, among NECP targets, Italy has set that by 2030 the share of gross energy consumption covered by renewable sources will reach 30%, compared to a current figure of around 18%. Moreover, most likely, the 30% target will be further increased with a view to making the goal of total decarbonization by 2050 more feasible.

The achievement of these national objectives requires an important effort on many fronts, including: energy efficiency (to contain consumption and, consequently, also the increase in the effort on renewable sources), support for the penetration of renewable sources in the electricity sectors, thermal and transport, increase in RES production from small and medium power plants spread throughout the national territory. To this purpose, this project focuses on supporting the energy communities and the self-consumption process.

Following the publication of the Renewable Energy Directive (RED II), Italy has planned to design regulatory framework and incentive systems for the increase of small-power renewable generation plants (residential use).

Objectives: The project aims to increase the number of RES plants, supporting the following configuration, through incentives.

- Energy communities;
- Self-consumption.

Specifically, this project aims to ensure the necessary financial resources to be able to install a new capacity of 1500 MW through the configuration of energy communities and of 1000 MW through the Self-consumption configuration. For both the configurations, it is expected that these can have an annual producibility of 1200 MWh / MW.

Implementation: Based on the national context and on the objectives set in the NECP, in order to concretely increase the number of RES plants and achieve 2500 Mw of new power generation capacity:

- 1600 ML € of loans would be allocated to energy communities
- 600 ML € of grants would be for self-consumption

Concerning the energy communities, the loans would be integrated with the financing mechanism introduced by DL 162/2019, converted by law 8/2020, and implemented with Arera resolution no. 318/2020 / R / eel of 4 August 2020 and decree of the MiSE.

Both the mechanism will be based on the amount of energy produced that is self-consumed by the members of the community, albeit "traveling" on the public network. The incentive is equal to 110 € / MWh and is recognized for 20 years (estimated life of the plant) is repaid through a contribution to electricity bills (Asos component). During the pre-

liminary investigation for the preparation of the decree, this value is associated with a shared energy level equal to 60% of that produced.

The financing mechanism on which the loans will be integrated consists of a part linked to the non-payment of the costs of transport and distribution of electricity and a part linked to the power of the plant. Considering a 100 kW plant, the explicit support mechanism currently in force (decree of 4 July 2019) provides for a premium on self-consumed energy of 10 € / MWh (only if self-consumption is greater than 40% of the produced) and an incentive of approximately 60 € / MWh (calculated as the difference between the recognized tariff of 105 € / MWh and the current market price of electricity), both recognized for 20 years.

Target population: local, regional and national administration; municipalities, renewable power producers, PV local installers.

Timeline: The implementation period is estimated to be 6 years.

Investment 1.2: Development of an Italian supply chain for renewable technologies production (PV cells and panels, and medium-large size wind turbines).

Challenges:

Photovoltaic technology has always played the role of driving technology in the energy transition process. In the next decades, the solar PV capacity is expected to increase from 795 GW in 2020 to 2440 GW in 2030. By 2030, solar power in Europe will grow from today's 152 GW to 442 GW and in Italy from 21 GW to 52 GW (source: BloombergNEF).

Italy has a background of innovative technologies and efficiencies potentially higher than conventional ones. Therefore, it is appropriate to strengthen EU capabilities able to compete in a market considered strategic for the energy transition, supporting manufacturing capacity building in the country, allocating the related financial resources through transparent and non discriminatory procedures to EU players.

This initiative will provide a substantial social impact at national and European level because it will foster the European technology leadership in the next generation of PV modules and cells impacting on the whole PV value chain, expertise and know-how.

Thanks to its recognized role in the Mediterranean basin Italy may become a pivot in the PV market for the whole area, which accounts for an additional installed PV capacity from today's 18 GW to 80 GW in 2030 (source: BloombergNEF).

Since the market for photovoltaic cells and modules is dominated by Asian producers (mainly Chinese) for about 70% and Europe currently accounts for less than 5% of the production capacity of PV modules, the project will contribute to build a lasting Ital-

ian and European technological independence from extra-EU PV producers in order to overcome the energy transition challenges.

As for wind energy, Italy has been working to strengthen the commitment to decarbonization roadmap and in light of the milestones set by the Green New Deal, Wind Turbine Technology will be playing an important role. According to NECP wind energy is expected to grow around 80%, from the present installed 10GW to 18GW (1GW offshore). The global Italian demand is expected to be split in 5GW dedicated to repowering existing wind farms and the remaining 13 GW for new plants to be developed within 2030.

The project is in line with the green and digital transition and green economy required by the RRF and European Green Deal.

Thanks to its Strategic position in the Mediterranean area, Italy may play a pivotal role in the wind turbine market for the whole area.

The creation of a new European player in wind turbine technology for medium-high power aerogenerators, offers the opportunity to develop an additional supply chain, increasing industrial production within Europe.

Objectives:

This investment aims to achieve the green transition and restore Italy's growth potential. It allows the creation of new jobs in the aftermath of the COVID-19 crisis. It promotes sustainable growth based on the use of renewable energy in line with the objectives of the Next Generation EU and the Integrated National Energy and Climate Plan.

Furthermore, this investment aims to relaunch of EU supply chain in the wind turbine sector with creation of a new player, expected to rapidly expand rapidly a market segment not fully covered today, generating employment in the aftermath of the COVID-19 crisis and creating a new competence in the EU, with impact on Italy (developing R&D capabilities). In agreement with European Green Deal the project will contribute to reduce social and territorial inequality.

It will develop:

- new jobs created in the country, focussing on southern regions;
- fixed capital: in high-tech industrial infrastructures and digital automation, research and development and production of intellectual property and know-how;
- human capital: by new technical and specialist skills
- natural capital: contributing to the renewable resources increase as required by the NECP.

The main objectives are to:

- establish a EU champion of advanced and proprietary green PV technologies production;

- consolidate and create proprietary know-how and skills, by an R&D in strong synergy with external Research Centers and Suppliers;
- set-up the necessary supply-chain, by restoring a European chain in photovoltaic industry;
- contribute to the national objective of CO2 emissions reduction spelled out in the National Energy and Climate Plan.

To achieve it, the use of other EU instruments like Horizon Europe (e.g. European Partnership for Clean Energy Transition) can be considered.

These actions will contribute to the national objective, spelled out in the National Energy and Climate Plan, to reduce the national objective of CO2 emissions and supporting the green & digital transition.

Implementation:

The project will enhance the technological skills and high-tech industrial infrastructures and digital automation of an existing Italian start-up specialized in the production of PV cells and modules. The production will increase from the current 200 MW/year to at least 2 GW/year in 2025 by establishing the new production line, the processes and the supply-chain along with the necessary R&D, IP and channels to the market. By early 2026, the proprietary technology upgrade will increase the production to at least 3 GW/year. The major steps of implementation are the following:

- Design for permitting and request submission to the relevant Authorities,
- Permit obtainment,
- Design specifications and procurement contracts,
- Cell and Module line tools manufacturing by Suppliers and shipment,
- Cell and Module line facility and equipment installation,
- Cell and Module line start up and setting up,
- Module production ramp up to 2 GW/year,
- Technology upgrade implementation and production ramp up to 3GW/year.

As for the wind turbine supply chain, the implementation is foreseen to be articulated on the following main steps:

- Set up of IP & technology (consolidation of existing capabilities and acquisition of missing technologies)
- Set up of a manufacturing facility
- Set up of a local supply chain
- Prototype Manufacturing and assembly phase
- Commissioning and Testing of a pilot unit
- In parallel with know how improvement and development

Target population: Local, regional, national administrations, renewable energy produc-

tion project promoters, renewable power producers, IPPs, investors in renewable energy project, EPCs, Distributors.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 1.3: Projects at local level (Municipalities)

Investment under definition

Investment 1.4: Reinforcement and digitalisation of power grid infrastructure.

1.4.1 Installation of thermal energy storage systems.

Challenges: The initiative supports the green energy transition, with a sustainable growth of renewable energy sources, allowing a larger reduction of renewable energy curtailment and a better balancing of its production in the national pool.

Reference is made to the Italian TSO's (Terna) Development Plan 2020 future increasing of installed RES capacity, leading to additional curtailment due to overgeneration.

Objectives: The investment anticipates the installation of thermal storage systems to decouple the thermal and electrical flows of "must-run" CCGT (Combined Cycle Gas Turbines) plants enabling time shifting of the electrical production, while ensuring safe and continuous energy supply to industrial complexes, especially those subject to major accident risk (Seveso's directive).

These actions will contribute to the national objective, spelled out in the National Energy and Climate Plan (NECP), to increase renewable quota in the Italian energy mix (55,4% at 2030) and reach a storage capacity of 3,0 GW at 2025, and are in line with EU's decarbonization strategy.

Implementation: Total amount of the investment (50 M€) to be fully funded by RRF on a non-repayable basis (100% grant on capital expenditure); otherwise, a suitable regulatory framework, providing for a support mechanism, should be developed to make the project sustainable.

Target population: Italian transmission system operator, renewable energy producers, installers, engineering companies, EPC contractors, small and medium enterprises.

Timeline: The implementation period is estimated to be 5 years.

1.4.2 Interventions to make electricity distribution networks smarter (Smart Grid).

Challenges: The growth of distributed RES generation foreseen by the NECP is going to require large investments to increase (especially) distributed generation hosting capacity. Although DSOs' investments are remunerated by tariffs, additional public contributions are able to accelerate projects implementation while minimising the impact of such effort on energy bills.

According to available analysis (Ministry of Economic Development and DSOs estimation), in the NECP's implementation timeline, the hosting capacity gap between DSOs funding potential through tariffs and foreseen system needs is around 8.000 MVA.

Objectives: The investment aims to increase the hosting capacity of distribution networks, in order to integrate the growing share of RES produced by distributed plants and to contribute to CO2 emissions reduction, complying with the NECP and EU strategies.

Consistently with the gap analysis mentioned above, the overall objective of this measure is to build around 230 new primary stations for an equivalent hosting capacity of 8.000 MVA.

RRF's resources are going to be committed to this purpose in order to minimise (if not completely avoid, any impact on energy bills by increasing tariffs).

Implementation: The Administration has gained considerable expertise in the implementation of the measure, thanks to previous experience in the management of the ERDF Fund. Therefore, the procedure tested and used - even recently - for similar initiatives on resources of the PON-IC, which provides for the selection of projects submitted on the basis of a technical-economic evaluation, can be replicated.

Based on state aid rules in force, the measures can only be implemented in the assisted regions (Apulia, Calabria, Sicily, Basilicata, Campania, Sardinia). The planned budget would be entirely expendable in these regions. However, the Directorate has already moved steps to open to such throughout the national territory.

The potential risks (however low and related only to cases in which it is necessary the authorization to the realization of lines) are manageable in the indicated times. An IT monitoring platform for similar operations financed from ERDF resources and more generally a bimonthly monitoring system is in place and can be replicated.

Target population: DSOs, local and regional administrations, Municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

1.4.3 *Interventions to increase the resilience of the distribution network.*

Challenges: Improving the resilience of the distribution network: in particular, increas-

ing the resilience of the system to extreme weather events. Although the investments of the concessionaires are remunerated in tariff, the need to support such investments with public contributions arises from the need to be able to count on the accelerating effect that only a public intervention can guarantee and that is fully justified in the face of the large investments provided for by the NECP on the network distribution for the achievement of the challenging objectives of the same NECP, both in terms of increasing the share of energy needs covered by energy from renewable sources and lower CO2 emissions. Non-repayable contribution of 100% of the investment made.

Objectives The investment aims to increase the resilience of the system to extreme weather events such as heat waves, ice sleeves, etc.

Implementation On the basis of the state aid rules in force, the measures can only be implemented in the assisted regions (Apulia, Calabria, Sicily, Basilicata, Campania, Sardinia). The planned budget would be entirely expendable in these regions, the Directorate has, however, already activated on this front so that such interventions are feasible throughout the national territory. The potential risks (however low and related only to cases in which it is necessary the authorization to the realization of lines) are manageable in the indicated times.

The bimonthly monitoring system currently used for other types of public support on the networks may be borrowed.

Target population: DSOs, local and regional administrations, Municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

1.4.4 Installation of integrated EV charging stations.

Challenges: The NECP gives the transport sector a central role in the decarbonization path to 2030. To achieve the European targets on decarbonisation, a fleet of around 6 million electric vehicles is expected by 2030 (of which 4 million fully electric and 2 million plug-in hybrids)

According to the data published by ACI, as of 31.12.2019 they are registered in the PRA 39,545,232. 46% of the fleet is petrol powered, 44% diesel, 9.9% has alternative power (it was 9.3% in 2018). Alternative fuel cars, 3,896,923, recorded a growth of 7.9% and are broken down as follows: 2,574,287 petrol-LPG (6.5% share), 965,340 petrol-methane (2.4% share), 22,383 battery electric (+ 0.1%), 316,209 petrol hybrid (0.8%), 18,359 diesel hybrid (0.1%), other 6,195. 5,606 units (about a quarter of the electric car fleet in Italy),

Based on this scenario, it is therefore essential to promote the development of a network of charging stations to support the projected increase in the need for electric mobility.

The lack of widespread distribution appears to be, for many studies conducted in Italy, the main cause of the lack of purchases of electric cars in Italy.

The employment impact, calculated from a statistical processing Input / output matrix based on networks, returns a value of approximately 6.6 hires for every million euros invested.

Objectives The work carried out in the MISTEG, for the purpose of revising the National Plan for the development of electric charging infrastructures (PNIRE), to the aim of identify, for each type, the objectives in terms of electric charging infrastructures necessary to reach the NECP targets, the following number of EV charging stations. Therefore, this project aims to support the construction of the following recharging points

- Number of charging stations on motorway: 222
- Number of charging stations on sub-urban areas: 1800
- Number of charging stations on urban center areas: 3537
- Number of charging stations connected to storage: 100

The targets were design assuming a slightly higher utilization factor for plants in extra-urban areas, and a progressive growth over time of the electric fleet in circulation in these areas.

Implementation General coordination will be carried out by the MiSE, with the support of the other Administrations with technical qualification functions (MIPAAF, MATTM, MEF). In the first months of 2021, the primary regulation and the implementing decree should be issued with notification to the EC. From the second half of 2021, resources will begin to be assigned and transferred according to a work progress logic.

The proposal approach provides for a contribution, in compliance with the limits and intensity of aid provided for in the European framework, on the cost of construction and in any case not exceeding 40% -80%. Details of the different financial contribution (% of the total cost), for the different configurations, are provided below

- Charging stations on motorway: 40 %
- Charging stations on sub-urban areas: 40 %
- Charging stations on urban center areas: 40 %
- Charging stations connected to storage: 80 %

The factor that most affects the economics is, on the other hand, linked to the level of use of the charging station and, therefore, indirectly to the intensity of traffic on the road on which it is installed.

Assuming a slightly higher utilization factor for installations in non-urban areas, and a progressive growth over time in line with the expected growth of the electricity fleet in circulation, it is possible to arrive at first estimates of the economic payback time of the investment, 'IRR and NPV. The aid intensity has been set at 40%, except for the case in

which there are accumulations, for which a higher aid intensity appears necessary.

Target population: Local, regional, national administration, Municipalities, renewable power producers, DSOs, EV charging station installers, infrastructure project developers, stakeholders of the electrical mobility

Timeline: The implementation period is estimated to be 6 years.

2) Promotion of clean hydrogen production and use.

Investment 2.1: Production of Hydrogen in brownfield sites.

Challenges: From an initial statistical survey of 2011, the total surface of the land dedicated to industrial areas in Italy was found to be 9.000 km², an area approximately equal to that of the Italian region of Umbria. Many of them are situated in strategic positions with untapped potential to contribute to build a more granular hydrogen network production & distribution to SMEs close by. The investment will provide the local use of H₂ in industry and SMEs, thus creating new Hydrogen Valleys with local production and utilisation.

Objectives: This investment has the objective of a new use of abandoned industrial areas to test unit hydrogen production from local RES in the industrial area and facility. The investment provides for a possible suitable re-use of industrial areas, avoiding further use of agriculture exploitation and becoming an engine for the revival of local economies, while providing a driving force for employment, economic growth and a widespread process of decarbonisation of the territories of the South Italy, enhancing production from renewable sources. The fallout in terms of employment can be quantified 25/50 units per system, according to capacity.

Implementation: - to be completed -

Target population: Hydrogen industrial players, research institutes, universities, SMEs, start-ups, municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.2: Production of Electrolysers and Development of an Italian Hydrogen Supply Chain.

Challenges: In Italy, already existing industrial entities having expertise in high technology adjacent sectors could speed-up the technology development and the set-up of an industrial electrolyser OEM for massive production of electrolysers. The project aims to create an industrial center for the production of electrolysers to meet the growing

demand in the coming years. The industrial pole must be able to produce electrolyzers of different sizes and types to meet the different needs of the market. At this stage the main types identified are: Alkaline, PEM, AEM. For the first two types, the objective is the reduction of final costs by leveraging economies of scale, for the AEM electrolyzers the involvement of research bodies (see projects H₂ R&D) is expected to increase yields and in particular on the length of the life cycle.

The Electrolyser market should scale up quickly as well: it is foreseen to grow by ~600 times in the next decade, from the current 70 MW of installed capacity to 40 GW declared by the European Union strategy. Italy has already some national capabilities in the production of electrolyzers, but the sector will require a significant scale up in the production output, in the development of end-to-end capabilities (from stack to electrolyser installation), and in the investments in R&D and pilot projects for large-size electrolyzers (i.e. electrolysis capacity greater than 10 MW)

To kick-start the development of a hydrogen market, the Government envisions the installation of about 5 GW of electrolysis capacity by 2030 to meet part of the above mentioned demand. National production of green hydrogen may be complemented with imports – which can be leveraged to position the country as a hub for hydrogen trading – or other forms of low carbon hydrogen, such as blue hydrogen.

Objectives: This investment aims to create of a national supply chain based on the potential user basin, economic impact in terms of employment and social growth, specialized jobs (technical, contribute to the decarbonisation of the economy), reduction of dependence on oil, reduction of energy imports, spillover of new specialized companies, projection on international markets, creation of turnkey service formulas for the the industrial sector.

The programme foresees two main delivery milestones where two different electrolyser sizes will be released. This choice goes into the direction of risk reduction and anticipates as much as possible the diffusion of systems to produce green hydrogen.

Implementation: To satisfy a hydrogen demand of about 2% by 2030 (corresponding to about 0.7 Mton / year), the most favorable conditions will need to be identified to ensure production feasibility and a low commodity cost.

Create an industrial plant for the production of electrolyzers to meet the growing demand in the coming years and create an Italian Supply Chain on H₂.

1. Set -up IP framework;
2. Set up a development programme based on a modular approach to satisfy a wide range of application;
3. Construction of dedicate manufacturing facilities dedicated to: feedstock management, assembling, prototype tests;
4. Manufacturing of the first prototype 1:1 scale with respect to commercial version

- for 1-5 MW scale;
5. Manufacturing of the first prototype 1:1 scale with respect to commercial version for > 10 MW scale;
 6. Execution of an experimental campaign on the prototype to verify its behaviours in different operating conditions and obtained the proper certifications.

Target population: Power system manufacturers, power engineering companies, producers of electrolyzers components, chemical industry, investors in electrolyzers, infrastructure project developers, local municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.3: Hydrogen use in “hard-to-abate” industry

Challenges: Hydrogen can help to decarbonize “hard-to-abate” sectors, characterized by a high intensity energy and lacking scalable electrification options. Two of them are the chemical products and oil refining sectors, in which hydrogen is already used as feedstock in the production of base chemicals, such as ammonia and methanol, and in a number of refining processes.

Hydrogen is mainly produced on-site in its “grey” form, i.e. from natural gas using Steam Methane Reformers (SMRs). This process is not emission free: emissions per kg of grey hydrogen produced are in the range of 7-9 kg CO₂ / kg H₂. To decarbonize it, a progressive switch to low carbon hydrogen would be a valid alternative. Current production is around 0.5 Mton H₂ /year (a penetration of about 1% on final uses), therefore representing one of the most promising sectors to start using low carbon hydrogen and developing the market.

In Europe, several projects have been launched in the past few years to experiment low carbon hydrogen in refineries and chemical plants, with strong momentum mainly driven by the willingness to contribute to national environmental targets, and to relevant funding provided by regulatory agencies for pilots and projects in low carbon hydrogen production. The dimension of the projects is still small compared to the total hydrogen need of an average plant, but many of them are expected to be in full operation by the end of the next year.

In Italy, refineries and chemical plants are mainly concentrated in central- northern Italy and on the islands, with wide variations not only in terms of plant dimensions and emissions, but also physical characteristics (e.g. proximity to sea, availability of sunlight, etc.). Therefore, the switch to low carbon hydrogen will need a careful plant-by-plant evaluation to assess its technical feasibility.

Objectives: In the primary steel industry, hydrogen represents the only zero carbon alternative in the production of Direct Reduced Iron (DRI), which can be progressively

used to avoid the high emissions' production of cast iron from blast furnaces. Currently, DRI technology uses natural gas as a preferential commodity: with the declining cost of hydrogen as compared to natural gas, steel making plants could start to consider hydrogen blending for DRI production.

