INSTITUT ROUSSEAU

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Italy factsheet

ROAD TO NET ZERO

BRIDGING THE GREEN INVESTMENT GAP

January 2024

This document is an appendix of the Road to Net Zero report. For more details and EU-scale results, please refer to the full report. For more information about the methodology used, please refer to the Methodological Appendix.

Key takeaways

- **An additional €70 billion investment is needed by 2050 to decarbonise the Italian economy, averaging around 2.7% of current GDP** yearly. This is more than the European average, mainly due to **Italy lagging behind in the transport sector**.
- This extra-investment plan can be **fully financed by redirecting fossil fuel subsidies**, will be **offset by a sharp decrease in energy costs**, is **~50% less expensive than the EU Com plan** (thanks to more efficiency & sufficiency) and **~6 times less than the cost of inaction**.
- **Italy's public expenditure should more than double** from €40 to €90 billion per year. **This additional public investment of €50 billion per year amounts to around 1.8% of the current GDP**. Biggest needs for additional public support are in the **buildings and transport sectors**.

TRANSPORT

Current public support needs to nearly triple. 65% of this extra public investment is required to enhance public transportations (notably by extending railway networks).

BUILDINGS

Italy's 'negative' extra cost results from the 2020 launch of **'Superbonus 110%' leading to extensive and uncontrolled tax credit commitments has to be strongly reformed**, notably by integrating an independent pre- and post-control of renovations and a more balanced subsidy rate.

AGRICULTURE

Some Italy's region high public support and performances in agro ecological transition should be generalized to lagging régions, particularly in the north.

ENERGY PRODUCTION AND INFRASTRUCTURE

Relative to its GDP, Italy benefits from a lower cost (and extra-cost) of decarbonising its energy sector compared to other EU Member States. This is mainly due to a very high share of efficient and cheaper solar photovoltaic generation in the future italian mix.

CARBON SINKS (LULUCF)

- Regeneration costs aside, **urgent human intervention is vital to ensure tree species adaptation** in a context of potent habitat shift by 2050.
- Italy's hedgerow deployment stands out. **Efforts must focus on preserving existing agroforestry infrastructures**.
- Even in a context of dominantly private forest ownership, the massive investments must be funnelled in public expenses to support long term-low profit measures.

CROSS-SECTOR/R&D

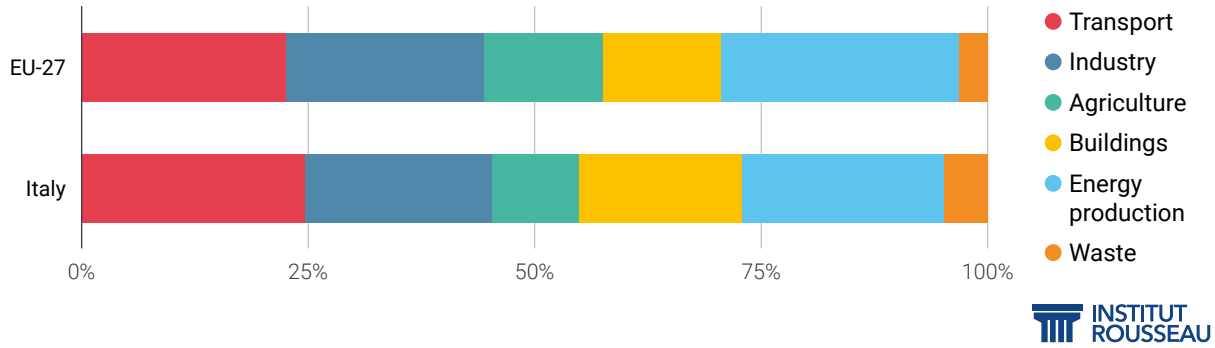
Italy's support for transition related R&D has to be strongly increased considering the current limited support both in the fields of energy and agriculture.