In the industrial sector – in addition to chemical production, oil refining and primary steel production – hydrogen has the potential to be used also in industrial heating, particularly for processes requiring high temperature (>1000°C, e.g. in steel or cement industry, glass and paper plants), in which electrification may not be the most efficient or feasible alternative due to the necessary upgrade of the existing infrastructure.

Implementation: - to be completed -

Target population: Hydrogen industrial players, research institutes, universities, SMEs, start-ups, municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.4: Hydrogen Use in Heavy Goods Transport on Wheel.

Challenges: The long-haul truck segment is one of the heaviest-emitting sectors, accounting for 5-10% of overall transport. Currently, the regulatory landscape for the transport sector is evolving with concrete actions towards decarbonisation, setting new emission standards for Original Equipment Manufacturers (OEMs) in the next few years. In particular, new regulations for OEMs require emission reductions by 15% and 30% on new sales, by 2025 and 2030 respectively.

To comply with these new targets, OEMs are starting to invest in alternative powertrains, to progressive switch from diesel engines, currently the most used in heavy transport, to lower carbon fuels (hydrogen, biofuels, biomethane, etc.), electric powertrains or LNG. Not only cost competitiveness (i.e. Total Cost of Ownership - TCO) but also technical parameters (e.g. refuel time) drive customers' choice in this sector. For example, while the TCO of fuel cell trucks is currently not in competition versus other low carbon alternatives, its superior mileage and faster charging time compared to electric powertrain can pave the way for fast adoption of hydrogen based solutions. Moreover, the TCO of fuel cell trucks can become competitive with diesel trucks in the next decade, thanks to the declining cost of both vehicle and hydrogen price.

In Europe, the fuel cell truck market is starting to ramp up, with the first ten fuel cell long-haul trucks currently in full operation in Switzerland. Italy can follow a similar trajectory: it can be expected to witness a penetration of at least 2% of fuel cell long haul trucks by 2030, on a total national fleet of around 200,000 vehicles.

To sustain such market growth, a full scale-up of the fuel cell technology and investments

in relevant infrastructure should be undertaken. In particular, a dedicated grid with tens of refueling stations needs to be deployed, with priority given to strategic areas for heavy road transports (e.g. near inland terminals and on typical long-haul trucks' routes). For instance, the A22 Modena-Brennero or the West – East corridor (Turin – Trieste) highway could be a one of the possible starting points to install refueling stations and enable the fuel cell trucks' market growth. Further developments will take into account the update of DAFI Directive, foreseen within 2021.

The long-haul truck segment might experience a more significant penetration, and rise to 5-7% from the above mentioned 2% by 2030. This could be partially due to a more stringent target on overall emissions, likely to be approved in the context of the EU Green Deal. Moreover, the specific regulation on OEMs may require an additional effort in terms of climate impact (15% and 30% emission reduction on new sales by 2025 and 2030, respectively).

Objectives: This investment aims to create a hydrogen refuelling station network with up to 40 refuelling distributors suitable for trucks for a reduction of transport-related emission.

- *Reduction of emissions:* effect on climate and health;
- *Energy efficiency:* use of local energy from renewables;
- *National and regional economic cycles:* reduction of dependence on oil, reduction of energy imports, creation of economic value at local level;
- *Economic value:* connection with EU economy, tourism of the future tourism - flows to the Mediterranean;
- *Specialized jobs:* technical for asset management and maintenance;
- *Image:* Italy beacon for green technologies, tourism and eco-sustainable transport;
- *Replicability:* projects can be replicated throughout the country and abroad.

Implementation: - to be completed -

Target population: Local, regional, national administration, Municipalities, infrastructure project developers, investors in hydrogen technologies.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.5: Hydrogen Use in Railway Mobility

Challenges: Another sector of interest for hydrogen is the railway sector, in particular the passenger railway transport: in Italy, approximately one third of the railways are dedicated to diesel trains, accounting for a small portion of national transport emissions. Fuel cell trains can become cost-competitive with diesel trains in the next decade, therefore being one of the most promising sectors in which to kick-start the development of a national hydrogen market.

In some European countries (e.g. in Germany), passenger hydrogen trains are already fully operative and regularly used by customers. In the UK and France, some proposals have been made to completely substitute diesel trains with hydrogen trains in hard-to-electrify routes by the next two decades.

In Italy, up to half of the non-electrified national routes could be converted to hydrogen by 2030: in some regions, diesel trains have a high average age and should be substituted in the next few years, making this the right moment to switch to hydrogen. Potential first regions in which start the deployment are those with a high number of diesel trains serving a large number of passengers, such as Sardinia, Sicily, Piedmont or regions where there is a common consensus on using hydrogen to start decarbonizing and improving local railways.

In terms of infrastructures, relevant synergies with the refueling stations for long haul trucks will need to be identified to boost utilization. Freight villages are an example of places in which hydrogen demand for both trucks and trains may need to be satisfied in the next decade.

Objectives: This investment aims to introduce hydrogen-powered trains into the national rail network. Hydrogen can replace diesel where track electrification is not economically feasible. Several trials and pilot projects worldwide have successfully shown the adaptability of the FCH technology to the rail sector across various applications ranging from regional passenger trains. In particular, about 40% of the national routes are not supported by electrification. As a result, the development of hydrogen trains is an economic opportunity to substitute the old locomotives.

Implementation: To develop a complete system for the production, storage and use of hydrogen for non-electrified railway mobility in which to carry out the first experimental projects, in view of the subsequent replacement of the diesel train fleet with hydrogen-powered trains. Construction of prototypes of hydrogen refueling stations complete with the infrastructure necessary for the service of the diesel train fleet with hydrogen-powered trains.

Target population: Local, regional, national administration, Municipalities, infrastructure project developers, investors in hydrogen technologies.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.6: Hydrogen Research & Development

Challenges: The main challenges of this investment concern the technological demonstration in integrated and operational environments (Technology Readiness Level - TRL 8) of the various technological and system solutions developed. In particular, the implementation and demonstrate the different technologies for the production of hydrogen from

Renewable Energy Sources (RES), transport and distribution in mixture with natural gas (GN), or in pure form, in pipelines, up to use of hydrogen in the various application sectors, relating to energy, industry, sustainable mobility and transformation processes into synthetic products (gases / liquids).

The TRL increase will be achieved thanks to the integration and experimentation in a qualified and operational environment (Hydrogen demo Valley) of the various technologies belonging to the value of hydrogen. Hydrogen acts as the link to create the interaction between the RES and the energy system, overcoming the criticality of intermittence, ensuring use deferred over time. Electrolisers are the key element in transforming electricity into hydrogen.

Objectives:

The investment aims to improve knowledge of the implementation of the hydrogen vector in all phases: production, storage and distribution. Alongside the technologies, the reduction of costs through the growth of returns through experimentation in the main segments and the creation of prototypes aimed at verifying the industrialization phase of innovative processes. R&D is an important enabler and accelerator for the diffusion of hydrogen.

In particular, the R&D activities will have following specific objectives:

- Production of hydrogen from electrolysis through mature technologies to ensure adequate hydrogen production, by coupling the use of renewable energy produced on site with electricity of certified renewable origin from the grid;
- Production of hydrogen from different energy sources with emerging technologies and in the pre-commercial phase according to industrial needs;
- Production of 100% renewable synthetic methane from green hydrogen and CO₂ of biological origin, in order to favor the transport and distribution of renewable gases in the network (in perspective for seasonal geological accumulation) and towards users
- Identification of enabling technologies, development of business models and creation of professional figures that favor the development of the hydrogen economy;
- Innovate and digitize energy systems and networks to increase the interconnection between physical assets, people and information through pervasive IoT sensors, artificial intelligence and advanced control systems that allow to increase the resilience and reliability of infrastructures in new energy scenarios.

Implementation

A real hydrogen network will be developed with the aim of testing diverse technologies as well as operation strategies for supply and demand matching, as well as to provide R&D and engineering services for industrial players in need of to-scale validation of their products in a holistic environment.

A network of sensors will be introduced for the monitoring of the pipelines and, at a higher level, an all-encompassing system for data acquisition and analysis (HW and SW), both for integrated management of the Hydrogen Demo Valley and for categorising in view of possible replication in similar contexts.

Target population: hydrogen industrial players, research institutes, universities, SMEs, start-ups, municipalities and other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

Investment 2.7: Hydrogen Combustion Technology Development for green power generation.

Challenges: In a system with an increasing share of variable electricity production from renewables, the high flexibility of gas turbine based power plants can effectively ensure grid stability and security of supply.

Objectives: The main objective of the investment is to make gas turbines an integral part of the future energy mix, meeting the incoming demand to extend the fuel flexibility of existing power generation infrastructure to incorporate green fuels, in particular Hydrogen.

The investment aims to improve the combustion technology for existing and new gas turbines to support, during and after Energy Transition, the green power generation. The vision is to meet GHG reduction targets, using as much as possible all the infrastructure already existing for Natural Gas, in line with circular economy principles.

Implementation: The strategy is to design retrofittable burners able to use Hydrogen, replacing NG, up to 70% corresponding to -40% CO₂ emissions reduction with respect to standard configuration operated with 100% of Natural Gas, and produce the prototype for each of the gas turbine sizes.

The Milestones of the investment are defined as real application and test of the technologies. These applications and tests will be done on field, on real Engine in Commercial running condition. In this case also the User (Electric Utilities) will be involved with positive effects on their business.

Target population: Gas turbine manufacturers, power engineering companies, other stakeholders.

Timeline: The implementation period is estimated to be 5 years (2021-2026).

3) Sustainable local transport, cycle paths and rolling stock renewal.

Investment 3.1: Investment in soft mobility (National Plan of Cycle Path)

Challenges: The number of cyclists in Italy is constantly increasing since 2013 (+ 41% to 2018) and brings an economic value of 7.6 billion euros per year, while the Cycle Internal Product is close to 12,000 million euros, representing a booster for the sector, implemented in synergy with the additional incentives for soft mobility undertaken by the other competent administrations (e.g. MATTM “mobility bonus”).

Besides being a sustainable urban transport solution, cycling plays a significant role for tourist mobility. With regard to cycle tourists, according to the analysis performed by Isnart-Unioncamere and Legambiente (2020), the total number of overnight staying of cycling tourists in 2019 was 54.7 millions. The majority of cycling tourists are foreigners (63%), while only 37% are Italians. The impact on the Italian economy in 2019 accounted for more than 4 million euros, corresponding to an average of 75 euros of expenditure per cyclo-tourist.

The estimates provided by Legambiente foresee a significant impact of the Covid-19 pandemic outbreak on the cycling sector: a 20% increase in the number of Italian cycling tourists is expected in 2020 compared to the previous year.

The mobility by bicycle will have a fundamental role in the immediate future and can have a driving effect on the cycle-travel sector with extraordinary potential in consideration of the Italian landscape and cultural context.

Objectives: The objective of the measure is to promote the use of zero emission vehicles for individual private transport and to encourage passenger intermodality involving the use of bicycles and public transport services. The realization of new cycle path will produce the following benefits:

- increase the potential attractiveness of daily journeys in urban areas with the use of bicycles, promoting the creation of interconnection nodes with other modes of transport (the so-called "last mile"), both within the city cycle network and in the connection between the sub-urban areas of large urban centers with the suburbs;
- improve the design quality of cycle paths, construction and maintenance of cycle networks, cycle and pedestrian routes, and urban and interurban infrastructures dedicated to soft mobility;
- enhance the playful and cultural aspects of the various areas crossed for tourist or recreational purposes (in the area of regional, national and European tourist cycle paths).

Implementation: The total cost of the measure is 737.3 million euros: 200.0 million euros for the realization of 1,000 km of urban and metropolitan cycle paths and 537.3 million for the realization of 1,626 km of tourist cycle paths.¹¹ At least the 50% of the

¹¹Additional resources for cycle routes deriving from national Funds (2014-2020 Infrastructure FSCs), addressed to the competent territorial bodies (Regions) with relative CIPE resolutions

resources will be allocated to the south regions.

The estimation of the cost for urban and metropolitan cycle paths was calculated as part of a technical-economic pre-feasibility analysis which assumes a unit cost of 200,000 euros per kilometer, with possible further increase of cost for metropolitan areas. The urban and metropolitan cycle paths will be developed in the 40 cities hosting major universities to be connected with railway or metro nodes. The main university centres will be identified on the basis of the number of students enrolled in the universities and the number of student travelers using the rail stations. The specific projects will be realised in compliance with the Decree of the Ministry of Infrastructure and Transport of 4 August 2017, n.397 and following amendments. The Decree among others establishes that, in case of municipalities with more than 100.000 inhabitants, the new cyclo paths must be part of the planned interventions of the relevant SUMP.

Moreover, the indication of adopting SUMPs is also in line with the decree 12.08.2020, n. 344, for the allocation of resources to local authorities (municipalities and metropolitan cities) for interventions on cycling. In particular, a reward for the bodies that had adopted, as of 30 April 2020, the SUMP in application of the decree of the Minister of infrastructures and transport 4 August 2017, n. 397 is provided.

The interventions will be implemented by the local authorities in compliance with the strategies defined in Law no. 2 of January 2018 and in line with the provisions of the Biciplans of Metropolitan Cities and Municipalities regarding the integrated planning of sustainable mobility. It has to be specified that the drafting of the National Cycling Plan in implementation of Law no. 2 of 2018 is nearing completion. At this purpose, the measure financed by the RRF will be integrated with the national resources already available.

The development of national priority tourist cycle routes involves internal green areas not subject to development deriving from mass tourism (e.g. Ciclovía Vento, along the Po river), and it is implemented through functional lots, with an extension of tens of kilometers. The new kilometers to be realized are cross-territories and they will be uniform in terms of design, sign and functionalities. Tourist cycle paths are listed in the table [M2C2-1](#) on page 65.

Table M2C2-1: Tourist cycle paths

No	National priority tourist cycle
1	Ciclovía Vento, da Venezia a Torino attraverso le Regioni di Veneto, Emilia-Romagna, Lombardia, Piemonte lungo le sponde del fiume Po (732km)
2	Ciclovía Sole, da Verona a Firenze attraverso le Regioni di Veneto, Lombardia, Emilia-Romagna e Toscana (392 km)
3	Ciclovía GRAB, Anello ciclabile all'interno della città di Roma lungo la via Appia e il fiume Tevere (44 km)
4	Ciclovía dell'Acquedotto pugliese, da Caposele a Santa Maria di Leuca attraverso le Regioni di Campania, Basilicata e Puglia, lungo l'infrastruttura storica del Canale Principe dell'Acquedotto pugliese (537 km)
5	Ciclovía Adriatica, da Venezia al Gargano attraverso le Regioni di Veneto, Emilia-Romagna, Marche, Abruzzo, Molise e Puglia lungo la costa affacciata sul Mar Adriatico (1109 km)
6	Ciclovía Tirrenica, dal confine Italia-Francia (Ventimiglia) a Roma attraverso le Regioni di Liguria, Toscana e Lazio lungo la costa del Mar Tirreno (560 km)
7	Ciclovía del Garda, un itinerario ciclabile ad anello lungo le sponde del lago di Garda attraverso le Regioni di Lombardia, Veneto e Trentino Alto Adige (140 km)
8	Ciclovía della Sardegna, itinerario ad anello attraverso l'intera isola della Sardegna e i centri di Cagliari, Oristano, Macomer, Sassari, Porto Torres, Olbia, Tortolì (1134 km)
9	Ciclovía della Magna Grecia, da Lagonegro a Pozzallo attraverso le Regioni di Basilicata, Calabria e Sicilia (1110 km)
10	Ciclovía Trieste-Lignano-Venezia, da Trieste a Lignano Sabbiadoro e Venezia attraverso le Regioni di Friuli Venezia Giulia e Veneto (150 km)

The aim of the measure is to have a reduction in air emissions. Considering that, for each kilometer traveled by bike instead of by car, the community is expected to save 97 euro cents for each kilometre of cycle path in terms of: health benefits, operating costs, travel time, noise, accidents, pollutants and GHG emissions from private vehicles (compared to the scenario in which the project is not implemented).

Target population: Regions, municipalities, provinces, metropolitan cities. The main beneficiaries are the citizens using bicycles for their daily trips in urban areas, as well as cyclo-tourists.

Timeline: The interventions will last 6 years, from 2021 to 2026. The cycle paths activation are progressive.

The interventions is coherent with the following timeline:

- realization of 1,000 km of urban and metropolitan cycle paths by 2022;
- realization of 1,626 km of tourist cycle paths by 2026.

Investment 3.2: Green local public transport and Rapid Mass Transport.

3.2.1 *Strengthening of the green transport industry, the related national supply chains and*

smart mobility.

The 2019 National Strategic Plan for Sustainable Mobility foresees the gradual replacement of busses for public transport with less polluting vehicles, particularly electric ones. Public transport in Italy currently accounts for only 14% of all motorised journeys, while 86% are made by car and motorbike. The LPT fleet in Italy has an average age of 10.5 years, is mainly Diesel Euro 2/5 and is characterized by a variable quality of service. The renewal of the LPT fleet implies an adequate production capacity, both in terms of its reconfiguration towards the development of innovative technologies and in terms of energy and environmental efficiency.

As part of the activities in support of the 2019 National Strategic Plan for Sustainable Mobility, the Ministry of Economic Development and the Ministry of Infrastructure and Transport commissioned Invitalia to carry out an analysis of the Italian bus production chain. This study revealed a varied landscape, in which, despite a few national bus manufacturers, there is a solid component supply chain. Currently the Italian bus production chain is made up of about 150 companies, most of which are small in size. The study also recommended strengthening the bus manufacturers' sector to cope with the technological transition that is required to meet the increasing demand for low and zero emissions busses.

The need of promoting the technological transition is also relevant for the hull construction sector, since the production of recreational crafts is not energy efficient and involves high carbon dioxide emissions.

Every year the public administration spends at least 150 billion on the purchase of goods and services and a relevant part of this is directed to investment in mobility. Through proper instruments, part of this spending could stimulate innovation and economic growth.

Objectives

The overall aim of the intervention is to promote the technological transformation - towards higher environmental and energy efficiency and smarter solutions - for the automotive, bus, nautical and maritime mobility supply chains.

A first action addresses specifically the bus sector. The intervention supports the investment in the bus production chain, in order to support the expansion of production capacity and the ecological transition to new feeding modes. The sum allocated can activate approximately 1 billion euros of investments for about 25-30 projects (this figure accounts also for the private business' investments).

A second action is intended to promote the purchase or construction of moulds prepared for the vacuum lamination of recreational craft units made of fibreglass infusion or prepregged fabrics, and for this purpose equipped with a perimeter flange.

A third action is aimed at stimulating innovation and industrial conversion towards new technologies for smart and sustainable mobility (electric / hybrid vehicles, digitalization, eco-design, etc.) of the small and medium enterprises active in the automotive, bus, nautical and maritime mobility supply chains. This, in order to lower the environmental impact of the sector and foster smart mobility.

Implementation

The cost of the measure is estimated to be 520 million euros: 300 million for the technological transformation of the busses supply chain; 20 million euros for the modernisation of recreational craft production facilities; and 200 million euros for Smarter Italy program to support innovation in the urban mobility supply chains.

The estimate of the intervention size for busses supply chain is estimated on the basis of the assessment carried out on the Italian companies that are active in the sector. Based on such analysis, the intervention shall allow the implementation of 25 to 30 industrial transformation projects through “Development contracts”.

Development contract acts as an instrument to support the bus production chain as it finances strategic and innovative large-scale production investment programmes. Development contracts are reserved to both individual and associated companies and involve a negotiating mechanism for financial incentives through non-repayable grants or interest rate subsidies and subsidised loans.

The total value of each investment programme financed by a Development Contracts has to be at least 20 million euros.

With regard to the administrative requirements, a directive issued by the Ministry of Economic Development (MiSE) is provided for the definition of the guidelines and implementation methods of the intervention, after which the companies submit a development plan, subject to an examination through a negotiation mechanism. The intervention can be implemented immediately and avail itself of a specific counter set up by MiSE. The examination requires 6 months; projects have an average duration of 36 months, to which must be added up another 12 months for reporting and final checks. The measure remains active until the counter’s resources are exhausted.

For what concerns the modernization of recreational craft production facilities, the use of infusion and fibreglass-resin processes results in a reduction in the overall weight of the hulls and consequently in fuel consumption. With a budget of 20 million, it is estimated that 200 moulds can be financed, for as many companies, through a tax credit from which the construction sites that build the hulls benefit.

The third action on the innovation and industrial conversion towards new technologies of the mobility supply chains will be supported under the Smarter Italy program, which is an innovation procurement program promoted by the Ministry of Economic Development

(MiSE), the Ministry of University and Research and the MID - Department for Digital Transformation of the Presidency of the Council of Ministers and implemented by the Agency for Digital Italy (AgID). Smarter Italy was established with the MiSE Decree of 31 January 2019, and it became operational with the agreement between MiSE and AgID for the implementation of intelligent public procurement.

As part of this action a new specific line of the Smarter Italy program will be activated by a Ministerial Decree of the MiSE. Under this line innovative green and smart mobility products and services will be procured via pre-competitive tender procedures or early adoption systems activated by Regions and municipalities. Through this system the public contractor buys either: a) the innovation process, including research and development services (research and development procurement and pre-commercial procurement) or b) the product of innovation created by others (public procurement of innovation).