1 Current GHG emissions, decarbonisation potential and action levers available

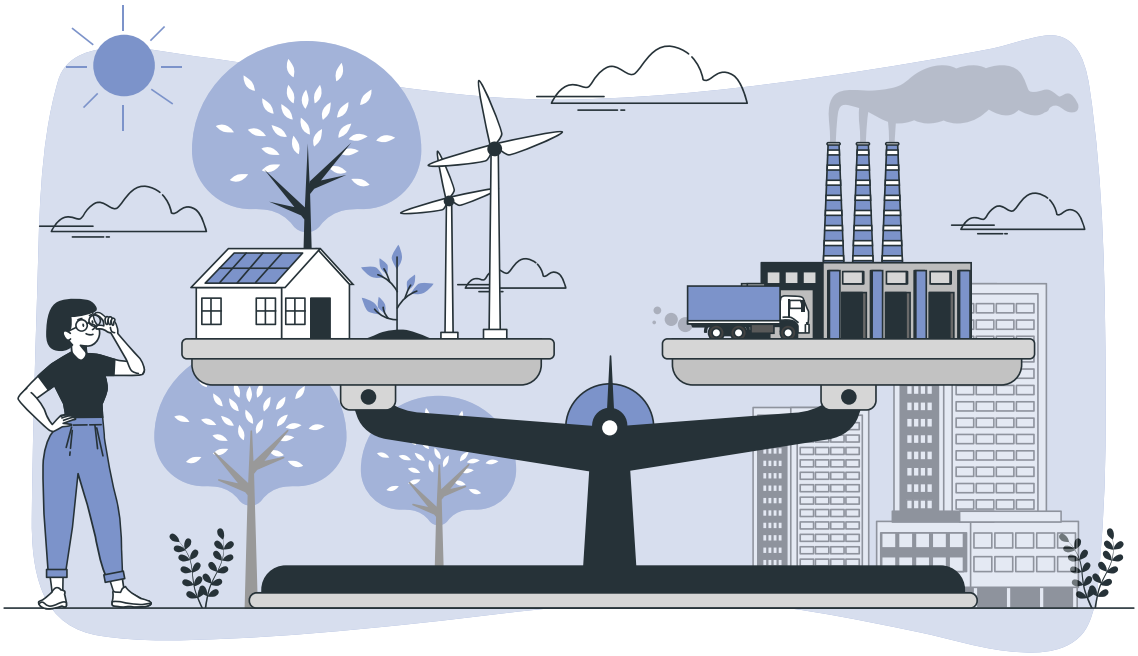
1.1 Current GHG emissions profile

Italy's territorial emissions are primarily due to transport (30%) and industry (21%). Agriculture and buildings (which consume energy for heating, lighting, cooking, ventilation, etc.) follow with 19% and 15% respectively, before energy production (11%). Waste management constitutes the remaining 4%, primarily attributed to methane emissions resulting from the natural decomposition of organic waste in landfills.

Fig. 1 **Sectoral breakdown of Italy and EU-27 current domestic emissions (2021), in %**



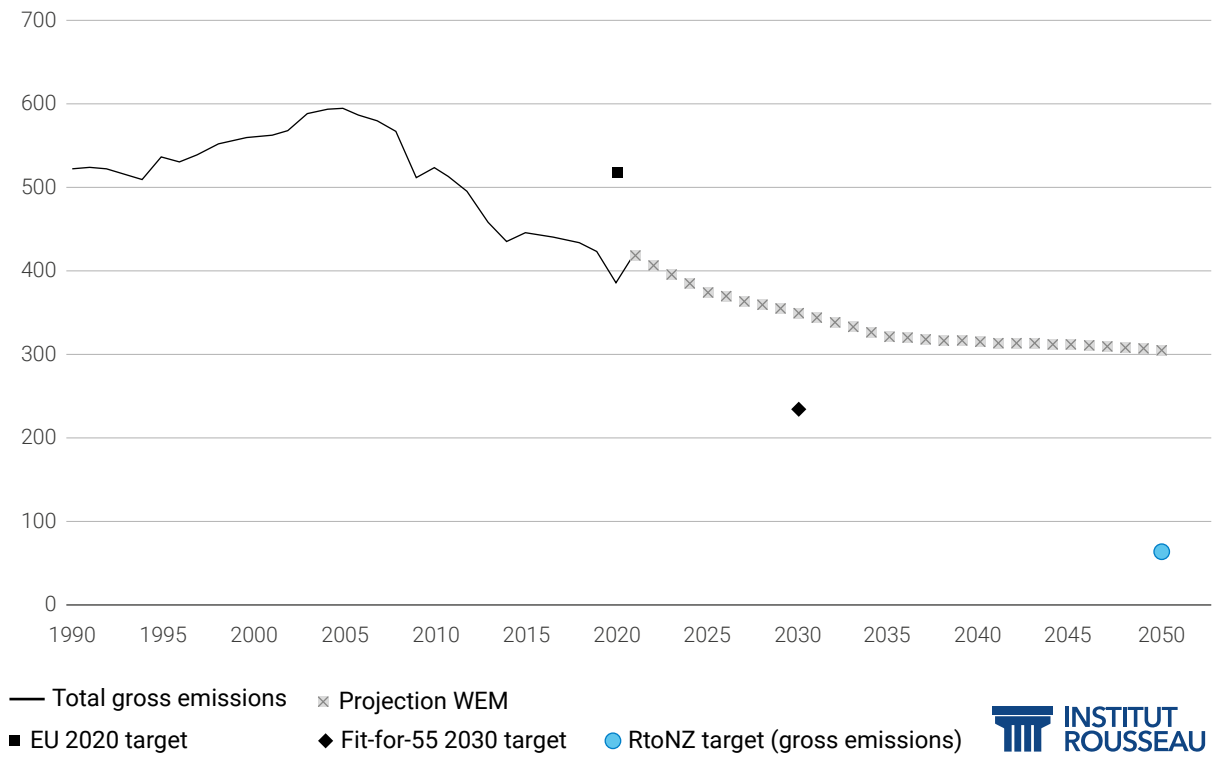
Compared to the rest of the EU, Italy stands out with a proportionally larger agriculture sector and a much less carbon-intensive energy mix (due to the use of nuclear energy for electricity production).



1.2 GHG emissions trend

Italy is the main greenhouse gas emitter in Europe. It contributed XXX million tons of CO_2-eq in 2021, nearly a quarter of the European Union's emissions. Since 1990, the country's emissions have decreased by 20% or 3.4 million tons per year on average (compared to -29% for EU-27), as shown on Figure 2.

Fig. 2 **Italy's past domestic emissions and progress towards achieving 2030 and 2050 targets, in million tons of CO_2 equivalent ($MtCO_2e$).**



WEM: With Existing Measures. European Environment Agency, 'Total net greenhouse gas emission trends and projections in Europe', 2023.

1.3 Decarbonisation levers

To meet these targets, it is necessary to activate multiple levers. There are 37 decarbonisation levers in total, outlined in Figure 3. Key decarbonisation levers with significant emission reduction potential involve energy (power production), transport (cars, trucks) and building renovations. But there is no single solution for instantly decarbonising the Italian economy. All listed levers, regardless of their scale or economical efficiency, must be engaged to reach the goal of carbon neutrality.

Fig. 3 **Decarbonisation levers proposed and modelled in this study, by sector**

TRANSPORT

1. Reduce the number of vehicles and convert them to low-carbon technologies
2. Develop public transportation
3. Develop soft mobility
4. Reduce air traffic and switch to Sustainable Aviation Fuels
5. Transition to zero carbon navigation

INDUSTRY

1. Reduce industrial production through end-use sufficiency
2. Increase material efficiency
3. Increase energy efficiency
4. Decarbonize industrial energy mix
5. Develop low-carbon innovative processes
6. On-site Carbon Capture, Utilisation and Storage
7. Develop EU strategic industrial sectors for the transition

AGRICULTURE

1. Reduce herd size and adapt breeding practices
2. Convert crop systems to agroecology
3. Convert tractors to low-carbon technologies

BUILDINGS

1. Efficient renovation of housing
2. Efficient renovation of public tertiary buildings
3. Efficient renovation of private tertiary buildings

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ENERGY PRODUCTION AND INFRASTRUCTURE

1. Decarbonize and adapt the power system
2. Switch from fossil gas to biogas and other 'green' gases
3. Phase coal and oil out, end conventional refining activities
4. Decarbonize heat production for district heating

WASTE MANAGEMENT

1. Separately collect and recover biowaste
2. Reduce plastic use, increase plastic recycling and substitution with other materials
3. Reduce wastewater treatment emissions through process adaptation
4. Produce biogas from waste and sludge

CARBON SINKS (LULUCF)

1. Improve forest management
2. Revitalise degraded ecosystems
3. Support wood industry adaptation
4. Increase forest area
5. Turn grasslands back to net sinks
6. Plant hedgerows and field trees
7. Protect wetlands and peatlands
8. Reach net zero artificialisation