The cost of the action is calculated assuming that 5 innovation contracts will be finalised per year over a period of 4 years. The average cost of an innovative contract is assumed to be 10 million of euros based on the experience stemming from the ongoing implementation of the Smarter Italy program.

Target population

The beneficiaries of the busses supply chain measure are EU companies that present an investment programme, through a proposing company, which promotes the initiative and the subjects that carry out research, development and innovation projects.

The beneficiaries of the modernization of recreational craft production facilities are EU shipyards that manufacture recreational craft units with NACE codes 3012 and 3011 and with a manufacturer code (MIC) in operation for at least 3 years.

The beneficiaries of Smarter Italy program for urban mobility are the local authorities (e.g. Regions, Municipalities) which will benefit from innovative mobility solutions offered by small and medium enterprises in the automotive, bus, nautical and maritime mobility supply chains.

Timeline

- The implementation of the busses supply chain measure will last 3 years (from 2021 to 2023);
- The implementation of the modernization of recreational craft production facilities will last 4 years, from 2021 to 2024;
- The implementation of Smarter Italy for smart and sustainable mobility will last 4 years, from 2022 to 2025.

3.2.2 *Renewal of the regional public transport bus fleet with clean fuels vehicles.*

Challenges

The Italian bus fleet for public transport presents an average age significantly above the EU counterparts: i.e. 10.5 years vs 7 years (CDP, ASSTRA, 2019. *Investire nel TPL*) and, thus, it is characterised by high fuel consumption and high operating and maintenance costs.

In particular, the Italian bus fleet for local public transport is composed of 42,000 vehicles out of which almost 90% are petrol, diesel and dual fuel vehicles and more than 40% are high emissions vehicles (i.e. Euro 0, Euro 1, Euro 2, Euro 3, Euro 4).

The high average age of the fleet represents a critical element for the public transport sector: firstly, it entails an increase in the operating and maintenance costs (e.g. the average maintenance costs of a new bus are 6 times lower than those of a 15 years old one), secondly, it reduces the quality of the service and travel comfort. Furthermore, a low-quality service does not encourage the shift from private cars to public transport, thus resulting in urban congestion and higher emissions from private vehicles (CDP, ASSTRA, 2019. *Investire nel TPL*).

The adoption of environmentally friendly vehicles will also require the availability of dedicated charging or refuelling infrastructures: this is the case of zero emissions vehicles like full electric or hydrogen powered vehicles. Another aspect to be considered is that electric vehicles, which currently represent the cleaner solution for road transport, are characterised by a limited travel range: i.e. about 170-200 km with a full charge. Therefore new investments in recharging and refilling infrastructure will be required to meet the objectives set by the European Directive 2014/94/EU on Alternative Fuels Infrastructure (DAFI) and by the EU Country Specific Recommendations 2019 (COM(2019) 512 final) and 2020 (COM(2020)512 final).

This action is fully aligned with the European Green Deal, which sets the objective to cut, by 2050, 90% of the transport-related emissions. Indeed, the achievement of such objectives implies among others the renewal of the public bus fleet and more specifically the adoption of alternative fuels vehicles and the related charging and refuelling infrastructure.

Objectives

The goal of this measure is to achieve a reduction of 66% in 2026 of GHG emissions from a fleet of 5,139 bus vehicles that will be substituted with low and zero emissions vehicles.

The operational objective of this measure is to accelerate the renewal of the bus fleet with buses powered through alternative and environmentally sustainable fuels (i.e. electricity, hydrogen and methane). This action can be implemented by purchasing new buses and the construction of an adequate charging infrastructure. Specific objectives are:

- enhancement of the quality and availability of public transport services and dis-

- courage the use of private vehicles;
- increase in user comfort and attractiveness of public road transport services;
- improvement of air quality, though the use of green fuels and innovative technologies in line with international agreements and regulatory provisions of the European Union;
- promotion the cohesion policy through the reduction of national gap as a result of the increase of bus equipment in Southern Italy.

Such objectives will be achieved through the renewal of about 12% of the overall bus fleet, corresponding to 5,139 vehicles that - if supported by the realisation of the dedicated infrastructure - would lead to the disposal of all Euro 0, Euro 1 and 96.5% of EURO 2 buses for local public transport by 2026.

Implementation

The implementation of the measure follows the national legislation as indicated National Strategic Plan for Sustainable Mobility (Piano Strategico Nazionale per la Mobilità Sostenibile - PSNMS). The plan covers the period between 2019-2033. Resources are assigned to local entities according to the provisions of the national legislative decree (Decree no. 1360 of April 2019). The list of beneficiaries local entities is defined through specific indicators aimed at measuring the environmental and socio-economic performance of the different municipalities/ regions: e.g. air pollution emissions and population.

The measure foresees the gradual renewal of buses for local public transport: 5,139 units by 2026. In detail, in the first two years of the intervention (2021-2023), the measure is mainly focused on CNG and LNG powered buses, rather than electric and hydrogen powered busses. Indeed, the use of methane as alternative fuel is faster to be implemented in the short-medium term due to the lack of adequate charging or refuelling infrastructure for electric or hydrogen vehicles. Resources allocated to electric and hydrogen-powered buses will significantly increase starting from 2024 compared to CNG and LNG powered buses.

Out of the total number of buses that will be renewed through the measure: 2,730 are GNC or GNL powered vehicles, 2,051 are electric powered vehicles and 358 are hydrogen powered vehicles.

The total investment cost for the measure accounts for 3,000 million euros, out of which 750 million euros for refill and recharge infrastructure and 2,250 million euros for purchasing new vehicles.

The investment cost for purchasing vehicles has been estimated by multiplying the average cost of buses - per type of fuel - and the number of buses to be acquired. The cost of a vehicle for local public transport depends on several factors, including: type, number of vehicles to be purchased with the same procedure, equipment and interior configuration.

Based on market benchmark¹², the total amount of the measure has been estimated considering the following average unit costs:

- GNC-GNL buses: 300,000 euro
- Electric buses: 550,000 euro
- Hydrogen buses: 850,000 euro

The 750 million euros for alternative fuels and recharge infrastructure are determined as the maximum cost recognized to beneficiary bodies. This sum is calculated according to the same parameters reported by the PSNMS, which establishes for an amount to be allocated to the construction of support infrastructures, up to 50% of the contribution for the first 3 years of each five-year period (art. 7 paragraphs 2 and 4 of the Prime Ministerial Decree of 17/04/2019). The intervention will therefore allow a complete implementation path for the green transition of road public transport, although, at the present stage, it is not possible to provide details about support infrastructures that will be implemented. The quantity and type of the support infrastructure will be defined according to the operational plans that will be proposed by the beneficiary bodies.

Target population: Resources are assigned to local entities according to the approach defined by the PSNMS. Thus, the new green buses will be operating in all such urban areas across the entire national territory. The beneficiaries are the local authorities, the public transport operators and the urban population.

Timeline: The implementation period will last 5 years, from 2022 to 2026 (cf. Table 3). In particular, in the first three years of the measure funding will be equally divided for the renewal of the bus fleet for public transport and for realisation of the charging infrastructure. In the last 2 years, funding will be entirely allocated to the renewal of the bus fleet.

3.2.3 *Renewal of the regional public transport railway fleet with clean fuels trains.*

Challenge

The Italian train fleet for regional local public transport is composed of 479 trains which present an average age of 29.28 years. The fleet includes 221 diesel trains and 258 electric trains.

Investments on the regional rail fleet are essential to improve comfort and reliability of suburban rail connections, which in turn can result in modal shift from private cars. Furthermore, older trains present higher operating and maintenance costs.

Investments made in Italy in recent years on local rail transport have produced positive effects with a growing share of citizens who gave up private cars because there was an

¹²CONSIP procurement, 2017

alternative to car journeys that, however, still dominate mobility in Italy (Pendolaria, 2019). Hence, a renewed train fleet will be effective in promoting modal shift from private cars thus favouring reduction on traffic congestion and related GHG emissions.

The need for a renewed train fleet for local public transport is fully aligned with the goals of the European Green Deal, which sets the objective to cut, by 2050, 90% of the transport-related emissions. Indeed, the achievement of such objectives is contributed by ensuring modal shift from private cars to trains powered by electricity or hydrogen.

Objective

The main goal of this action is to improve air quality and reduce GHG emissions from regional trains through the use of innovative technologies in line with international agreements and with the regulatory provisions of the European Union. The yearly savings from year 2026 onward in terms of GHG emissions will be in the range of 9.050 to 20.960 tonCO₂ depending on whether hydrogen is produced from fossil fuels or from renewable energy sources.

The general objective of this measure is to reduce the average age of the regional rolling stock fleet through the purchasing of electric powered train groups with semi-pilot and hydrogen powered trains. Specific objectives are:

- strengthen regional transport services by rail and discourage the use of private motor vehicles;
- improve the user comfort and increase attractiveness of regional rail transport services;
- promote the cohesion policy through the reduction of national gap as a result of the increase of rolling stock equipment in Southern Italy.

Such objectives will be achieved through the replacement of the most obsolete diesel trains with hydrogen trains, as well as the replacement of the oldest electric trains with new electric ones. As part of the intervention a total of 80 trains will be replaced resulting in a reduction of the fleet average age: from 29.28 years in 2020 to 27.72 years in 2026¹³.

Implementation

The total number of trains to be purchased as part of the intervention is 80 units by 2026, out of which 59 are electric powered trains and 21 are hydrogen powered trains. These amounts have been estimated on the basis of a market assessment. The share of hydrogen and electric powered trains may be modified depending on the rolling stock supply chain and local needs.

The total investment cost for the measure accounts for 1,000 million euros. In particular: 748 million euros for electric powered vehicles and 252 million euros for hydrogen powered

¹³The projection was made assuming no train would have been replaced in the no intervention scenario.

vehicles.

The investment cost has been estimated by multiplying the unit cost of trains - per type of power - and the number of trains to be acquired. The following unit costs have been considered, based on available market information:

- Electric powered trains: 12.7 million euros;
- Hydrogen powered trains: 12.0 million euros.

Trains to be procured as part of this intervention are the ones used for regional services under public service contracts (PSC)¹⁴.

Target population: New rolling stocks are assigned to local entities and the vehicles will be operated by the service operators within the territory of the local entities identified. The main beneficiaries are the regional railway passengers.

Timeline: The purchasing plan is developed over a period of 6 years, from 2021 to 2026 (cf. Table 3).

3.2.4 *Renewal of the regional public transport naval fleet with clean fuels naval units.*

Challenge

In a country like Italy, maritime transport plays a relevant role as public transport service for mobility in the coastal areas.

The Italian public transport naval fleet is composed of 51 units with an average age of 34.3 years: only 5 naval units are less than 25 years of age and only 3 naval units are less than 15 years old.

The advanced age of the fleet represents a critical element for the public transport sector, especially from a sustainable point of view: it hampers the service quality, the comfort of travel and impacts severely in terms of GHG emissions. Furthermore, a low-quality service does not encourage the use of such public maritime services.

The National Reform Program, under Priority no. 5, promotes the implementation of sustainable investments. To this extent, the "sustainable" solutions to the issue of local mobility include the encouragement to use waterborne public transport that promote intermodal transport (ship-bike) and new-generation ships, powered by LNG (liquefied natural gas) or alternative fuels (methanol or hydrogen).

Moreover, the renewal of the naval fleet contributes to goals of the EU Regulation 2018/1999 which encourages measures to achieve low-emission mobility (including transport electrification).

¹⁴Therefore, this investment is not overlapping with the one proposed as part of M3C2.

Ministerial Decrees no. 52/2018 and no. 397/2019 allocate resources to the renewal of the public transport naval fleet but these are not deemed sufficient for the challenge identified.

Objective

The operational objective of the measure is to renew 25% of the total naval fleet for local public transport by purchasing low and zero emissions naval units (e.g. marine vehicles powered by LNG, electric or hydrogen). This action will allow for improving air quality and reducing emissions of climate change gasses. The yearly savings from year 2026 onward in terms of GHG emissions will be in the range of 45.300 ton of CO₂. Furthermore the measure will allow for savings of about 16.40 ton/year of SO_x.

The specific objectives are:

- improvement in social cohesion by ensuring territorial continuity via sustainable sea transport services;
- increase in the level of comfort of passengers;
- improvement in the user comfort and attractiveness of local maritime transport services;
- improvement of air quality and reduction of GHG emissions, through the use of alternative fuels;
- reduction of sea pollution;
- improvement of energy efficiency and security.

Such objectives will be achieved by purchasing new ro-ro pax and passengers-only ferries including high-speed naval units powered by hydrogen, LNG or electricity for the local and regional sea, lagoon (particularly the Venice lagoon), lake and river transport (cf. Legislative Decree no. 422 of 19.11.1997). Such units will be employed in transport services subject to public service obligations setting the following conditions: a) provision of an exclusive connection between municipalities within the same territory or region; b) continuous or periodical services with an undifferentiated offer to the public and pre-established itineraries according to Legislative Decree no. 422 of 19.11.1997; c) naval units pre-determined or approved by the competent authorities, pursuant to Article 16 of Legislative Decree no. 422 of 1997 d) contribution to the emission limits set by the EU Directive no. 2012/33 and by Regulation no. 2016/1628/EU.

The new naval units to be purchased must ensure:

- adoption of the criteria of the Energy Efficiency Design Index (EEDI) imposed by the IMO in order to reduce emissions (as a minimum) by 20% compared to the average emissions of a naval unit of the years 2000-2010;
- adoption of the latest automatic identification system (AIS) technology available on the market to locate other naval units in the vicinity;
- accessibility to people with reduced mobility;

- bicycle storage, except for vehicles destined for the Venice lagoon;
- suitable air conditioning on passengers' areas;
- availability of Wi-Fi in areas for passengers;
- luggage storages directly accessible to passengers with the possibility of securing them.

The measure will also strengthen the growth of the next-generation ship management market through the adoption of a tailored procurement plan for the purchasing of naval units.

Implementation

The total cost of the measure is 500 million euro: the purchase of 12 ro-ro and ro-ro pax ferries of about 30 million euros and the purchase of 10 high speed naval units (hydrofoil) of about 14 million euros.

The measure will be implemented by providing support to regional and local public transport companies through the adoption of a tailored procurement plan at central level for the purchasing of naval units.

In order to reach the the measure's objective, a "central direction cabin" will be set up at national level with the aim of monitoring the implementation of the plan: it will support, among other things, the establishing of procurement models (tenders), the subscription of contracts and the facilitation of economies of scale on a national basis.

Target population: New naval units are assigned to Regional authorities and the vessels will be operated by the service operators within the territory of the local entities identified. The main beneficiaries are the seaside population of densely populated regions.

Timeline: The implementation period will last 4 years, from 2022 to 2025 (cf. Table 3).

3.2.5 Digitalization of local public transport.

Challenge

The research and demonstration activities of recent years have amply demonstrated that the application of technologies can bring tangible and important benefits with considerably limited costs (for example, the benefit / cost ratio expected from cooperative services alone - C - ITS - is estimated at 3:1; the benefits deriving from the integrated use of innovative systems and services are much greater). Today's challenge consists in bringing benefits at a metropolitan scale, addressing the issues related to the expansion of the metropolitan area, starting from the dissemination of knowledge, by finding the necessary resources, not only financial ones - up to the provision of support in the creation of an efficient market (of components, systems and services) and an effective support framework.

Local public transport must accelerate its transformation by adopting new generation vehicles with electric traction and different charging systems according to use, connected to the infrastructure and equipped with operation control systems in order to guarantee road safety and the regularity of the service. In this scenario, it is necessary to boost a strong technological innovation.

The widespread use of ICT technologies for vehicles and roads is an essential component of the digital transition, as it also favors the development of new services for mobility in general, for both passengers and operators; finally, the availability of new data allows a new approach to the design, management and maintenance of urban networks.

Objective

The proposal aims at making public services safer, more versatile and connected through two specific actions:

- A. the implementation of a national enabling platform with C-ITS services in urban areas within the city of Turin, Rome and Naples;
- B. the creation of a living lab within the city of Milan that optimizes the most advanced solutions in terms of power trains for city buses, to adapt the infrastructure with C-ITS technologies as well as with 5G technologies in order to improve the safety of the vehicles and the service to end users.

The action A concerns:

- the design and implementation phases of the platform allowing the creation of a technical ecosystem for connected vehicles;
- the adaptation of local IT systems (monitoring, traffic management, information) also through the realization of new monitoring sensors, new cameras for monitoring and video analysis.

The action B, instead, concerns the implementation of pilot cutting-edge solutions both on public transport fleets and on urban infrastructure, favoring the development of new services for the citizen, the municipality and the public transport operator. In particular, this action includes:

- the purchase of 9 trolleybus and the installation of 6 charging infrastructures;
- the installation of digital infrastructure of 40.3 km of network through the implementation of smart systems and control traffic systems;
- the realization of infrastructure-vehicle communication system (I2V and I2X);
- the development of MaaS systems for the planning and use of services and traffic forecasting systems for travel planning.

Implementation

The total cost of the measure is 52,0 million euros: (A) 22,0 million euros for the imple-

mentation of a national enabling platform with C-ITS services and (B) 30,0 million euros for the creation of a “living lab”. The following section describes the implementation of each action.

Action A: C-ITS

The design of the platform will be carried following functional requirements and equipment specifications. The phase of design includes the tender procedure for the realisation, the supply and the commissioning and start-up in the three cities involved by 2021. The design and implementation phase will be followed by a testing phase by 2023.

Simultaneously, the mobility management systems of the three cities will be upgraded in terms of both extension and capacity to be integrated within the IT Platform. The full integration of the services will be completed by 2025.

The interventions will be customised on each city’s peculiarities and they will follow different roadmaps. Implementations will be subject to ex-ante / ex-post assessment, aimed at verifying the effects of C-ITS services in the urban area in the full-scale application, with particular reference to the effects in terms of sustainability of mobility. The impact assessment will be designed by following the best practices in the sector and adopting the indications of the pilot projects in progress in which the implementing bodies participate (e.g.: C-Roads Italy 2 and 3); consistently with the ex-ante / ex-post approach, the impact assessment will be initiated in the starting stages of the project and will last for its entire duration. The project is delivered in three phases:

- phase 1: verification and design of the platform and ex-ante assessment by 2021;
- phase 2: national platform in shared test and adaptation of local systems by 2023;
- phase 3: provision of C-ITS services, progressive extension of the areas covered by the short range services, traffic management systems, ex-post assessment by 2025.

Action B: - TPL 4.0

The interventions of the measure will be completed in 5 years by 2025. The project will be delivered according to the following steps:

- M12: renewal of 9 local public electric busses;
- M20: realisation of 6 charging infrastructures for the electric busses;
- M24: installation of 40.3 km of digital lanes infrastructure and of traffic control system;
- M30: development of advanced ADAS systems that make use of V2X communication;
- M36: development of the information and management system of smart grids; MaaS installation.

Target population: Metropolitan municipalities of Milan, Turin, Rome, Naples. The main beneficiary are passengers of urban mobility services.

Timeline: The intervention will last 5 years (cf. Table 3). In particular, Action A will last 5 years from 2021 to 2025, while Action B will last 3 years from 2021 to 2023.

3.2.6 *Development of Rapid Mass Transport systems (metro, streetcar, BRT).*

Challenge Sustainable Urban Mobility Plans (SUMPSs) promote sustainable mobility planning in urban areas: their aim is to ensure an adequate provision of sustainable and safe transport in cities. This is achieved through modal shift incentive policies, promotion of intermodality and the construction of new infrastructures.

In this context, measures to strengthen the rapid mass transportation system are fundamental for the implementation of an integrated transport system. The extension of rapid mass transport systems - which consist in networks of metropolitan railways, tramways, metro lines and BRT “Bus Rapid Transit” corridors - is of paramount importance to ensure the reduction of travel time for large passenger flows.

In 2016, Italy registered about 1,000 km of network equipped for rapid mass transport services in the city¹⁵ (Pendolaria, 2016) against 155,000 km of road network (European Road Network, 2020). Private cars are the most used vehicles in Italy: 36 million people over 18 years old have used their car at least once during 2019 while two out of three people have used it every day (ISTAT, 2020). Private cars share on total passenger trips (including walking) is more than 60%, while public transport is just about 10% (data for 2019, Isfort, 2020). This can lead to traffic congestion, especially in metropolitan areas.

Hence in case of congested urban areas, the implementation of rapid mass transport systems would allow for shifting mobility demand from private cars. The sustained speed that these transport systems can offer, often guaranteed by dedicated areas and / or lanes which ensures they are not affected by congestion, makes such systems extremely attractive to commuters and occasional passengers.

Objective

The goal of this measure is to shift about 10% of total demand of road passengers transport by car by 2026 in affected urban areas.

The operational objectives of this measure are: (i) the construction of new lines and extension of existing lines of rapid mass transport systems; (ii) the enhancement of existing rapid mass transport systems by upgrading the infrastructure, plant and equipment with the aim of increasing the offered capacity; (iii).the increase of vehicle fleets of rapid mass transport systems aimed at improving the offered capacity.

As part of this measure, 195 km of network equipped for rapid mass transport systems will be newly built. This account for:

¹⁵The city considered are Milan, Rome, Naples, Genoa, Turing and Catania

- the implementation of 57 km of tramway, including rolling stock;
- the implementation of 84 km of trolleybus, including vehicles;
- the implementation of 4 km of cableway, including cableway cars;
- the implementation of bus rapid transit systems of about 50km of lanes, including buses.

The measure contributes to the gradual decarbonisation of transport. The specific objectives are:

- modal shift of 10% of total demand of road passengers transport by car in the affected urban areas;
- reduction of GHG emissions.

Implementation

Table M2C2-2: **Tramways**

Municipality	Intervention	Type	Length (km)	Number of rolling stocks
Bergamo	Linea Tranviaria T2 della Valle Brembana, Bergamo - Villa D'Almè	TRAMWAY	10	11
Florence	Sistema tramviario di Firenze Linea 3 (II lotto) - Tratta Libertà - Bagno a Ripoli (3.2.1)	TRAMWAY	7	16
Genova	Sistema degli assi di forza per il TPL	TROLLEYBUS	45	145
Palermo	Sistema Tram Palermo - Fase II Tratte D, E2, F, G e parcheggi di interscambio	TRAMWAY	20	35
Rimini	2° stralcio "trasporto rapido costiero" (metro mare): tratta Rimini FS-Rimini Fiera	TROLLEYBUS	4	6
Rome	Funivia Battistini - Torrevecchia - Casalotti G.R.A. (Funivia Casalotti)	CABLEWAY	4	212
Rome	Tramvia Viale Palmiro Togliatti (Tramvia Togliatti)	TRAMWAY	8	20
Total			98	445

The total cost of the measure is 2,000 million euros; the interventions covered by this cost have been divided in the following two macro-groups:

1. realization of 98 km of network equipped for rapid mass transport systems, out of which 45 of tramway and 49 of trolleybus, 4 cableway and the purchasing of 82 tam groups, 151 trolleybuses and 212 cable cars for a total amount of 1,642 million euros. The operation will involve the cities of Genoa, Bergamo, Rimini, Florence, Rome and Palermo;

2. realization of 97 km of network equipped for rapid mass transport systems, out of which 12 km of tramway, 35 km of trolleybus and 50 km for bus rapid transport systems, including purchasing of buses, for a total amount of 358 million euros.

The interventions included in macro-group A have been identified through a call for expressions of interest. They are reported in the table [M2C2-2](#) at page 79.

The interventions to be included in macro-group B will be identified by launching a new call for expressions of interest which will be finalised by January 2021. The second EoI, according to the procedure already implemented for the first EoI with B.E.I, will consider the following criteria:

- The allocation of funding for interventions in the rapid mass transport sector is conditional on the drafting of the SUMP, as per Ministerial Decree 397/2017. Resources in fact, may be allocated exclusively to interventions included in these Plans or following a request for funding submitted by the competent local authority. Municipalities within a metropolitan city can access funding only in the presence of a SUMP for the urban area.
- The evaluation method for identifying projects to be funded as part of this measure is based on a standardized procedure that follows a specific in-depth and qualitative analysis. The analysis must assess the following indicators:
 - Technical-economic feasibility of the proposal with reference to the evaluation of the quality of the project, comparison of the unit cost of the infrastructure to the unit cost of similar transport systems, justification of the design choices and transport analysis;
 - Financial, managerial and administrative sustainability of the approval process and assessment of the project's activations capability;
 - Effectiveness of the investment and economic-social profitability in terms of satisfaction of mobility demand, rebalancing between public and private transport, energy saving effects, environmental impact, accident reduction and socio-economic benefits.
- Each local authority, whose request has been positively evaluated, signs an agreement with the Ministry of Infrastructures and Transport, in charge of regulating the financing, to ensure the implementation of the intervention.
- In addition, the funding beneficiaries sign specific agreements with economic operators to ensure the implementation of the intervention.
- For the purposes of an activation consistent with the timing of the RRF, interventions concerning metropolitan systems are not included in this proposal as they require longer implementation times and, especially in Italian cities with many archaeologically sensitive areas, could be affected by slowdowns not predictable in the project phase.

Target population: The following local authorities can be beneficiaries of the financing:

- Metropolitan cities and capitals of metropolitan cities;
- Municipalities capital of the Region;
- Municipalities with over 100,000 inhabitants;
- Municipalities (individually or through agreements between local authorities, in accordance with art.30 of TUEL) with a population equal to or less than 100,000 (only where the interventions solve serious existing critical issues for mobility duly argued);
- Regions with rapid mass transport systems not delegated to Local Authorities.

The final beneficiaries of the intervention are the urban population of the affected areas.

Timeline: The implementation period of the interventions of macro-group A will last 6 years, from 2021 to 2026 (cf. Table 3). The interventions will be progressively activated. The interventions of macro-group B and the specific timeline will be defined after the results of the expression of interest planned by January.

3.2.7 Sustainable mobility “Affrettati Lentamente”.

Challenges:

In 2017, private cars have been the most used vehicles in Italy for each typology of Municipalities (e.g. metropolitans cities, suburbs of the metropolitan area, municipalities with a different range of inhabitants). Sustainable mobility choices are more frequent in the municipalities in the center of the subways areas, especially due to the greater incidence of people who travel on foot for study or work reasons (24.5%) or who exclusively use public transport (22.8%). The bike is used above all in municipalities with over 50,000 inhabitants (3.2%). (ISTAT, 2018).

As noted, sustainable mobility plays a key role from many points of view (economic, environmental, passenger comfort).

To this extent, it is necessary to increment the level of dedicated infrastructures and services including the creation of cycle paths, the development of shared mobility and info-mobility. These measures are fundamental both for sustaining the increasing demand and to promote a “soft” mobility.

The project proposal addresses the challenges and priorities identified in the country-specific recommendations. In particular, it addresses point 21 of the Council Recommendations on Italy’s National Reform Programme 2020, which states that meeting the challenges related to the environment and climate change, including sustainable urban mobility, is an opportunity to improve productivity and create jobs while avoiding unsustainable practices. The project proposal is also consistent with the European Commission’s Report on Italy - 2020 which identifies sustainable transport as one of the priorities on improving environmental sustainability.

Objective

The intervention objectives is to support the development of infrastructures and services for sustainable mobility as an alternative or integration of existing public transport services. The intervention includes actions for the promotion of sustainable mobility through the promotion of modal shift in passenger transport, including the creation of cycle paths, the development of shared mobility and info-mobility.

The project proposal stems from the need to give continuity and systematise the actions promoted by the Ministry of the Environment to favour the propensity for modal change and improve air quality in the urban environment, reduce polluting and climate-altering emissions. Through the implementation of the project, the aim is to develop alternative and / or supplementary sustainable mobility services and infrastructures to local public transport services.

Implementation

The estimated total cost of “Affrettati lentamente” intervention is 80 million euros, with a maximum funding for each municipality of 2 million euros for the implementation of one or more measures covered by the expression of interest for a total of 40 projects to be financed.

The estimate is based on similar measures carried out in previous years through specific Ministry of Environment (MATTM) funding programmes; it would allow the funding of at least 40 projects proposed by as many Municipalities with the consequent dissemination of the know-how and achievement of results on most of the national territory.

The interventions will be identified through a publication of an expression of interest within the Q4 2021 and subsequent selection of projects according to a series of criteria, including environmental effectiveness, identification of the beneficiary municipalities (they are responsible for the implementation and will implement the projects). The admission ranking will be defined by the Q2 2022. The start of the work is Q4 2022 and the conclusion of the intervention by Q2 2026.

Target population: 150 municipalities of 50,000 inhabitants with 40 projects to be financed.

Timeline: The measure will last 5 years (from 2021 with the start of administrative procedures to 2026).

4. Green and digital dimensions of the component

a) Green Transition:

b) Digital Transition:

See Table 1 work in progress

5. Milestones, targets and timeline

See Table 2 work in progress

Below are presented all Milestones (M) and Targets (T) related to each Reform and Investment of this component 'Energy Transition and Sustainable Mobility'.

Reform 1. Simplification of authorization procedures for renewable onshore and offshore plants and new legal framework to sustain the production from renewable sources and time and eligibility extension of the current grants for renewable plants

- M1: By Q1 2021, a first proposal draft of the reform in order (i) to widen the eligibility perimeter and (i) to extend the grants availability period
- M2: By Q2 2021, a first consultation update to consolidate the first proposal draft
- M3: By Q2 2021, the final approval enactment
- T1: By Q4 2023, additional 6 GW awarded in the auctions, considering a time and eligibility extension of the current grants for renewable plants (PV plants, wind farms, offshore and repowering)
- T2: By Q4 2026, increase of net cumulative 10,5-15 GW of installed capacity in order to reach the NECP target
- T3: By Q4 2026, achievement of 2-3 Mton/y of CO2 reduction

Reform 2. New legislation providing a quota obligation system to use renewable gas for importers and producers of natural gas

- M1: By Q1 2021, primary regulation and implementing decree issued with notification to the European Commission
- M2: By Q3 2021, obligation to release a quota of renewable gas to all producers and importers of fossil natural gas

Reform 3. Smarter procedures for project evaluation in the local public transport systems sector with fixed installations and in the rapid mass transport sector

Reform 4. Adoption of national programs on air pollution control (in accordance with Directive (EU) 2016/2284 and with the Climate Decree Legislative Decree no.111/2019)

Investment 1. Development and support for the supply chain of renewables

1.1 Renewable Energy Sources (RES)

1.1.1 Support for the development of the authorization of projects such as project pv floating and wind farms offshore, projects that are developed on PA sites (disposed in the last 3 years), or are low ground consumption or combined with storage technology

- M1: By Q1 2021, Design of rules for access to benefits and definition of the implementing process
- M2: By Q2 2021, Preparation of call for tenders
- M3: By Q3 2021, Publication of call for tenders
- M4: By Q1 2022, Allocation of grants/loans
- Mn. Milestones from M2 to M4 to be repeated from Q2 2022 with a similar timing
- T1: By Q4 2026, increase of net cumulative 4,5-5 GW of installed capacity in order to support the NECP target
- T2: By Q4 2026, contribution to the achievement of 2-3 Mton/y of CO2 reduction

1.1.2 Support to the development of innovative integrated offshore renewable plants

- M1: By Q2 2022, obtaining all the required permits for Lidar installation from the Authority
- T1: By Q2 2022, completion of a wind measurement campaign with n.1 Lidar floating installation in the northern coast of Adriatic Sea
- T2: By Q3 2022, completion of a wind measurement campaign with n.1 Lidar floating installation located in the southern and western coast of Sardinia region and northern coast of Adriatic
- T3: By Q3 2022, completion of a wind measurement campaign with n.1 Lidar fixed installation on oil&gas platform in the northern coast of Adriatic Sea
- T4: By Q3 2022, completion of a wind measurement campaign with n.1 Lidar floating installation in the southern coast of Adriatic Sea
- T5: By Q3 2024, installation of a PV floating plant in the northern coast of Adriatic Sea with a total power installed of 100MWe.

- M2: By Q3 2024, Authorizations for the construction of electrical infrastructures obtained (Autorizzazione Unica Dlgs 387/2003)
- T6: By Q3 2024, installation of electrical infrastructure related to offshore renewable plants at northern coast of Adriatic Sea and with the chance to enhance the local grid
- T7: By Q3 2024, installation of a northern coast of Adriatic Sea energy system storage with a total power of 50MW/MWh
- T8: By Q2 2025, installation of southern Sardinia electrical infrastructure related to offshore renewable plants and with the enhancement of the local grid
- T9: By Q3 2025, installation of southern Sardinia offshore wind floating system uses an innovative pendulum system to restore stability and to minimize motions and final weight of the foundation

1.1.3 Promotion of RES for collective and individual self-consumption

- M1: By Q1 2021, definition of the rules for access to benefits and definition of the organizational structure necessary for receiving the requests submitted to the GSE
- M2: By Q2 2021, publication of the methodologies and periods within submit the applications for the benefits
- M3: By Q4 2026, allocation and distribution of public funding to the winners of the tender
- T1: By Q4 2026, achievement of the 2500 MW of new power generation, and validation through the GAUDI platform

1.2 Development of an Italian supply chain for renewable technologies production (PV cells and panels, and medium-large size wind turbines)

- M1b: By Q3 2021, Contract signature with technological partner to obtain the license for on-shore AeroGenerator of medium-high power
- T1b: By Q4 2021, 70% of the documents, specifications and drawings needed to start the production are completed
- M1a: By Q2 2022, Design for permitting and request filed
- T2b: By Q2 2022, 80% attendance to Technology transfer/training lectures
- M2a: By Q3 2022, Permissions obtained by the relevant Authorities
- M2b: By Q4 2022, procurement and delivery of the main components for prototype nacelle (gear box, generator) available for front runner assembly step
- M3a: By Q4 2022; Design specifications for procurement contracts
- M3b: By Q4 2022, factory ready to manufacture new components according to the technical specification
- M4a: By Q1 2023; Procurement contracts with suppliers for the Cell and Module lines. Procurement Orders placed over the PO List
- T4b: By Q1 2023, first nacelle assembled and tested according to the specifications
- T3b: By Q2 2023, nacelle assembled and tested according to the specifications
- M4b: By Q4 2023, certification for commercial purpose obtained in order to declare engine class
- T5b: By Q4 2023, first wind turbine is installed and first commissioning is done
- M5a: By Q1 2024, the tools needed to be installed in the Cell and Module manufacturing line are manufactured and ready for shipment by the Suppliers
- T6b: By Q1 2024, the assembly station for prototype is improved and other 2 stations are installed
- M6a: By Q2 2024, installation of the Cell and Module facility manufacturing tools is completed
- T7b: By Q3 2024, a small pre-series batch of 4 turbines is assembled. The process for the 4 pre-series turbines is organized for all 4 turbines at once
- T8b: By Q4 2024, the assembly stations for pre-series are improved and other 3 stations are installed
- M7a: By Q3 2024, the Cell and Module line is started up and ready for process set up
- T1a: By Q2 2026, the Cell line and Module lines are running firstly at the pace of 2 and then 3 GW/year production

1.3 Projects at local Level (Municipalities)

1.4 Reinforcement and digitalisation of power grid infrastructure

1.4.1 Installation of thermal energy storage systems

- M1: By Q2 2021, preparation of all the technical documentation required to obtain the permission to build the plant

- M2: By Q3 2022, obtaining all the necessary authorisation to install the thermal storage
- M3: By Q4 2022, final approval of the economical feasibility of the investment associated with the project
- M4: By Q1 2023, start of the execution and installation phase of the storage plant
- T1: By Q4 2025, installation of three thermal storage systems on a selected areas

1.4.2 Interventions to make electricity distribution networks smarter (Smart Grid)

- T1: By Q4 2026, interventions on 8000 MVA electricity distribution networks to increase the integration of renewable energy
- T2: By Q4 2026, interventions on 230 electrical substations to make them smarter

1.4.3 Interventions to increase the resilience of the distribution network

- T1: By Q4, 2026, Improvement of the resilience of 4000 km of the distribution network to extreme weather events

1.4.4 Installation of integrated EV charging stations

- M1: By Q1 2021, definition of rules for access to benefits and organization for receiving applications
- M2: By Q3 2021, publication of a public notice, communicating the opening of the counter for the presentation of applications for benefits
- M3: By Q4 2022, identification of tender winners and dissemination of benefits
- M4: By Q4 2025, verification of the operational characteristics of the charging point
- T1: By Q4 2026, installation of n° 222 EV charging stations on motorway
- T2: By Q4 2026, installation of n°1800 charging stations on sub-urban areas
- T3: By Q4 2026, installation of n° 3537 charging stations on urban center areas
- T4: By Q4 2026, installation of n° 100 charging stations connected to storage

Investment 2. Promotion of clean hydrogen production and use

2.1 Production of Hydrogen in brownfield sites

- M1: By Q3 2021, completion of the feasibility study and business plan
- M2: By Q2 2022, obtaining all the required permits & authorizations from the Authority
- M3: By Q2 2023, procurement completed and construction activities launch
- T1: By Q2 2026, construction of 5 to 10 Hydrogen Valleys in abandoned industrial areas

2.2 Production of Electrolysers and Development of an Italian Hydrogen Supply Chain

- M1: By Q4 2021, completion of the feasibility study and business plan to set up a development programme based on a modular approach to satisfy a wide range of application
- M2: By Q4 2022, 1st step of procurement and 1st step of construction activities completed, such as: feedstock management, assembling, prototype tests
- M3: By Q4 2023, construction and procurement completed & commissioning started, starting the manufacturing of the first prototype 1:1 scale
- M4: By Q4 2024, execution of experimental campaign on the prototype to verify its behaviours in different operating conditions and obtained the proper certifications
- M5: By Q4 2025, industrial production
- T1: By Q4 2024, construction of 1 Gigafactory for the production of key components and material for electrolysers
- T2: By Q4 2025, target annual capacity of 1 GW of electrolysers

2.3 Hydrogen Use in hard-to-abate industry

- M1: By Q4 2022, Engineering, permitting and 1st step of the procurement are completed
- M2: By Q2 2023, all the procurement phases are completed and construction activities
- T1: By Q2 2026, realization of a first prototype in the industry "hard to abate" by testing the use of green hydrogen
- T2: By Q2 2026, CO2 emission reduction equal to 0.283t/tsteel

2.4 Hydrogen Use in Heavy Goods Transport on Wheel

- M1: By Q4 2021, completion of the feasibility study and business plan of the project
- M2: By Q4 2022, obtaining all the required permits and authorisations
- M3: By Q4 2022 Secure contracts for the procurement of materials and for the supply of hydrogen through tank trucks
- T1: By Q4 2026, installation of 40 Hydrogen refuelling stations suitable for trucks

2.5 Hydrogen Use in Railway Mobility

- M1: By Q4 2021, completion of the feasibility study and business plan
- M2: By Q1 2022, engineering, permitting and 1st step procurement completed
- M3: By Q3 2023, procurement completed and construction activities & commissioning started
- M4: By Q4 2024, construction & commissioning completed
- T1: By Q2 2026, construction of 7 hydrogen refueling stations with the infrastructure necessary for the service of the diesel train fleet with hydrogen-powered trains.
- T2: By Q2 2026, reduction of emissions equal to 550 tCO₂ / year

2.6 Hydrogen Research & Development

- T1: By Q2 2026, 4 Projects in 4 different research lines are developed: mobility, transport, industry, residential and building

2.7 Hydrogen Combustion Technology Development for green power generation

- M1: By Q3 2022, design of new Gas Turbine combustion system (Burner Design & Config. Setup) are completed
- M2: By Q4 2024, combustion systems tested on field, though specific procedures
- M3: By Q2 2026, test in full scale test facility: burner tested and validated in single burner, full scale, full pressure and full temperature test rig
- T1: By Q2 2026, Burners able to use hydrogen, replacing NG, up to 70%
- T2: By Q2 2026, 40% CO₂ emissions reduction with respect to standard configuration operated with 100% of Natural Gas

Investment 3. Sustainable local transport, cycle paths and rolling stock renewal

3.1 Investment in soft mobility (National Plan of Cycle Path)

- T1: By Q4 2022, realization of 1,000 km of urban and metropolitan cycle paths
- T2: By Q4 2026, realization of 1,626 km of tourist cycle paths

3.2 Green local public transport and Rapid Mass Transport

3.2.1 Strengthening of the green transport industry, the related national supply chains related and smart mobility

- M1: By Q1 2021: adoption of a MiSE directive to define the guidelines and implementation methods of the intervention for the busses supply chain measure;
- M2: By Q2 2021: adoption of a legislative scheme with MISE/MEF for the introduction of incentives for the recreational craft support measure
- T1: By Q2 2023: a number of 60 companies will receive incentives from the busses supply chain measure;
- T2: By Q2 2024: a number of 200 companies will receive incentives from the recreational craft support action;
- M3: By Q3 2022: Decree of MEF establishing a new line of Smarter Italy on sustainable and smart mobility;
- T3: By Q1 2025: 20 innovation tenders for smart and sustainable mobility are launched through the Smarter Italy program (1 procurement per year).
- or outboard engines for recreational craft with four-stroke outboard engines.