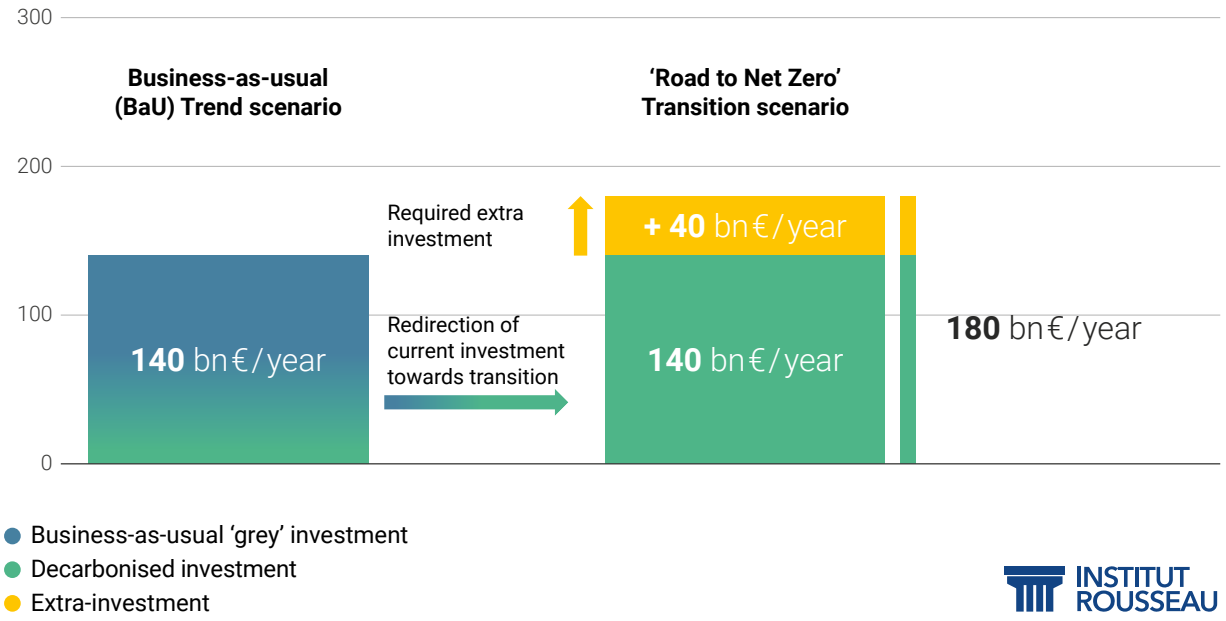
CROSS-SECTOR LEVERS

1. Enhance Research & Development in transition solutions
2. Foster public awareness of environmental issues
3. Boost the Fair Transition Fund to support professional transitions

2 Global investment required

The collective investment required to activate all decarbonisation measures is estimated at €5 trillion by 2050, averaging €180 billion yearly (Figure 4). This equals almost 9.4% of current GDP. This contrasts with the ongoing business-as-usual (BaU) scenario, estimated at around €3,85 trillion between now and 2050, averaging €140 billion per year (7.3% of current GDP). The difference, about €1.15 trillion or an average of €40 billion per year, represents the 'extra investment' needed for carbon neutrality. This extra investment represents a 30% increase compared to the baseline scenario and around 2.1% of current GDP.

Fig. 4 **Concepts and amounts of total EU-27 investment required for the transition and extra investment compared with a business-as-usual scenario (in billions of euros per year)**



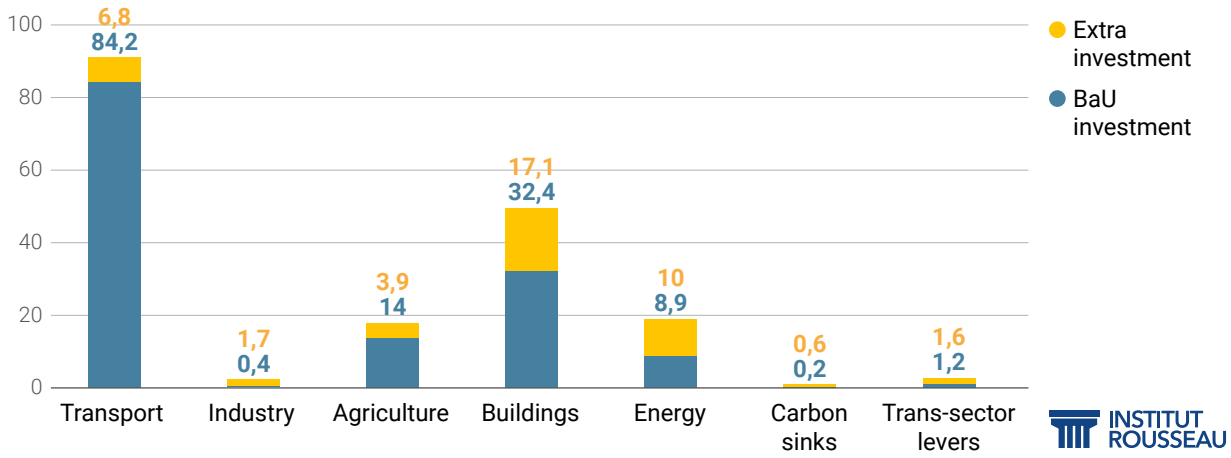
These estimates are correct only under the express condition that all BaU investments are actively redirected towards the transition by 2050. This implies a massive divestment from sectors that have become partially to completely obsolete. Without this active shift, not only will carbon neutrality not be achieved, the above-mentioned extra cost will also be higher.