3.2.2 Renewal of the regional public transport bus fleet with clean fuels vehicles

- M1: By Q4 2021, conclusion of administrative procedures for the purchase
- T1: By Q4 2026, dismissal of 63 EURO 0 buses
- T2: By Q4 2026, dismissal of 250 EURO 1 buses
- T3: By Q4 2026, dismissal of 4,826 EURO 2 buses

3.2.3 Renewal of the regional public transport railway fleet with clean fuels trains

- M1: By Q4 2021, conclusion of administrative procedures for the purchase
- T1: By Q4 2026, renewal of 59 electric powered trains
- T2: By Q4 2026, purchasing of 21 hydrogen powered trains

3.2.4 Renewal of the regional public transport naval fleet with clean fuels naval units

- M1: By Q4 2024, conclusion of administrative procedures for the purchase
- T1: By Q2 2025, 22 ro-ro pax and passengers only dual-fuel or full-electric powered ferries purchased

3.2.5 Digitalization of local public transport

- T1: By Q4 2026, 3 large cities where new ecosystem for connected vehicles is developed
- T2: By Q4 2021, 9 renewal of local public electric buses
- T3: By Q3 2022, 6 realization of charging infrastructure
- T4: By Q4 2022, realization of 40.30 kilometers digital lanes infrastructure and of traffic control system
- M1: By Q4 2021, verification and design of the platform and ex-ante assessment
- M2: By Q4 2023, national platform in shared test and adaptation of local systems
- M3: By Q4 2025, provision of C-ITS services
- M4: By Q2 2023, development of advanced ADAS systems
- M5: By Q4 2023, development of the information and management system of smart grids and MaaS installation

3.2.6 Development of Rapid Mass Transport systems (metro, streetcar, BRT)

- T1: By Q4 2026, realization of 57 kilometers of lines realized (tramway)
- T2: By Q4 2026, realization of 84 kilometers of lines realized (trolleybus)
- T3: Q4 2026, realization of 4 kilometers of lines realized (cableway)
- T4: Q4 2026, realization of 50 kilometers of lines realized (bus rapid transit system lanes)
-

3.2.7 Sustainable mobility (“Affrettati Lentamente”)

- M1: By Q4 2021, publication of expression of interest
- M2: By Q2 2022, identification of beneficiaries

6. Financing and costs

See Table 2 work in progress

3 M2C3 - Energy upgrading and renovation of buildings

1. Description of the component

Summary box

Policy area: Energy efficiency, redevelopment and safety of public and private buildings, including residential construction, climate policy, social policy.

Objectives: The objectives of this component are:

a) *Green Transition:* the energy requalification of buildings can reduce energy consumption by X ktoe per year, increase efficiency energy by X% compared to a normal scenario and reduce the GHG emissions of X tCO₂ per year during the period 2021-2026, improving environmental and health performance.

b) *Jobs and growth:* efficiency improvements and redevelopment of buildings stimulate investment, create new jobs, promote the adoption of digital technologies, improve the resilience of the real estate portfolio support SMEs.

c) *Social resilience:* the interventions to improve the efficiency of buildings aim to renovate the existing building stock and alleviate the problems of energy poverty by reducing energy bills, while improving the affordability of housing and living conditions.

Reforms and investments:

Outcome 1: Energy efficiency program for public buildings.

Investment 1.1: School building security and energy upgrading plan;

Investment 1.2: School building replacement and energy upgrading plan;

Investment 1.3: Energy efficiency program for State-property buildings;

Investment 1.4: Program “Safe, green and social” for public housing;

Investment 1.5: Energy upgrading and renovation of public buildings in metropolitan areas;

Investment 1.5: Upgrading courthouses.

Outcome 2: Energy and seismic efficiency program for private and public residential buildings.

Investment 2.1: Time extension of the 110% superbonus to improve energy efficiency and buildings safety.

Estimated costs:

EUR 29,230 million to be covered by RRF

M2C3 - Energy upgrading and renovation of buildings

	Resources (euro/mln)				
	Existing	New	Total	REACT-EU	TOTAL NGEU
	(a)	(b)	(c) = (a)+(b)	(d)	(e) = (c) + (d)
1. Energy efficiency program for public buildings	6.10	4.62	10.72	0.32	11.04
- Program for the safety and energy upgrading of schools	5.87	0.50	6.37	0.05	6.42
- Energy efficiency program for State-property buildings	-	-	-	-	-
- Realization of new Schools by building replacement	-	0.80	0.80	-	0.80
- Program "Safe, green and social" for public housing	-	2.00	2.00	-	2.00
- Energy upgrading and renovation of public buildings in metropolitan areas	0.23	0.87	1.10	0.25	1.35
- Upgrading courthouses	-	0.45	0.45	0.02	0.47
2. Energy and seismic efficiency program for private and public residential buildings	10.26	8.26	18.51	-	18.51
TOTAL	16.36	12.88	29.23	0.32	29.55

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

2. Main challenges and objectives

a) Main challenges

The objective of the component is to give a strong impulse to the renewal of the public and private building heritage, first of all to significantly increase its energy efficiency, an action necessary to achieve the decarbonisation objectives of the economy set by the National Plan for Energy and Climate (PNIEC). Energy efficiency also allows significant savings, first of all, for the PA since a substantial part of the resources will be directed to the renovation of public buildings, schools, as well as residential buildings, starting with those with the worst energy efficiency. The efficiency measures will also make it possible

to intervene on the seismic safety of buildings in the areas at highest risk and to wire the buildings in synergy with the provisions of mission 1 on digitization.

A similar efficiency and safety measure is also envisaged for private buildings, through a robust and targeted incentive scheme. In this case, as well as for public buildings, Italy is characterized by an antiquated housing stock and with energy standards below the European average.

- **Climate changes.** Environmental sustainability and the fight against climate change are the central challenges of the European Union. The ambitious goal of achieving "climate neutrality" in EU countries by 2050 is also pursued through a strategy that aims to improve the energy efficiency of buildings, given that the building stock is the largest energy consumer in Europe (40% of consumption) and responsible for 36% of greenhouse gas emissions. Therefore, a process of redevelopment of existing buildings helps to achieve significant energy savings, especially in Italy where the real estate portfolio has structural characteristics that are examined and detailed below. In the broader appreciation of the potential of real estate efficiency, the same EU measures provide an exemplary role for public buildings, establishing in the Directive 2012/27/EU on energy efficiency that, from January 1st, 2014, the 3% of the total covered usable area of the heated and/or cooled buildings owned by the central government and occupied by it, must be renovated/upgraded every year to meet at least the minimum energy performance requirements.
- **Age of the building heritage.** In Italy, as highlighted in the National Plan for Energy and Climate, buildings for residential use amount to about 12 million with almost 32 million homes. More than 60% of this building stock is over 45 years old, that is, it is prior to Law 373/1976¹⁶, first law on energy saving¹⁷. This partly explains the high number of properties in the worst energy classes. In fact, 51% of residential buildings and 39% of non-residential buildings are characterized by poor energy performance, in energy class F and G (Energy Performance Certificate)¹⁸. It follows that the same buildings are unprepared to protect occupants from high temperatures and more frequent natural hazards, in changing climatic conditions, taking into account that about 37% of the total surface of non-residential buildings (schools, offices, shopping centers, hotels) is located in climatic zone E¹⁹ and in

¹⁶PNIEC - National Plan for Energy and Climate.

¹⁷Of these buildings, over 25% record annual consumption from a minimum of 160 kWh/m² year to over 220 kWh m² (PNIEC).

¹⁸Enea (2020) WEEE - Annual Energy Efficiency Report.

¹⁹Presidential Decree 412/1993 divides the Italian municipalities into 6 winter zones, based on degree days, on which the legislative, construction and energy requirements of the building and the operating methods of the systems depend. The Italian climatic zones share similar average temperatures during the various seasons. The climatic zones are therefore areas of the Italian territory that theoretically have the same climate, for which it is, therefore, possible to imagine the same or similar conditions. They have been defined so as to be able to establish the daily duration and the periods of ignition of

general almost 70% in temperate or cold areas.

- **Need for investment.** Italy intends to pursue a reduction in consumption by 2030 equal to 43% of primary energy and 39.7% of final energy compared to the PRIMES 2007 reference scenario²⁰. As regards the absolute level of energy consumption by 2030, Italy aims to reach a target of 125.1 Mtoe of primary energy and 103.8 Mtoe of final energy, starting from the estimated consumption in 2020. To this end, provides for a minimum final consumption reduction target of 0.8% per year in the period 2021-2030, calculated on the basis of the 2016-2018 three-year period. According to the PNIEC estimates, the achievement of the further national decarbonisation objectives, of a reduction in the non-ETS sectors equal to -33% compared to 2005 levels, require a significant commitment in terms of incremental investments.
- **High initial costs:** The investment required to significantly improve energy performance by carrying out a "deep renovation" of buildings (with an improvement of at least 60% in energy efficiency)²¹ often requires high upfront costs compared to gradual savings on long-term energy costs, so finding suitable financing solutions is challenging. The difficulty of finding internally the financial resources necessary to carry out energy efficiency interventions or even just to carry out the necessary planning activities (energy audit, business plan) preparatory to the implementation of the interventions themselves, is the first "block" to overcome.

b) Objectives

The component consists of two lines. The first concerns the implementation of a program to improve the efficiency and safety of the public building heritage, with reference to schools, public housing, municipalities and judicial citadels. The second provides for the introduction of a temporary incentive for energy redevelopment and anti-seismic adaptation of private real estate, through a tax deduction equal to 110% of the costs incurred for the interventions.

The component is in line with the country-specific recommendations for Italy for 2020 (CSR-3), which suggest concentrating investments and investment policies on energy efficiency. Italy is on track to reach its climate and energy targets for 2020, but further efforts are needed to reach the targets for 2030. Italy has decided to bring the share of renewable energy to 30% of final consumption gross national energy consumption in 2030 and to reduce energy consumption by 9.3 Mtoe/year until 2030²². The construction

the thermal systems (heating) in order to contain energy consumption. The climatic zones (also called climatic bands) are identified on the basis of the degree days and are six (from A to F);

²⁰The benchmarks may change with the PNIEC update.

²¹On the basis of primary energy savings, the European Observatory of the building stock has identified the following levels of renovation: light (less than 30%), medium (between 30% and 60%) and deep (over 60%). More generally, to be considered 'profound' a restructuring would have to generate efficiency in terms of both energy and greenhouse gas emissions.

²²The PNIEC identifies an indicative breakdown of the various sectoral contributions to the overall ob-

sector plays a central role in achieving these goals. While the share of SMEs adopting energy efficiency measures in 2017 is slightly higher in Italy than in the EU as a whole, the residential sector is responsible for over a third of total energy consumption. In fact, most of the 14.5 million Italian buildings were built before the adoption of the criteria for energy saving and the corresponding legislation, suggesting the opportunity of a widespread diffusion also of prevention interventions, in consideration of the exposure to the seismic risk of our country.

In light of these considerations, all the investments of the component aim to directly support the interventions in energy efficiency, thus taking into account the CSR-3 of 2020.

The component also supports the European flagship project "Renovate" (COM (2020) 575), improving the energy efficiency of public and private buildings and contributing to the doubling of the renovation rate and the promotion of deep renovations by 2025.

The investment objectives of this component are threefold.

Twin transition:

Green transition. The buildings are responsible for the X% of energy consumption in 2019. The set of interventions proposed has the potential to reduce energy consumption by X ktoe per year, increase the annual energy efficiency of X% compared to a normal scenario and reduce greenhouse gas emissions by X tCO₂ per year in the period 2021-2026. Thanks to the hoped-for acceleration of the interventions to improve the efficiency of existing buildings and deep renovation with the application of performing technologies, all the investments of the component contribute to the reduction of 26 MtCO₂eq of emissions in the civil sector by 2025 (PNIEC objective). Furthermore, this component reinforces the achievement of the envisaged objective of increasing energy efficiency on the building stock of the central public administration equal to at least 3% per year of the useful covered area (Article 5 of Directive 2012/27/EU). Finally, the initiatives intend to increase the national percentage of nZEB (Nearly Zero Energy Building - buildings whose energy consumption is almost zero)²³ compared to the stock of existing buildings,

jective of reducing energy consumption of 9.3 Mtoe/year, highlighting in the civil sector a reduction of 5.7 Mtoe in energy consumption by 2030, to which they contribute in particular 3.3 Mtoe reduction in the residential sector and 2.4 Mtoe in the tertiary sector. The industrial sector would achieve a reduction in consumption of approximately 1.0 Mtoe. While the transport sector, thanks to interventions to shift private passenger mobility towards collective mobility and/or smart mobility, road-to-rail freight transport and vehicle efficiency, manages to contribute to the gap between the two scenarios by 2030 for about 2.6 Mtoe. These parameters may undergo changes following updates of the PNIEC.

²³The definition of NZEB is contained in the European Directive 2010/31/EU on the energy performance of buildings (art.2): “*building with very high energy performance, determined in accordance with Annex I. The very low or almost zero energy requirement should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on site or nearby*”. The Directive was implemented with the Decree-Law of 4 June 2013 n. 63, converted with amendments

which in 2019 are less than 0.03% on a regional basis, while, less than 10% of the total nZEB are existing buildings that have been redeveloped to achieve this standard (mainly small single or two-family buildings and schools)²⁴.

Including X% of climate spending (see Table 1), this component contributes to the goal of dedicating at least 37% of spending to climate goals, while respecting a just and sustainable transition.

Further benefits are expected from the extension of the useful life of the properties, such as resilience to climate change and environmental disasters, by profoundly renovating housing and the building stock with a long-term perspective. Part of this component is also the replacement of heating systems, based on fossil fuels, which contribute to excessive air pollution, with cleaner alternatives powered by renewable energy.

The application of green public procurement through this component will increase the demand for more sustainable buildings and provide a stimulus for eco-innovation.

Jobs and Growth:

Work and growth. Creating jobs, stimulating local investments and their positive spillover effects on the local economy, promoting the adoption of digital technologies and the integration of renewable energies. In general, building efficiency processes have shown to have wide repercussions in environmental, economic and employment terms, due to the plurality and breadth of economic activities that they feed - specialized audit services, installation and maintenance, diagnosis and ICT, standard products high - thus contributing jointly to economic growth, as well as to the reduction of energy consumption and polluting emissions. A multiplier of the positive effects induced by efficiency actions, in terms of income production and employment, is the improvement of the knowledge and skills of workers and service providers as well as the potential creation of a pool of new employment and development of new qualified professions, both at higher level and at university and post-university level.

Social resilience:

By increasing the rate of deep energy renovation of existing buildings, including public buildings and national residential buildings, including social housing, it is possible to achieve substantial savings for the public budget. Furthermore, the reduction of energy bills mitigates the risks of energy poverty, particularly in the poorest performing buildings occupied by low-income and vulnerable families, while improving living conditions, enhancing thermal comfort, removing harmful substances. (e.g. asbestos, old lead

by Law 3 August 2013, n. 90 (in GU 03/08/2013, n. 181).

²⁴In Italy, the number of nZEB buildings in 2018 amounted to approximately 1,400 buildings, mostly of new construction (90%) and residential use (85%), as indicated by the nZEB Observatory - ENEA, Costanzo E., Basili R., Hugony F., Miscio M., Pallottelli R., Zanghirella F., Labia N., 2019. Observatory of nearly zero energy buildings (nZEB) in Italy 2016-2018.

pipes), improving facilities, ensuring that redeveloped housing units remain affordable for low-income families.

c) National strategic context

In general, in line with the national strategic objectives (PNIEC) and in the broader European regulatory and policy framework (Clean energy package) there is the potential to significantly reduce energy consumption in the building sector, through a huge program of interventions of redevelopment aimed at improving energy efficiency, capable of making a significant contribution to achieving climate neutrality by 2050.

3. Description of the reforms and investments of the component

1) Energy efficiency program for public buildings.

Investment 1.1: Structural rehabilitation of school buildings - School building security and energy upgrading plan

Challenges: The average age of the school structures clearly shows the need for a major requalification plan, in the awareness that the need to guarantee the quality of teaching also passes through the requalification and innovation of the learning environments, as also highlighted in the "2019 School Building Report" of the Agnelli Foundation. Starting from the data from the School Building Registry of the Ministry of Education, the Report deepened the analysis of 39,000 active buildings (about 150 million square meters), highlighting that school buildings in Italy have an average age of 52 years with strong regional heterogeneity, and that two out of three date back to more than 40 years ago. Considering that many of them are no longer adequate from the point of view of safety and sustainability and that most of them are still lacking also from the point of view of energy efficiency (only 38% of these buildings are equipped with double glazing, just 12% have external wall insulation and just over 25% are equipped with photovoltaic panels), the investment focuses mainly on the renovation, safety and energy requalification of these buildings, as well as the digitisation of learning environments through the internal wiring of schools.

Objectives: The goal is to create an energy efficiency program, seismic adaptation and safety of part of the school buildings, including digitization of the learning environments through the internal wiring of the schools, in such a way as to favor a progressive reduction of energy consumption and climate-altering emissions, an improvement in energy classes, an increase in the seismic safety of buildings and the digitization of learning environments. In addition, the program will promote participatory planning, involving the subjects who live in these places every day (teachers, students and the school community), the development of the territory and the enhancement of services to the community, the employment effects on companies in the sector.

The rate of renovation of the surface of the school buildings that is intended to be carried

out is equal to 20% of existing assets, thus reaching the share of 50% overall, considering the starting situation equal to 30% of buildings already efficient and safe. The proposed redevelopment plan is part of the reform of the school building reorganization, started with the establishment in 2012 in the budget of the Ministry of Education of the Single Fund for school building, and continued with the definition of three-year programs on the basis of annual plans drawn up by the regions. Up to now, investments of over 8 billion euros have been favored with the implementation of over 14,000 interventions.

The proposed redevelopment plan aims to renovate an area of X sqm of school buildings. The building renovations undertaken will result in a reduction in energy consumption (toe) of at least X%, passing from X toe to X toe, with an increase of X m³ surface area of schools with increased energy qualification by 2026.

The energy savings achieved will reduce annual greenhouse gas emissions by X tCO₂ and it will have significant positive social implications by improving learning conditions in schools.

Implementation: The program manager is the Ministry of Education, which is responsible for authorizing, monitoring and reporting on the interventions. The implementation of the interventions and works is the responsibility of the local authorities (Municipalities and Provinces) owners of public buildings used for school use which are also responsible for implementing the monitoring data on the information system. The Ministry of Education, in consideration of the investments in progress, has already defined a monitoring and reporting information system (GPU) on the model of those used for the reporting of European structural funds. In addition, the system also records the pre and post operam project indicators and is connected with the National Registry of the school buildings and with other national databases (eg BDU, BDAP). For the purposes of reporting and monitoring the works, on-site checks are also envisaged through the use of the school building task forces of the Agency for territorial cohesion.

Timeline: The implementation time is expected to start in 2021 and will last until 2026.

Investment 1.2: Construction of new schools through building replacement - School building replacement and energy upgrading plan

Challenges: The low energy performance, linked to the age of the school building heritage, where they cannot be adequately improved with a redevelopment of existing buildings (e.g.: buildings with a very high average age or in the case that the cost of demolition is demonstrated compared to that of the improvement), can be effectively addressed with a plan for the construction of new schools through a progressive building replacement, especially in areas at greatest seismic risk, to ensure that safe, comfortable and innovative environments are available, also in consideration of the need for support teaching based on new methodologies.

Objectives: The objectives of the program concern the progressive building replacement of a part of the old and not very innovative school patrimony; the construction of new modern, welcoming, innovative and sustainable structures from an environmental and energy point of view, in such a way as to favor the reduction of consumption and polluting emissions, the increase in the seismic safety of buildings and green areas and the digitization of learning environments through the internal wiring of schools; the participatory planning of learning environments, involving the subjects who live in these places every day (teachers, students and the school community), in such a way as to positively affect the teaching and learning of students; the development of the territory and the enhancement of services to the community;

The building replacement plan aims to intervene on n. x school buildings (x% compared to existing assets), equal to an area of x sqm.

The actions undertaken will lead to a reduction in energy consumption (toe) of at least xx%, passing from x toe to x toe, with an increase in energetically redeveloped surface equal to x m³ by 2026.

The energy savings achieved will reduce annual greenhouse gas emissions by x tCO₂ and it will have significant positive social implications by improving learning conditions in schools.

Implementation: The program manager is the Ministry of Education, within the terms and in the manner indicated in the previous section, relating to the implementation of the investment 1.1.

Timeline: The implementation time is expected to start in 2021 and will last until 2026-

Investment 1.3: "Safe, green and social" for public housing

Challenges: Home represents a fundamental element for consolidating and relaunching welfare measures, especially in a moment of extreme social exposure. To face the challenge of resilience towards seismic, environmental and social risk, a public housing program will be established aimed at creating, through redevelopment interventions, seismically safer homes and at the same time reducing their polluting emissions.

Objectives: The objective of the program is to support energy efficiency, seismic improvement and the reduction of management costs of the housing stock of national public housing. Overall, for energy efficiency it is estimated to intervene on approximately 10,200,000 m², representing 1/5 of the entire surface of the public residential building stock in Italy; for the seismic improvement it is estimated to intervene on about 1/5 of the value indicated above, about 2,000,000 m², starting from the assumption that almost half of the national territory falls into categories 1 and 2 of seismic classification, mostly areas with a low population density thus not including the large metropolitan areas,

where most of the public residential buildings are located.

The expected results aim to ease the transition of energy class from class G (buildings with the worst performance) to class E and the seismic improvement of the entire surface subject to intervention. A reduction in consumption of at least xx%, with a variation from x toe per year post investments.

The savings achieved through building renovation will reduce annual greenhouse gas emissions by x tCO₂ and will have significant positive social implications by improving housing conditions and promoting, where appropriate, the participation of residents of social housing units.

Implementation: The reference for coordinating the project is the Presidency of the Council of Ministers - Home Italy Department. The intervention priority will be given to the buildings with the worst performances (those with an EPC class F and lower).

The control room, set up at the Casa Italia Department, with the participation of the Ministries directly concerned (MEF and MIT) and the Regions, has general guidance and liaison tasks. The Casa Italia Department and the Regions ensure, on an operational level, monitoring during construction, to be carried out with an intense presence / reminder action on the territory and at the implementing bodies, aimed at identifying specific critical issues and promptly implementation of effective and practicable operational solutions.

During the operational phase, a control task force will be set up with the presence of ANAC, CdC, GdF, for the execution of anticipated control activities.

Timeline: The implementation time is expected to start in 2021 and last until 2025.

Investment 1.4: Energy efficiency and redevelopment of public buildings in metropolitan areas

- Projects being defined with ANCI, which concern the redevelopment of municipal-owned buildings for social uses. -

Investment 1.5: Improvement of judicial citadels

Challenges: To increase the resilience of the judicial system - linked to the issues of energy efficiency / anti-seismic consolidation of buildings - and fill the lack of functional spaces essential for making judicial activity efficient and effective, a program is proposed for the implementation and efficiency of the so-called "Judicial citadels". The interventions for the construction of the citadels have the objective of generating a concrete and visible improvement of the services provided to citizens, as well as strengthening the presence of the State and democratic institutions in urban contexts often burdened by

conditions of economic and social hardship.

Objectives: The program aims at redeveloping and enhance the real estate assets of the administration of justice in an ecological and digital manner. Among the primary objectives there is also the reduction of urban land consumption, combining into unitary buildings both the main functions and the services attached to each judicial office. Almost all the projects will insist on the existing heritage and therefore on maintenance, allowing the protection, enhancement and recovery of the historical heritage that often hosts the offices of the Administration, redeveloping the existing ones, rationalizing consumption and ensuring the economic, environmental and social sustainability of the interventions through the use of sustainable materials and renewable energy.

The milestones are the identification of the contracting parties and the relative stipulation of contracts. They measure the completion of all the preparatory phases for the operational start-up of the activities. As a time horizon, the achievement of this intermediate step is set at the fourth quarter 2023, due to the complexity of the interventions to be carried out. The specific target of the program is estimated in at least 40 buildings to be redeveloped, including the construction of the judicial citadels.

Implementation: The program manager is the Ministry of Justice. The implementation of the investment proposal envisages the following macro activities: signing of the memorandum of understanding between the various administrations involved in which objectives, responsibilities and roles are established; design of the work, which includes, in addition to a series of preliminary investigations (geological, structural), three levels of subsequent technical investigations (technical and economic feasibility project, final project and executive project), the final result of which is the drafting of the executive project; assignment of the execution of the work, in which the tender notice will be published for the assignment of the construction works of the citadel and has as its objective the selection of the person who will carry out the work, concluding with the signing of the contract; execution of the work, which is the construction phase of the judicial citadel and begins with the delivery of the works and ends with the issue of the certificate of completion of the works; the technical-administrative testing, in which a third party is responsible for certifying that the object of the contract, in terms of performance, objectives and technical-economic and qualitative characteristics, has been carried out and performed in compliance with the provisions and contractual agreements, and ends with the issue of the test certificate.

Timeline: The implementation time is expected to start in 2021 and will last until 2026.

2) Energy and seismic efficiency program for private and public residential buildings.

Investment 2.1: Extension of the superbonus to 110% for energy efficiency and building safety

Challenges: In order to face the challenge of the high initial costs of the renovation of buildings and the long payback periods, it is intended to extend the recently introduced 110% Superbonus measure (Article 119 of the Relaunch Decree)²⁵ to finance the energy and seismic requalification of residential buildings. The support will be provided in the form of a tax deduction, available for those who intend to carry out renovations / energy requalification of the building, such as those of thermal insulation of building envelopes, replacement of winter air conditioning systems and reduction of the seismic risk of buildings, as well as the installation of solar photovoltaic systems and infrastructures for charging electric vehicles. This tool is aimed at stimulating local economies and recreating lost jobs, both along the entire construction chain and in the production of goods and services for housing, as well as for the weakest categories most affected by the pandemic.

Objectives: The benefit is for expenses incurred for interventions carried out on common parts of buildings, on functionally independent real estate units and with one or more independent accesses from the outside, located inside multi-family buildings as well as on individual real estate units. The objective of the initiative is to extend the Superbonus measure, from the current 2021 until 2023, which finances energy redevelopment and seismic risk reduction works of national residential buildings at no cost, thanks to the operating mechanism of the subsidy, which raises the deduction rate for expenses incurred to 110%. The extension of the measure aims to triple the positive effect - in terms of annual energy savings generated by the energy requalification interventions - stimulated by the normal Ecobonus, shifting to deep redevelopment interventions. The eligibility of the interventions is conditioned by the improvement of at least two energy classes of the building or of the real estate units located inside multi-family buildings or, if this is not possible, the achievement of the highest energy class before and after the intervention, to be demonstrated through the certificate of energy performance (APE). Two categories of intervention are admitted to deductions of 110%: the "driving interventions" the achievement of the highest energy class, to be demonstrated through the energy performance certificate (APE), before and after the intervention. Two categories of intervention are admitted to deductions of 110%: the "driving interventions"²⁶ and the "driven interventions", the latter are admissible on condition that they are carried out jointly with at least one of the driving interventions. The objective is equal to 3 million square meters redeveloped per year, corresponding to approx 1% of the total area occupied by residential buildings.

Furthermore, the expected results aim to triple the annual savings generated by the

²⁵The measure was introduced in the "Relaunch" emergency package, formally converted into law on 18 July 2020, with the aim of contributing to the relaunch of the Italian economy in response to the COVID-19 crisis.

²⁶The driving interventions concern the building envelope, requiring an external insulating coating for an area of at least 25% of the building and the systems.

Ecobonus, quantified in 0.3 Mtoe of additional annual savings from new interventions, starting from a baseline of current level of energy savings generated by the Ecobonus equal to 0.1 Mtoe of additional annual savings from new interventions.

The milestone identified is the approval of the extension rule of the Superbonus measure for interventions carried out until 31 December 2023.

Implementation: The body in charge of the tool is the Ministry of Economic Development and tax bodies (Revenue Agency). The implementation procedures envisage a tax deduction of 110%, to be divided among the entitled parties in 5 annual installments of the same amount, within the limits of the capacity of the annual tax deriving from the tax return. In order to ease the generalized use of the measure, the facilitation mechanism provides for the possibility, instead of the direct use of the deduction, to opt for an advance contribution in the form of a discount from the suppliers of the goods or services or, alternatively, for the assignment of the credit corresponding to the deduction due.

In addition to the formalities ordinarily provided for tax deductions, for the purposes of using the incentive, the taxpayer must also acquire the approval of the documentation certifying the existence of the conditions that give the right to the tax deduction, including sworn certification technique relating to energy efficiency and seismic risk reduction interventions by qualified technicians and the attestation of the adequacy of the expenses incurred in relation to the subsidized interventions based on specific cost tables.

The mechanisms activated for some time for the Ecobonus, the Sismabonus and the Superbonus will be used for the monitoring and verification of the targets.

Target population: Condominiums, Individuals, outside the exercise of business activities, arts and professions, owners of the property object of the intervention, autonomous public housing institutes (IACP) or other institutions that meet the requirements of European legislation on "in house providing", undivided housing cooperatives, non-profit organizations and voluntary associations, amateur sports associations and clubs.

Timeline: The implementation time is expected to be in the fourth quarter of 2023 (December 31, 2023) (see Table 2 for details). Specifically, the measure applies to expenses incurred up to 30 June 2022 and up to 31 December 2022 for IACPs. It can be applied for a further six months in the cases of works carried out by condominiums and IACP when at least 60% of the works have been carried out before the expiry date of the measure. In order to give more time for more complex interventions, it is planned to extend the application of measure (i) for the IACP to 30 June 2023, extended by a further six months when at least 60% of the works have been carried out; and (ii) for condominiums up to 31 December 2022, regardless of the completion of at least 60% of the works.

4. Green and digital dimensions of the component

a) Green Transition:

Construction as a whole - housing, workplaces, schools or other public buildings - is the largest consumer of energy in the EU and a major contributor to carbon dioxide emissions. Overall, buildings in the EU are responsible for 40% of energy consumption and 36% of greenhouse gas emissions, mainly due to construction, use, renovation and demolition.

In Italy, as highlighted in the National Energy and Climate Plan, over 60% of the buildings for residential use were built prior to Law 373/1976, the first law on energy saving, and of these buildings, in addition to 25% recorded annual consumption from a minimum of 160 kWh/m² year to over 220 kWh/m². For national non-residential buildings - schools, offices, shopping centers, hotels, hospitals - the PNIEC reports the estimated average consumption for the different uses and climatic zones, highlighting, among other things, the most energy-intensive buildings, such as for example hospitals, with average electricity consumption of 303 kWh/m² and thermal consumption of 342 kWh/m².

Buildings, responsible for greenhouse gas emissions due to significant energy consumption, must therefore become more resilient as they are particularly vulnerable to the impacts of climate change. In line with EU guidelines, the achievement of ambitious emission reduction targets - up to climate neutrality by 2050 - significantly contributes to the construction of energy-efficient, sustainable buildings equipped with key enabling technologies (for example, advanced and sustainable building materials, digital interconnections). Building renovations improve energy performance and increase the use of renewable energy (for example, using solar photovoltaic systems, heat pumps),

Therefore, including the X% of climate expenditure (see Table 1 below), this component contributes significantly to the 37% target set by this regulation (proposal). The component also contributes to wider environmental objectives with an environmental expenditure equal to X% (see Table 1 below).

In addition, all investments foreseen in the component contribute to the green transition, taking into account the climate and environmental objectives defined in Regulation (EU) 2020/852 (Taxonomy Regulation) and the mitigation of climate change. The investments, in fact, concern the construction and renovation of energy and resource efficient buildings, with particular attention to environmental sustainability, as well as to technological innovation with a view to economic resilience.

b) Digital Transition:

- in progress ... -

See Table 1 work in progress

5. Milestones, targets and timeline

See Table 2 work in progress

6. Financing and costs

See Table 2 work in progress

Cost estimation method

Investment 1: Structural rehabilitation of school buildings - School building security and energy upgrading plan

Costs defined on the basis of national three-year programs and annual plans drawn up by the Regions. three-year programming of the Ministry of Education.

Investment 2: Construction of new schools through building replacement - School building replacement and energy upgrading plan

Costs defined on the basis of national three-year programs and annual plans drawn up by the Regions. three-year programming of the Ministry of Education.

Investment 3: "Safe, green and social" for public housing

For the housing stock of public residential buildings, the method of estimating costs for energy efficiency interventions took into account the implementation of a typical intervention that ensures a passage of energy class from class G to class E (e.g. : 1970s building , centralized system, light fixture, with more than 30 real estate units). Data provided by Federcasa and a medium-sized Aler were taken as a reference: the average costs of an energy efficiency intervention with a double class jump amounted to € 127 per sqm.

For seismic safety, on the other hand, reference was made to the average costs for interventions on the residential building heritage sustained during the 2009 earthquake emergency in L'Aquila and the White Paper for the reconstruction of the territories hit by the earthquake of 6 April 2009. In this document the costs of repairs on damaged buildings are compared with the costs that would be incurred on intact buildings; estimating an average cost on intact buildings of 350 € per sqm.

Investment 4: Energy efficiency and redevelopment of public buildings in metropolitan areas

[to be defined...]

Investment 5: Efficiency of judicial towns

[to be defined ...]

Investment 6: Extension of the super bonus to 110% for energy efficiency and building safety

The estimates were made taking into account the average costs for the energy and seismic upgrading of buildings recorded by the Ecobonus and Sismabonus incentive measures already in place for years, as well as the energy savings obtained from the application of the eco-bonus.

4 M2C4 - Protection of land and water resources

1. Description of the component

Summary box

Policy area: Protection of the territory and of the water resource, fight against hydrogeological instability, sustainable irrigation and reforestation

Objectives: The safety of the territory, intended as the availability of water resources, the elimination of soil and water pollution and the mitigation of hydrogeological risk, is a fundamental aspect for protecting the health of citizens and for attracting businesses, investors and tourism.

The objectives of this component are:

(i) Prevent and contrast the effects of climate change on hydrogeological instability phenomena and on the vulnerability of the territory in urban areas;

(ii) Guarantee the security of water supply for drinking, irrigation and industrial purposes and the reduction of water dispersions;

(iii) Ensure the sustainable management of water resources along the entire cycle and the improvement of the environmental quality of inland and maritime waters.

Twin transition: This component contributes significantly to the green transition by promoting a more efficient and sustainable use of water resources and by preventing actions against the risks associated with climate change. Great attention is also paid to the digitalisation of processes, with particular reference to the digital management of water resources and the efficiency of the networks, to be transformed into a “smart network”.

Jobs and growth: The fragility of the Italian territory and the stress on water resources in terms of both quantity and quality are critical issues that determine a structural economic weakness. The safety of the territory and the efficient and sustainable use of natural resources are therefore preparatory elements for the socio-economic development of the country.

The investments related to this component will contribute to creating and maintaining a significant number of jobs and to both local and national economic growth. The prevention of hydrogeological instabilities and an efficient integrated water service are necessary conditions for the health and quality of lives of citizens, for the establishment and maintenance of productive activities in the territories, and for the attraction of tourism. Furthermore, many of the proposed interventions, especially those of a structural nature, involve the opening of construction sites that generate jobs.

Social resilience: The measures envisaged by this Action will contribute to increase investments in the management of water resources in the South, in order to reduce the Water Service Divide of the South compared to the Center - North of the country. The internal areas of the country will be interested by investment priorities, in particular those related to the irrigation sector.

Reforms and investments:

Outcome 1: Prevent and combat the effects of climate change on hydrogeological instability phenomena and on the vulnerability of the territory in urban areas.

Reform 1.1: Simplification and acceleration of the procedures for implementing interventions against hydrogeological instability;

Investment 1.1: Structural and non-structural interventions for flood risk management and hydrogeological risk reduction (including innovation and digitization of territorial monitoring networks);

Investment 1.2: Urban Forestry;

Investment 1.3: Interventions for the resilience, the enhancement of the territory and the energy efficiency of the Municipalities;

Outcome 2: Guarantee the security of water supply for drinking, irrigation and industrial purposes and the reduction of water dispersion.

Reform 2.1: Simplification of legislation and strengthening of Governance for the implementation of investments in the water supply infrastructure;

Reform 2.2: Revision and strengthening of the governance model of reclamation consortia;

Investment 2.1: Investments in primary water infrastructures for the security of water supply1;

Investment 2.2: Investments in the resilience of the irrigation agro-system for a better management of water resources (including digitalization and technological innovation of distribution networks);

Outcome 3 Ensure the sustainable management of water resources along the entire cycle and the improvement of the environmental quality of inland and maritime waters;

Reform 3.1: Measures for the full implementation of the assignments for the Integrated Water Service;

Investment 3.1: Investments aimed at reducing losses in water distribution networks, including digitization and monitoring of networks;

Investment 3.2: Investments in sewerage and wastewater treatment;

Investment 3.3: Interventions in port areas to fill the deficit of facilities for the management of waste collected at sea.

Estimated costs:

EUR 14,830 million to be covered by RRF

M2C4 - Protection of land and water resources

	Resources (euro/mld)				
	Existing	New	Total	REACT-EU	TOTAL NGEU
	(a)	(b)	(c) = (a)+(b)	(d)	(e) = (c) + (d)
1. Measures to counter hydrogeological risks	3.36	0.25	3.61	-	3.61
2. Urban forestry	0.03	0.30	0.33	0.20	0.53
3. Sustainable forestry management and rural land maintenance (*)	-	-	-	-	-
4. Sustainable management of integrated water services	1.46	2.92	4.38	-	4.38
- <i>Primary water infrastructure for the security of water supply</i>	<i>1.46</i>	<i>0.90</i>	<i>2.36</i>	-	<i>2.36</i>
- <i>Resilience of the irrigation agro-ecosystem</i>	-	<i>0.52</i>	<i>0.52</i>	-	<i>0.52</i>
- <i>Measures to reduce losses in water distribution networks, including their digitalization and monitoring</i>	-	<i>0.90</i>	<i>0.90</i>	-	<i>0.90</i>
- <i>Sewerage and wastewater treatment</i>	-	<i>0.60</i>	<i>0.60</i>	-	<i>0.60</i>
5. Resilience, safety and energy efficiency of the municipalities	6.00	-	6.00	-	6.00
6. Port area facilities for the management of waste collected in the sea	-	0.50	0.50	-	0.50
TOTAL	10.85	3.97	14.83	0.20	15.03

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

2. Main challenges and objectives

a) Main challenges ²⁷

Significant negative impact of hydrogeological instability on the population and on the economic and productive fabric of Italy

- According to the data collected by the Higher Institute for Environmental Protection and Research (ISPRA) and reported in the Report on hydrogeological instability in Italy (2018 edition), 7,275 municipalities (91% of the total) are at risk from landslides and / or floods; 16.6% of the national territory is classified as more dangerous; 1.28 million inhabitants are at risk of landslides and over 6 million inhabitants at risk of floods. Only with reference to the landslide phenomenon, the main events (those that caused deaths, injuries, evacuees and damage to buildings, cultural heritage and infrastructures) are a few hundred a year and constantly increasing: 70 events in 2011, 85 in 2012 , 112 in 2013, 211 in 2014, 311 in 2015, 146

²⁷The data on the Integrated Water Service cited in this section come largely from the paper Acqua N.144: "Development of the South. Let's start from water" by REF Ricerche, February 2020.

in 2016, and 172 events in 2017.

- The costs for the restoration of damages and the reconstruction of the territories affected by emergency events are huge: in 2018 alone, with the Legislative Decree 119/2018 (tax decree) and the law 145/2018 (budget 2019), more than EUR were allocated 3.1 billion for the mitigation of hydrogeological risk in areas where disasters had occurred and a state of emergency had been declared.

Delays in the implementation of hydrogeological risk reduction projects

- The project selection procedure and the method of transferring financial resources is complex and lengthy, and the assignments by tender, often conducted by small local authorities, has led to delays in the time required to carry out the works. In addition, only a limited number of projects could be set up, and the establishment of planning funds has only partially overcome this problem.
- With the identification of the extraordinary commissioners for hydrogeological instability an improvement has begun in the overall spending capacity. However, since they have not been equipped with adequate technical support structures, to perform the contracting authority functions and sometimes their monitoring / approval functions, the Commissioners rely on local authorities, whose weakness constitutes a bottleneck in the procedures.

Fragmented and inefficient management of water resources, characterised by high losses

- Lack of strong public governance at the basin level to ensure integrated management of water resources - for civil, irrigation and industrial use - and lack of solid wholesale managers from a technical and financial point of view.
- Fragmentation of the managers in the Integrated Water Service (they are 290, more than 3 for the Optimal Territorial Area) and poor effectiveness and industrial capacity of the implementing subjects in the water sector in the South.
- Insufficient planning capacity of the reclamation Consortia, especially in the southern regions. Need to improve their governance to ease the implementation of investments to intercept the needs of the agricultural sector.
- High level of water resource losses: in distribution for civil uses the average loss is 41% (51% in the South) and it causes rationing in periods of drought. Even in irrigation use, the losses are very high and the margins for improving efficiency are significant. “Intelligent” extraordinary maintenance is therefore required, using digital tools and pressure regulation in order to efficiently reduce leaks.

Sewerage and purification not in line with European Directives, especially in the South

- 987 infringement procedures have been opened by the EU against Italy, most of which concern purification and water quality. They are concentrated in Sicily (255 cases), Calabria (190), Campania (104), as well as in Lombardy (147 cases).²⁸

²⁸Since May 2018, Italy has been ordered to pay 30 million euros for each six-month delay in bringing

- There are delays in spending the funds available for the Integrated Water Service (SII) in the South. The data from the Department for Cohesion Policies and the Agency for Territorial Cohesion show that funds and contributions (from the EU) are available for the Integrated Water Service - ESI - and national - FSC funds), but that the spending capacity is rather limited²⁹. Currently, around EUR 4 per capita per year vs. EUR 40 per capita per year nationwide.

Lack of digital, smart and organic management, of information and monitoring systems

- In order to improve the effectiveness and efficiency of investments in water infrastructures and in the protection of the territory against hydrogeological risk, it is necessary to have monitoring systems in the following fields: (i) monitoring of the territory, to favour the full integration of the information collected and data processing to support intervention decisions in critical areas; (ii) monitoring of water networks to detect malfunctions and reduce waste; (iii) monitoring of water infrastructures for the prediction of their useful life and the planning / verification of maintenance interventions.

b) Objectives

1) *Prevent and contrast the effects of climate change on hydrogeological instability phenomena and on the vulnerability of the territory of urban areas.*

- Mitigate the risks related to hydrogeological instability by combining structural and non-structural measures, in order to reduce the damage caused by the increasingly frequent extreme weather events, poor widespread forest management, as well as the lack of maintenance of forest hydraulics systems in mountain and hilly areas.
- Invest in the creation of territorial monitoring systems to have a valid database, aimed at a more effective planning of interventions and risk prevention.
- Increase the resilience of territories in urban areas through interventions aimed at reducing their vulnerability to the negative effects of climate change; through preventive and mitigation actions aimed at favoring the enhancement and sustainable development of the territory.

2) *Ensure the security of water supply for drinking, irrigation and industrial purposes and a reduction in water dispersion*

into compliance with the law the over 70 agglomerations with more than 15,000 equivalent inhabitants that lack adequate sewerage systems and purifiers.

²⁹For the 2007-2013 and 2014-2020 programming cycles, the total amount of public resources available is € 10.3 billion. Of these, about 83% should go to the territories of the South and the Islands, 12% to the North and 3% to Central Italy. The area of the South and the Islands is experiencing significant delays: the rate of completion of the interventions in July 2019 was "only" at 18%, for an amount of 760 million euros of expenditure, while 22% of the projects, corresponding to 1,464 million euros in loans, had not yet started.

- Improve the security of water supply by planning extraordinary maintenance, upgrading and completing water supply systems (dams, reservoirs, diversions and supply networks), including through monitoring and control systems to identifying the main vulnerabilities. Primary water infrastructures for civil, agricultural, industrial and environmental uses must be made efficient and resilient, with a view to adapting to climate change and ensure the overcoming of increasingly frequent water crises and of "emergency" policies.
- Increase the efficiency and resilience of the irrigation agro-ecosystem to extreme climatic events, such as instability and drought, by investing both in infrastructural interventions and in monitoring of usages (through the digitization and technological innovation of networks), for more sustainable management of water resources and a reduction of losses.

3) *Ensure the sustainable management of water resources along the entire cycle and the improvement of the environmental quality of inland and maritime waters.*

- Obtain a significant reduction in the dispersion of water in the distribution networks, also with the aid of new technologies, to favor the complete transformation of the water networks into a "smart network" and increase the resilience of systems to climate change.
- Achieve a higher quality of inland and maritime waters through investments in purification and wastewater treatment plants, which have beneficial effects on public health and the environment and allow for a reduction in infringements of EU directives;;
- Contribute to overcoming the water service divide between the South and the Center-North of the country, giving a concrete impetus to the begin an industrial management in areas of the country where the integrated service has not yet been entrusted to managers able to guarantee effective implementation of interventions.

c) National strategic context

The Action represents a clear and effective response to the priority challenges identified for Italy by the European Council where, in the communication COM (2020) 512 final of last May 20, the Council highlighted, among other things, that Italy is very vulnerable to extreme meteorological phenomena and hydrogeological catastrophes, and that infrastructural deficits in water management generate an environmental and health impact that entails considerable costs and loss of income for the Italian economy.

Overall, the Action is coherent with the priorities of the European Green Deal, in particular with the Climate Action and the European Biodiversity Strategy 2030. Through the national planning process, its coherence and complementarity with the policy objective "A greener Europe" of the cohesion policy 2021 - 2027 (specific objectives b.4 "promoting adaptation to climate change, risk prevention and resilience to disasters" and b.5 "Promoting sustainable water management").

The investments and reforms proposed in the Component are fully in line with the priorities established in the national investment strategies and plans, consistent with the European framework defined as a priority by the Flood Risk Directive (2007/60 / EC) and the main directives in the integrated water sector, such as the Water Framework Directive (2000/60 / EC), the Drinking Water Directive (1998/83 / EC) and the Urban Waste Water Treatment Directive (1991/271 / EC).

In particular, investments in water resources are defined in the "National plan of interventions in the water sector", divided into a "aqueducts" section, on the initiative of the Regulatory Authority for Energy, Networks and the Environment (ARERA), and in a section " invasi ", on the initiative of the Ministry of Infrastructure and Transport (Directorate General for Dams and Water and Electricity Infrastructures).

Investments in purification are defined in the "Plan for the collection and purification of waste water and overcoming EU infringement procedures" of the Ministry of the Environment and Protection of the Territory and the Sea (MATTM).

Furthermore, at the local level, we have the "Hydrographic District Plans" for the various uses of the resource (irrigation, industrial, civil, electricity) and the "Area Plans" for the Integrated Water Service, which define the priorities for intervention and investments in water, irrigation and purification infrastructures in the various hydrographic districts and territorial areas.

With specific reference to the issue of the integrated water service tariff, since 2012 the tariffs have been regulated by the Regulatory Authority for Energy, Networks and the Environment (ARERA) as a national regulator in line with the EU principles of cost coverage and "the polluter pays ". With Resolution 580 of 27 December 2019, ARERA approved the Method for the 2020-2023 tariffs, a regulatory scheme, which, in full consistency with the European regulatory framework, intends to bring those who are late towards national standards. It aims at increasing the efficiency of operating and management costs, as well as improving the awareness of citizens.³⁰

Finally, with respect to investments for the reduction of hydrogeological risk, we have the "National Plan for the mitigation of hydrogeological risk, the restoration and protection of the environmental resource" (so-called Proteggi-Italia), referred to in the DPCM of 20 February 2019. The Plan pursues the formation of a unitary framework of needs and is structured in different areas and intervention measures (emergency measures, prevention measures, maintenance and restoration measures, as well as simplification and governance strengthening measures).

³⁰In the context of water tariffs for agricultural use, there are regional regulations that quantify water uses for irrigation (based on the guidelines issued by MIPAAF with DM 31/07/2015), as well as a database (Webgis SIGRIAN) to quantify collective and individual water uses (and allow monitoring of illegal subtractions).

The measures of the Component are therefore defined within a broader and more general framework to ensure the complementarity of the various programs and a full synergy with other European and national funds. In this regard, the investments envisaged in the PNRR will be integrated and strengthened with:

- EAFRD resources (1 billion euro) for sustainable forest management, for forest hydraulics works in mountain and hilly areas with high hydrogeological and landslide risk and for the maintenance of rural areas;
- REACT-EU resources (200 million euros) for urban forestry interventions;
- Ordinary national resources, as provided in particular by the latest Budget Law, for interventions to combat hydrogeological instability (160 million euros) and for the resilience and enhancement of the territory in the municipalities (600 million).

3. Description of the reforms and investments of the component

1) Prevent and contrast the effects of climate change on hydrogeological instability phenomena and the vulnerability of the territory in urban areas.

Reform 1.1: Simplification and acceleration of the procedures for implementing interventions against hydrogeological instability.

Challenges: In its investigation relating to the 2016-2018 planning fund, the Court of Auditors highlighted the absence of an effective national policy to combat hydrogeological instability, of a preventive and non-emergency nature; the difficulty of administrative bodies to include the protection of the territory into their ordinary functions; the weakness of the implementing subjects and of the Extraordinary Commissioners / Presidents of the Region, who do not have dedicated technical structures. The Court of Auditors also underlined the procedural stickiness, the absence of adequate controls and a unitary system of databases.

Objectives:

- Simplification of project implementation and financing procedures.
- Strengthening the extraordinary Commissioners and strengthening the technical structures to support them in the design, procurement and supervision of projects.
- Strengthening the operational capacity of the district and provincial authorities.
- Systematization of information flows in order to eliminate redundancy in reporting between the various information systems of the State.

Some corrective actions have already been introduced by the so-called "Simplification Decree" (Law 11 September 2020, n. 120), which also provides that:

- the Extraordinary Commissioners for hydrogeological instability can avail themselves of technical assistance and operate in derogation from the Code of Public Contracts, always in compliance with the mandatory constraints deriving from be-

longing to the European Union;

- the maximum deadline for issuing opinions at the conference of services is thirty days.

Implementation: In order to speed up the whole process of planning, programming and implementing the interventions, other actions to reform the current legislation have been undertaken by the Ministry of the Environment. One of the most important is the revision of the Prime Ministerial Decree of 28 May 2015 (containing the criteria and methods for establishing the priorities for assigning resources to the interventions), whose aim is to simplify the preliminary procedure for projects, including:

- the involvement of the District Authorities right from the insertion of the interventions in the ReNDiS database (so as to instruct, for purposes of selection, only the interventions that have already obtained a positive opinion from the same Authority);
- the standardization of processes by establishing timelines for each phase;
- updating of the classification criteria on a technical-scientific basis, with the support of ISPRA;
- the inclusion of financial penalties in the event of a slowdown in spending by the Region.

Furthermore, a Decree Law is being defined by the competent Ministry of the Environment, which aims to further simplify the various processes, to insert innovative elements in terms of interoperability of IT reporting systems, to rationalize and systematize the regulatory framework of sector. The Decree provides for the strengthening of the operational capacity of Government Commissioners, also through the use of in-house State companies. Furthermore - to lay the foundations for a future, gradual return to ordinary management of resources - it is planned to strengthen the role of the Provinces, setting up a specialized office within them for the activities of contrasting hydrogeological instability, of which the Commissioner can also avail.

Finally, a strengthening of the control at central level is envisaged, with the establishment of a technical control room at the MATTM and the possibility of activating a National Task Force for specialized technical support for implementation.

Target population: Cities and urban and rural territories of the entire country, with particular reference to the areas characterized by greater risk and criticality.

Timeline: approval by Q1 2022.

Investment 1.1: Structural and non-structural interventions for flood risk management and hydrogeological risk reduction (including innovation and digitization of territorial monitoring networks

Challenges: The threats due to hydrogeological instability in Italy, exacerbated by the effect of climate change, compromise the safety of human life, the protection of productive activities, the protection of ecosystems and biodiversity, the protection of environmental and archaeological assets, agriculture and tourism. To reduce emergency interventions, increasingly necessary due to frequent disasters, it is necessary to intervene in a preventive way, through a broad and widespread program of structural and non-structural interventions.

Objectives:

- Securing built-up areas and hydrographic basins exposed to hydrogeological risk;
- Environmental remediation and mitigation of climate change effects;
- Greater level of control and management of flood risk;
- Increase of environmental and territorial knowledge and enhance specific survey activities, in order to implement a policy of prudent and sustainable management of the water resource and of the territory;
- Innovation and digitization of territorial monitoring systems, to favor the full integration of the information collected and the processing of data to support intervention decisions in critical areas of the territory.

In order to achieve the indicated objectives, it will be necessary to combine structural measures (such as those aimed at securing landslides or reducing the risk of flooding in metropolitan areas) with the additional non-structural measures envisaged by the water and flood risk management plans, focused on active maintenance of the territory, requalification, monitoring and prevention. Furthermore, in order to preserve and improve the state of water bodies and reduce land consumption, it will be necessary to increase the use of "nature-based" and "land-based" interventions, which allow for the integration of risk mitigation needs, with the protection and recovery of ecosystems and biodiversity.

These interventions benefit from complementary resources of 160 million euros in the Budget Law.

Furthermore, in addition to the measures described, with particular regard to the mitigation of risks in mountain, hilly and rural areas, EAFRD will finance (with 1 billion euro) sustainable forest management interventions, extraordinary maintenance and refurbishment of forestry hydraulics in mountainous and hilly areas with high hydrogeological and landslide risk, forest fire prevention and reconstruction of degraded forest areas, management and maintenance of rural areas.

Implementation:

The interventions may concern the entire national territory; structural measures will be selected by the MATTM starting from those inserted in the ReNDiS database on the basis of technical and objective criteria (such as people and goods at risk, the frequency of calamitous event to be addressed, the approved design level and the construction site),

considering the necessary compatibility with the timing of the Recovery Plan (dictated not only by the design maturity, but also by the type and size of the intervention).

As regards the methods of implementation, starting from Legislative Decree 91/2014, the interventions on the subject of hydrogeological instability are implemented by the Presidents of the Region as extraordinary Government Commissioners. However, even within the same regulatory framework, the regional administrations do not act in the same way: in many cases the Commissioners, lacking adequate technical support structures, delegate the implementation to the beneficiary Municipalities. This explains the need for reform no. 1.1 which aims, among other things, at strengthening the technical structures of the Commissioners.

Target population: Inhabitants of areas classified as at greatest risk, throughout the national territory.

Timeline:

- project selection by Q3 2021;
- completion of the design and assignment of the works by Q4 2023;
- completion of the works by Q3 2026.

Investment 1.2: Urban forestry

Challenges: Italian cities are increasingly exposed to problems related to air pollution, the impact of climate change and the loss of biodiversity, with evident negative effects on the well-being and health of citizens. This makes it important to implement measures aimed at environmental sustainability and the enhancement of the territory in the urban environment.

Objectives: In line with national and EU strategies, the project includes a series of large-scale actions aimed primarily at metropolitan cities, to improve the quality of life and well-being of citizens through the development of urban and peri-urban forests. The goal is to plant millions of trees, identifying the places and quantities according to the principle of using "the right tree in the right place". The Charter of the Ecoregions of Italy drawn up at the level of "34 ecoregions" will make it possible to select and assign to each metropolitan area the most suitable trees in terms of ecological, biogeographical and other different local needs. In this way, it will be possible to contribute to:

- preserve and enhance the widespread naturalness, biodiversity, and ecological processes linked to the full functionality of ecosystems;
- contribute to reducing air pollution in metropolitan areas, thus protecting human health;
- recover man-made landscapes by enhancing internal areas in direct ecological relationship with urbanized areas (ecological corridors, territorial ecological networks)

and enhancing the system of protected areas present in the immediate vicinity of metropolitan areas;

- curb soil consumption and restore useful soils.

The project also responds to social and economic needs. In many urban areas, especially in the South, green infrastructures could represent an important opportunity for employment development both in the field of plant production and in the management of green.

To supplement the resources of the PNRR, 200 million euros from REACT-EU will also be allocated to urban forestry interventions.

Implementation: The implementing bodies of the interventions will be the Municipalities, with a focus on Metropolitan Cities. The project is consistent with the experimental activity for urban reforestation launched pursuant to article 4 of the law of 12 December 2019, 141 (so-called national “climate law”). The implementation of the project can therefore be based on the scheme adopted pursuant to the aforementioned law, which envisages a planning phase managed by metropolitan cities; the presentation of detailed operational programs to the Committee for the development of public parks set up pursuant to article 3 of the law of 14 January 2013; the transfer of resources to metropolitan cities by the Ministry of the Environment for the implementation of interventions.

For the preliminary activities relating to the detailed operational programs, the Committee for the development of public green spaces makes use of the ISPRA and the National Network System for the protection of the environment, as per Law 132/2016.

Target population: Inhabitants of the Municipalities.

Timeline: - to be defined -

Investment 1.3: Interventions for the resilience, enhancement of the territory and energy efficiency of the municipalities

Challenges: Some of the most delicate challenges are concentrated in urban areas, where the majority of the population lives. Climate change and the observed increase in the frequency of extreme events make it increasingly urgent to address the geological-hydraulic criticalities in cities, such as floods, erosion and gravitational instability, and the consequent damage (consisting, among other things, in the deterioration of the building stock, damage to the underground service networks and interruptions to the road network).

Objectives: This investment aims to increase the resilience of the territories and promote their enhancement and sustainable development, through a varied set of interventions, of medium-small size, located in urban areas. The safety measures, aimed at reducing the vulnerability of the territory before the adverse of climate change effects and at limiting

damage, are accompanied by preventive and mitigation actions that intervene on the causes of climate change and promote the energy sustainability of the territory.

The planned interventions have, in particular, the following objectives:

- Prevention and mitigation of risks connected with hydrogeological risk and safety of the inhabited areas exposed to these risks;
- Road safety;
- Making buildings safe (through seismic improvement and adaptation interventions);
- Energy efficiency of buildings and public lighting systems.

Implementation: The interventions fall under current legislation and concern the urban areas of the entire national territory. The implementing bodies are the Municipalities. In particular, the resources are assigned to the Municipalities by decrees of the Ministry of the Interior, with the exception of the resources referred to in the budget law n. 145 of 2018, art. 1, paragraph 139, assigned to the Municipalities of their territory by the Regions with ordinary statute.

Target population: inhabitants of urban areas throughout the national territory.

Timeline: 2026Q2

2) Ensure the security of water supply for drinking, irrigation and industrial purposes and a reduction in water dispersion.

Reform 2.1: Simplification of legislation and strengthening of Governance for the implementation of investments in the field of water supply infrastructures.

Challenges: The articulated regulatory framework, the fragmented management of the water resource and of infrastructures connected to its supply have a negative impact on the capacity to plan and implement investments.

Objectives:

- More effective coordination of the legislation relating to the National Plan of interventions in the water sector;
- Provision of support and accompanying measures for implementing bodies not able to carry out investments relating to primary procurement within the foreseen time frame;

More specifically, this reform intends to act on the legislation that regulates the National Plan of interventions in the water sector (Law 205/2017, article 1, paragraph 516 and following), according to the following lines of action:

- making the National Plan the central public financing instrument for investments in the water sector by unifying the economic resources relating to water supply

infrastructures under the Plan;

- overcome the division between the “reservoirs” and the “aqueducts” section;
- involve ARERA to support the making of the entire Plan;
- simplify the training and updating procedures of the Plan;
- simplify the procedures for reporting and monitoring the investments financed;
- provide for central accompanying measures by MIT (directly or through a state company) for subjects that have lower capacity to plan and implement.

Implementation: The Ministry of Infrastructure and Transport will present a reform proposal relating to the water supply sector. The reform proposal will be shared with the institutional bodies involved (including MATTM and MIPAAF).

Furthermore, to promote the planning and implementation of interventions according to a systemic and organic logic and strengthen the Governance of the sector, the process of strengthening the district basin Authorities³¹, already started by the MATTM through a community project (We create PA - Line L6W1, funded under the PON Governance 2014-2020), will continue.

Target population: users of the water resource for different uses.

Timeline: approval of the regulatory provision by the first half of 2022 and finalization of the "internal" procedures for the implementation of the reform (methods to recognize needs, selection criteria, guidelines for the evaluation of investments) within the following year.

Reform 2.2: Revision and strengthening of the governance model for the reclamation consortia.

Challenges: On the national territory, some consortium structures have been commissioned, even for a long time. This has significantly limited their activity and planning capacity. In addition, the financial situation of the consortium bodies, in many cases precarious, due both to the various crises in the agricultural sector and to ineffective administrative functioning of the consortia themselves.

Overall, what has been described has penalized entire regional territories and their inhabitants, especially in the southern regions, resulting in a poor capacity for maintenance of the territory and innovation in the management of water for irrigation, as well as an inefficient use of economic resources destined to activities for the defense of the soil and the creation of reservoirs.

Objectives:

³¹In complementarity with the measures to strengthen the district authorities themselves envisaged in the context of reform no. 1.1, for a more effective contrast to hydrogeological risk.

- Promote the updating and strengthening of the governance model of the reclamation consortia, favoring the return to self-government of the commissioned consortia;
- Strengthen the planning capacity of the reclamation consortia, also through regional planning centers.

More specifically, the reform will concern the reorganization of the reclamation consortia through the revision of the criteria referred to in the State-Regions Agreement of 18 September 2008 (which include: the definition of the reclamation areas; the subjects and functions of the consortia; financial system of interventions and private participation; consultation and collaboration with local authorities and agricultural entrepreneurs; supervision and internal management control). In particular, it is envisaged the review of the procedures to allow for substitutive powers by the State and to reduce the time to decide the commissioning of entities, placing a time limit on the same entities, so as to guarantee the completion of all the actions necessary to return to the self-government of consortia in the shortest possible time.

Implementation: From a procedural point of view, MIPAAF will assess the strengths and weaknesses of the current governance system; consequently, in agreement with the Regions and Autonomous Provinces, it will elaborate a proposal to modify the criteria referred to in the aforementioned Agreement.

The established criteria must be incorporated into regional laws. To overcome the risk of non-transposition, all means of preventive consultation will be used. Based on the recognition of the existing regional regulations (Q4 2021), MIPAAF will present a reform proposal to the Regions (Q4 2022). Reward mechanisms linked to the effective implementation of the criteria within regional laws will also be included in the planning on national funds.

Target population: Reclamation consortia and inhabitants in rural areas of the country.

Timeline: The deadline for the approval of the Agreement is set for the end of 2023.

Investment 2.1: Investments in primary water infrastructure for the security of water supply.

Challenges: The increasingly frequent water crises due to ongoing climate change entail the need to make primary water infrastructures for civil, agricultural, industrial and environmental uses more efficient and resilient, so as to guarantee the security of water supply in all sectors and overcome the "emergency policy".

Objectives:

- Water supply security of important urban areas and / or large irrigated areas;
- Adjustment and maintenance of the safety of structural works;

- Greater resilience of infrastructures, also with a view to adapting to climate change;
- Recovery and increase of the useful transport capacity, with consequent economic repercussions, and improvement of the quality of the water resource.

In order to achieve the objectives indicated, investments financed will include measures for extraordinary maintenance and the upgrading and / or completion of the derivation, storage and primary supply infrastructures³².

The interventions will cover the entire national territory, with different purposes depending on the geographical area. In particular:

- the completion of large unfinished systems mainly in the south;
- extraordinary maintenance interventions aimed at static and seismic safety and greater efficiency in large irrigation systems or for multiple purposes, in the center-north;
- interventions on strategic infrastructures, which have also been operating for more than 60-80 years, and the related interconnections, to make them more resilient, throughout the territory.

Implementation: The program is in continuity with objectives and contents of the National Plan of interventions in the water sector (with particular reference to the “Invasi” section and to the interventions on large drinking water aqueducts in the “Aqueducts” section).

The competent central administration is the MIT Directorate General for "Dams and water infrastructures" which, for each work, signs an agreement with the implementing body to regulate the conditions and methods of intervention. For the “Aqueducts” section, ARERA works with MIT in the selection of investments. The implementing bodies will be the primary supply managers, the Reclamation Consortia, the Irrigation Bodies, and the managers of the integrated water service.

To ensure the completion of the projects within the time horizon of the RRF, interventions with defined and clear project profiles will be selected, proposed by subjects with proven spending capacity and without particular uncertainties in the authorization and possibly expropriation phases. In any case, constant monitoring will be carried out by MIT and ARERA and accompanying and replacement mechanisms will be put in place in the event of forecasts of non-compliance with the deadlines. It should also be noted that the procedure for selecting the interventions has already been launched by MIT, in September 2020, together with the preliminary activity relating to the National Plan of interventions in the water sector.

Target population: Users of the integrated water service, reclamation consortia, irrigation bodies.

³²The interventions on the distribution networks will be financed on the investment line no. 2.1.

Timeline: completion of the design suitable for the contract of works by 2022; awarding of works during 2023 and completion of works in mid-2026.

Investment 2.2: Investments in the resilience of the irrigation agrosystem for the better management of water resources (including digitalisation and technological innovation of distribution networks).

Challenges: The spectrum of continuous water crises, due to scarcity and the different distribution of the resource, has important effects on agricultural production, in particular where constant irrigation is a necessary practice and an essential condition for competitive agriculture. To increase the capacity to deal with emergency situations, it is essential to quantify the volumes used for irrigation purposes, to increase the efficiency in the irrigation of water and also to favor the use of non-conventional water to supplement the conventional ones.

Objectives:

- Improve water resource management and reduce losses;
- Encourage the measurement and monitoring of uses both in collective networks (through the installation of meters and remote control systems) and for private uses (through a monitoring system of private concessions);
- Prevent illegal uses of water in rural areas;
- Increase the resilience of the irrigation agro-ecosystem to extreme climatic events, drought events in particular.

In order to achieve the objectives indicated, infrastructural interventions on the networks and irrigation systems and on the related digitalisation and monitoring systems will be financed, consisting in the conversion of the irrigation system towards higher efficiency systems. Furthermore, purification monitoring systems will be implemented with the potential for irrigation reuse. Finally, the data system for collective uses (SIGRIAN) will be developed, to record and monitor the volumes used in self-supply and To prevent illicit uses of water (also thanks to the joint measurement of the volumes used on collective distribution networks).

Implementation: Irrigation and reclamation bodies will be responsible for the implementation of the interventions. The Ministry of Agricultural, Food and Forestry Policies will carry out the recognition and selection of the interventions in the initial phase of the launch of the Plan, using the National Database of investments for Irrigation and the Environment (DANIA). The latter will allow a selection based on objective criteria, being a tool that collects the interventions (implemented by the irrigation bodies, already financed or only planned), cataloging them through technical and financial-procedural information, also considering their territorial classification. Specifically, priority will be given to projects with a high construction capability and deemed to be of greater terri-

torial strategic importance by the regional authorities.

Target population: Agricultural production sector, population of rural areas made safe.

Timeline:

- project selection by Q3 2021;
- assignment of the works in phases and by Q3 2023;
- completion of the interventions by Q3 2026.

3) Ensure the sustainable management of water resources along the entire cycle and the improvement of the environmental quality of inland and maritime waters.

Reform 3.1: Measures for the full implementation of the assignments for the Integrated Water Service.

Challenges: In the South, the insufficient presence of industrial managers and the vast presence of management in economy traces a picture of the very fragmented and complex water sector: there are 1,069 managers, 995 of which are Municipalities that manage the service in economy (in particular, 381 in Calabria, 233 in Sicily, 178 in Campania, 134 in Molise). Previous experiences show that in the South an autochthonous evolution of the system is not viable, without a central intervention aimed at its resolution.

Objectives:

- Promote / strengthen the industrialization process of the sector (meaning supporting integrated operators, public or private, with the aim to achieve economies of scale and guaranteeing efficient management of investments and operations);
- Reduce the existing gap (water service divide) between the center-north and the South of the country, where there is a lack of industrial managers.

Implementation: In order to give concrete and specific impetus to the industrialization process of the sector, conditions to allocate of PNRR resources will be the establishment of Local Government Bodies and the successful entrusting of the integrated service to managers able to guarantee the efficient implementation of interventions.

The areas that currently do not meet the aforementioned criteria will have a deadline (Q2 2022) for adaptation to the national and European regulatory framework, so that they too can take advantage of PNRR funding. In particular, it is planned to reserve up to 30% of available funding for one year, in order to allow the lagging regions to align themselves.

In this regard, the MATTM, with the project Mettiamoci in Riga - Intervention Line 7, as part of the PON Governance 2014-2020, provides for the definition and signing of specific Memoranda of Understanding with Regions and Government Bodies in the area,

to give support, where delays are recorded, in the preparatory activities for the drafting of the Area Plans and the award of the integrated water service. To date, discussions are underway with the Regions of Sicily, Calabria, Molise and Campania to finalize the memoranda of understanding and start the support activity through a specific working group.

Target population: Users of the integrated water service.

Timeline:

- signing of the Memorandum of Understanding between the MATTM and the Regions concerned by Q2 2021;
- verification of the constitution of the ATOs and of the award of the SII by 2022Q2.

Investment 3.1: Investments aimed at reducing losses in water distribution networks, including digitization and monitoring of networks.

Challenges: The recovery of investments in the water sector that has been observed after the attribution to ARERA of the competences in the field of regulation and control of water services, still appears insufficient compared to the actual needs for modernization and development of Italian water infrastructure. The data acquired referring to 2016 show a replacement rate of the adduction and distribution networks equal to 0.39% (compared to an outdated infrastructure: about 35% of the pipelines are aged between 31 and 50 years). This is a low replacement rate, still far from the value of 2%, consistent with a technical 50 years life of such infrastructures. The value of the linear water losses (indicator calculated by comparing the total losses to the length of the network) is on average equal to 24 cubic meters / km / day, with an average value of the percentage water losses equal to 41%. The remote controlled district networks are equal to 21.8% of the total distribution networks. The data on service interruptions is strongly influenced by certain critical situations at local level (especially in the South and Islands).

Objectives:

- Obtain a reduction of losses in networks for drinking water;
- Increase the resilience of water systems to climate change;
- Strengthen the digitization of networks and transform them into a "smart networks", to promote an optimal management of water resources, reduce waste and limit inefficiencies.

In order to achieve the objectives indicated, the financed investments will concern the modernization and efficiency of the water distribution networks, favoring innovative projects that involve the use of new technologies. To this end, advanced control systems must be provide to allow monitoring of the main nodes as well as of sensitive points of the network, through the measurement and acquisition of flow rates, operating pressures

and water quality parameters.

An example of a “flagship” project of great economic, social and environmental value could be that relating to the restructuring of the water networks of the cities of Potenza and Matera in Basilicata. The managing body is the in-house company Acquedotto Lucano, which already has available a feasibility study and which could quickly prepare a technical-economic feasibility project to be tendered by the end of 2021. Current losses in the water distribution networks are very high (over 50%). Also the supply cost is very high as it concerns purified water raised a few hundred meters to an upper level. The manager’s difficult financial situation does not allow these investments to be activated exclusively on the tariff.

Implementation: As regards the aims and procedures, the proposed intervention is in continuity with the National Plan of interventions in the water sector (with particular reference to the interventions related to the drinking water distribution networks in the “Aqueducts” section).

The investments may concern the entire national territory and will be implemented by the Integrated Water Service Operators. The selection of projects will be carried out by the competent Ministries and by ARERA on the basis of a series of criteria, including: the existence of an integrated operator, in line with Italian and European legislation; the current level of losses and their expected reduction; the technical quality of the proposals, taking into account the existing level of digitization; the characteristics of the territory and the population; environmental impact; the ability of the operator, also from a digital point of view; the level of co-financing and coherence with general water planning tools.

Target population: Users of the integrated water service, reclamation consortia, irrigation bodies.

Timeline: selection of 70% of projects by 2021 and the remaining 30% by mid-2022; award of works by 2023 and completion by 2026.

Investment 3.2: Investments in sewerage and purification.

Challenges: The quality of the water resource has long been in a crisis, exacerbated in recent years by climatic variations, by the development of urban agglomerations with an increasingly intense consumption of land and by the presence of emerging pollutants, with consequent problems on the safeguard of water resources and of human health. The water systems present a high obsolescence; in particular, sewerage, urban drainage and purification systems, which are not always present, are frequently not adequate to European standards, with consequent burdensome infringement procedures. Since 2016, the establishment of a Single Commissioner has been planned to speed up the implementation of the collection works,

Objectives:

- Make the purification of wastewater discharged into marine and inland waters more effective, also by means of technological innovation;
- Where possible, transform purification plants into “green factories”, which allow energy and sludge recovery, and the reuse of purified wastewater for irrigation and industrial purposes;
- Contribute to overcoming EU infringement procedures in this area.

An example of a “flagship” intervention, relating to the purification plants, could be that in the province of Palermo on to the completion of the sewage networks and the construction of the new purification plants of Altavilla Milicia, Bolognetta and Partinico. In this case, the managing body would be the in-house company AMAP, who has the executive projects and has already started the design of tenders to quickly dispose of the definitive projects that allow the tender to be started by the end 2021. These agglomerations are all in infringement proceedings and the financial dimension of all interventions does not allow these investments to be activated exclusively on the tariff.

Another example of an intervention of great impact, in the context of the digitisation and control of the sewerage network, could be that relating to the management of rainwater in the city of Rome, where ACEA has already in the pipeline - based on the tariff system - an investment of 20 million euros to be launched by the end of 2021. A viable hypothesis may consist in increasing the project amount envisaged with the financial resources of the PNRR, allowing better management of rainwater in Rome, which currently creates numerous problems to citizens.

Implementation: The Ministry of the Environment and the Protection of the Territory and the Sea has the task to control and monitor the state of implementation of the interventions. The Integrated Water Service Managers will be entrusted with the implementation of the interventions. Their selection will be made by the Ministry of the Environment and the ARERA regulator, on criteria, such as: the existence of an integrated operator, in line with Italian and European legislation; the need to deal with an open infringement procedure; the expected improvement in the quality of receiving water bodies; the technical quality of the proposal; the characteristics of the territory and the population and possible synergies with other interventions; the ability of the operator; the level of co-financing; consistency with general water planning tools.

Target population: Users of the integrated water service.

Timeline: selection of 70% of projects by 2021 and the possibility of selecting the remaining 30% by mid-2022; award of works by the end of 2023 and completion by 2026.

Investment 3.3: Interventions in the port areas to fill the deficit of facilities

for the management of waste collected at sea.

Challenges: The lack of facilities for the management of waste collected at sea in the various port areas of the country leads to a worsening of the quality of maritime waters, causes considerable damage to the marine ecosystem in contrast with the principles of the circular economy.

The construction of new facilities and the modernization of existing ones therefore appear necessary, also in light of the provisions of Directive 883/2019 on port facilities for the collection of waste produced by ships, currently being implemented and, more generally, by the Directive framework on marine strategy 2008/56 / EC (Marine Strategy Framework Directive -MSFD) which constitutes the environmental pillar of the maritime policy of the EU (IMP) and of the "Blue Economy". Moreover, the intervention responds to the provisions of Directive 904/2019, also in the transposition phase.

Objectives:

- Improve the quality of maritime waters by reducing the pollution generated by plastic abandoned in the sea;
- To fill the deficit of facilities for the management of waste produced by ships and waste captured at sea, with particular attention to the recovery of fishing equipment, in the various port areas of the country;
- Contribute to the recovery of the marine ecosystem and the promotion of the circular economy.

In order to achieve the indicated objectives, it will be possible to carry out both construction interventions of new plants and interventions to adapt existing plants (intervention 1). Alongside the "structural" interventions, information and training actions will be organized for operators in the fishing sector and local communities, to raise awareness on the prevention of the phenomenon of abandonment of waste and its correct management (intervention 2).

Implementation:

The intervention is promoted by the Ministry of the Environment and the Protection of the Territory and the Sea. The other central administrations involved are the Ministry of Agricultural, Food and Forestry Policies and the Ministry of Infrastructure and Transport. The implementing bodies will be the Municipalities and / or Port Authorities depending on the type and size of the port, but the Port Authorities, the Maritime Authorities and any Marine Protected Areas will also be involved locally.

As regards the structural / plant projects, specific agreements will be stipulated between the Ministry of the Environment and the other Competent Authorities to identify the criteria for the realization of the projects.

Following the cognitive analysis carried out in the first year, the interventions - which

may concern the entire national territory - will be selected on the basis of the following priority criteria:

- absence or inadequacy of port facilities for waste collection;
- port size and / or port type;
- insistence of the port waste collection facility in protected marine areas of environmental value;
- presence of research, experimentation and development activities already planned or launched at the local level for the recovery of waste collected accidentally or voluntarily.

With reference to training and information measures, specific guidelines will be developed by the Ministry of the Environment, with the support of public research bodies.

Target population: the populations in the basin of the port areas of the country.

Timeline: For intervention 1 the cognitive activity will end with the definition of the already mentioned agreements between the Ministry of the Environment and the competent Authorities, while for intervention 2 the aforementioned guidelines will be drawn up (4Q2021). For the subsequent implementation of the plant interventions, an overall duration of 4 years is estimated, from design to final construction.

4. Green and digital dimensions of the component

a) Green Transition:

This Action envisages almost 55% of expenditure for the climate (see Table 1), thus contributing very significantly to the green transition by promoting a more efficient and sustainable use of water resources and prevention actions against the risks associated with climate change.

In particular, through investments 2.1, 2.2, 3.1, 3.2 and 3.3, the improvement of the environmental infrastructures for the management of water and waste and the reduction of pollution are pursued, protecting the health and well-being of citizens from environmental risks and impacts. The aim of investment 1.1 and investment 1.2, is to protect and restore biodiversity and natural ecosystems, to increase carbon absorption capacity, and to strengthen resilience in the face of climate change.

With reference to the climate and environmental objectives defined in the EU Regulation 2020/852 (Taxonomy Regulation), this Action provides a contribution in each of the following areas:

- Adaptation to climate change (through measures to reduce hydrogeological risk);
- Mitigation of climate change (through interventions for energy efficiency in munic-

- ipalities and urban forestry measures);
- Sustainable use and protection of water and marine resources (through measures relating to water supply infrastructures, the irrigation agrosystem and water distribution networks);
 - Pollution prevention and reduction (in particular, through investments in the “sewage and purification” sector aimed at reducing pollution of maritime and inland waters);
 - Protection and restoration of biodiversity and ecosystems (to which we contribute mainly through urban forestry interventions);
 - Transition towards a circular economy (in particular, through the investment aimed at filling the plant deficit of the port areas for the management of waste collected at sea).

b) Digital Transition:

Based on the codes provided for in the Recovery Fund Regulations, this Action does not directly contribute to the achievement of the aforementioned target, even if it provides for important measures to favor the "digital management" of the water resource and related networks, to be transformed into a "smart network ". In particular, the installation of software equipment and applications and hardware platforms for the implementation of remote control systems and the digitization of measuring instruments is envisaged.

Table 1 - Green and Digital Impact

Short title	Green objectives				Digital objectives	Transition challenges	
	Climate	Environmental	Intervention field	DNSH	Tag	Green	Digital
	Tag	Tag					
<i>Objective 1</i>							
Investment 1.1 Interventi strutturali e non strutturali per la gestione del rischio alluvioni e la riduzione del rischio idrogeologico	100%	100%	35	Si	-	-	-
Investment 1.2 Forestazione urbana	40%	100%	50	Si	-	-	-
Investment 1.3 Interventi per la resilienza, la valorizzazione del territorio e l'efficientamento energetico dei Comuni - <i>messa in sicurezza del territorio/dissesto idrogeologico</i>	100%	100%	35	Si	-	-	-
Investment 1.3 Interventi per la resilienza, la valorizzazione del territorio e l'efficientamento energetico dei Comuni - <i>messa in sicurezza ed efficientamento energetico degli edifici</i>	40%	40%	25	Si	-	-	-
Investment 1.3 Interventi per la resilienza, la valorizzazione del territorio e l'efficientamento energetico dei Comuni - <i>messa in sicurezza delle strade</i>	0%	0%	62	Si	-	-	-
<i>Objective 2</i>							
Investment 2.1 Investimenti nelle infrastrutture idriche primarie per la sicurezza di approvvigionamento idrico	40%	100%	40	Si	-	-	-
Investment 2.2 Investimenti nella resilienza dell'agrosistema irriguo per la migliore gestione delle risorse idriche (compresa la digitalizzazione e l'innovazione tecnologica delle reti di distribuzione)	40%	100%	40	Si	-	-	-
<i>Objective 3</i>							
Investment 3.1 Investimenti finalizzati alla riduzione delle perdite nelle reti di distribuzione idrica, compresa la digitalizzazione e il monitoraggio delle reti	40%	100%	39-bis	Si	-	-	-
Investment 3.2 Investimenti nella fognatura e depurazione	40%	100%	41-bis	Si	-	-	-
Investment 3.3 Interventi nelle aree portuali per colmare il deficit di impianti per la gestione dei rifiuti raccolti a mare	40%	100%	44	Si	-	-	-

5. Milestones, targets and timeline

See Table 2

Reform 1.1 (procedures for implementing interventions against hydrogeological instability)

Milestone:

- Adoption of the decree by Q3 2021;
- Conversion of the decree law into law by Q1 2022;
- DPCM issue for the revision of the project selection criteria by 2022Q1.

Investment 1.1 (flood risk management and hydrogeological risk reduction)

Milestone:

- project selection by Q4 2021;
- completion of the design suitable for the contract of works by 2023Q3;
- awarding of works by Q4 2023;
- completion of the works by Q3 2026.

Target to 2026:

- Reduction of people at direct risk: to be defined
- Reduction of people at indirect risk: to be defined
- Reduction of people at risk of losing their home: to be defined
- Number of Municipalities subject to safety measures: to be defined

Investment 1.2 (urban forestry)

Milestone and Target: to be defined

Investment 1.3 (resilience, enhancement of the territory and energy efficiency of municipalities)

Milestone and Target: to be defined

Reform 2.1 (governance in the area of water supply infrastructure)

Milestone:

- Preparation of the regulatory provision and presentation to Parliament by 2021Q3;
- Approval of the regulatory provision by Q1 2022;
- Development of internal procedures for the implementation of the reform by 2022Q4.

Reform 2.2 (governance model of land reclamation consortia)

Milestone:

- Recognition of the current governance system by MIPAAF by Q4 2021;
- Reform proposal presented by MIPAAF to the Regions by Q4 2022;
- Approval of the new State-Regions Agreement by Q4 2023.

Investment 2.1 (security of water supply)

Milestone:

- selection of 80% of projects by Q2 2021, selection of the remaining 20% of projects by Q2 2022;
- completion of the design suitable for the contract of works by 2022Q4;
- awarding of works by 2023Q3;
- completion of the works by 2026Q2.

Target to 2026:

- Number of projects completed (interventions on reservoirs and/or supply systems): to be defined;
- Number of complex water systems for which security of supply is increased: to be defined.

Investment 2.2 (Resilience of the irrigation agrosystem)

Milestone:

- project selection by Q3 2021;
- financing of selected projects by Q3 2022;
- awarding of works by Q3 2023;
- completion of the works by Q3 2026.

Target to 2026:

- % Increase of withdrawal sources equipped with meters: from 24% current (baseline) to 41%;
- Area (expressed as a% of the total) that passes to a more efficient management of the irrigation resource as a result of the interventions: from the current 8% (baseline) to 12%.

Reform 3.1 (full implementation of the assignments in the Integrated Water Service)

Milestone:

- Signing of memoranda of understanding between the MATTM and the regions concerned by Q2 2021;
- Verification of the constitution of the ATOs and the assignment of the SII by Q2 2022.

Investment 3.1 (water distribution networks)

Milestone:

- selection of 70% of projects by Q3 2021, selection of the remaining 30% of projects by Q2 2022;
- completion of the design suitable for the contract of works by 2022Q4;
- awarding of works by Q3 2023;
- completion of the works by Q3 2026.

Target to 2026:

- Kilometres of district water network: baseline: 128,000 km; 2026 target:150,000 km;
- Reduction of percentage water losses: baseline 50%; 2026 target:to be defined

Investment 3.2 (sewerage and purification)

Milestone:

- selection of 70% of projects by Q3 2021, selection of the remaining 30% of projects by Q2 2022;
- completion of the suitable design for the works contract by Q2 2023;
- awarding of works by Q4 2023;
- completion of the works by Q3 2026.

Target to 2026:

- Reduction in the number of non-compliant equivalent inhabitants: baseline 3,572,574 equivalent inhabitants non-compliant; 2026 target:to be defined

Investment 3.3 (plant deficit in port areas for waste management)

Milestone:

- Conclusion of the information and investigation activities by Q4 2021;
- Award of works (for intervention 1, relating to the structural / plant part) by Q4 2023;

Target to 2026:

- Number of ports in which action is taken for plant adaptation: 150.

6. Financing and costs

This component will be coherent with the policy objective "*A greener Europe*" of the cohesion policy 2021 - 2027. The interventions financed by the PNRR and those financed by the structural funds will be linked by a complementary and/or integration relationship, and an ex ante demarcation will be foreseen to avoid planning overlaps.

See Table 2 work in progress