In terms of total investment (Figure 5), approximately 77% is focused on two sectors: transport (**50%** of overall investment, €91 billion annually) **and buildings** (**27%**, €49 billion annually). This is due to the large-scale nature of these sectors, which invest in tens of millions of vehicles and buildings. These sectors are followed by energy production and infrastructure (10%, €19 billion annually) and agriculture (10%, €18 billion annually). Industry (€2.1 billion annually), cross-sector measures (€2.7 billion annually), carbon sinks (€1 billion annually) and waste management require only 3% of total investment.

When considering extra investment compared to the business-as-usual trend, the top three sectors remain the same, but the **buildings and energy production sectors require the most substantial extra effort, with respectively 41%** (€17 billion per year) **and 24%** (€10 billion per year) of the total

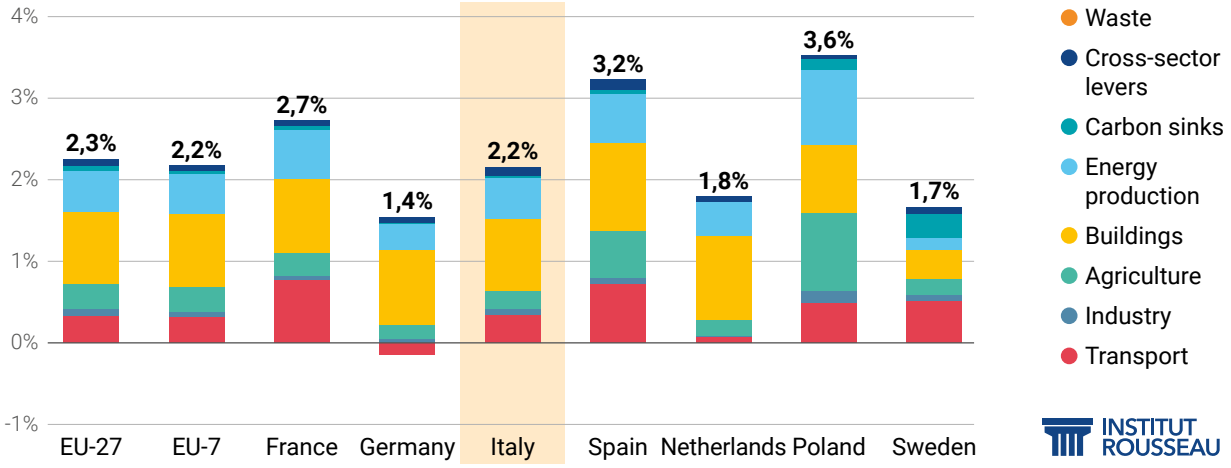
extra investment required. In the building sector, this is attributed to the need for an accelerated renovation pace and a shift towards comprehensive renovations, which are individually more expensive. On the energy side, electricity production almost triples due to electrification of uses. Significant extra investments are required to adapt the electrical grid and increase renewable production (mostly solar), because the business-as-usual scenario for these infrastructure is relatively low. Italy relies on imports of decarbonized gases, which reduces its need for investments in local renewable generation compared to other countries. The transport sector's decrease in extra investment ranking is mainly due to reducing the private car fleet.

Fig. 5 **Italian trend investment, extra-investment and total investment per sector, in billion euros per year, on average, by 2050.**



When considering all sectors, Italy's additional investment requirements align with the EU average, as illustrated in Figure 6. While investment needs are slightly elevated for transport infrastructure, the increase in railway investments in recent years has helped moderate extra investment demands. Conversely, Italy's additional investment needs are slightly lower for agriculture, attributable to the nation's existing relatively substantial public support for organic farming and other Agro-Environmental and Climate Measures (AECMs).

Fig. 6 **Yearly extra investment needed by sector per country (in % of GDP 2022)**

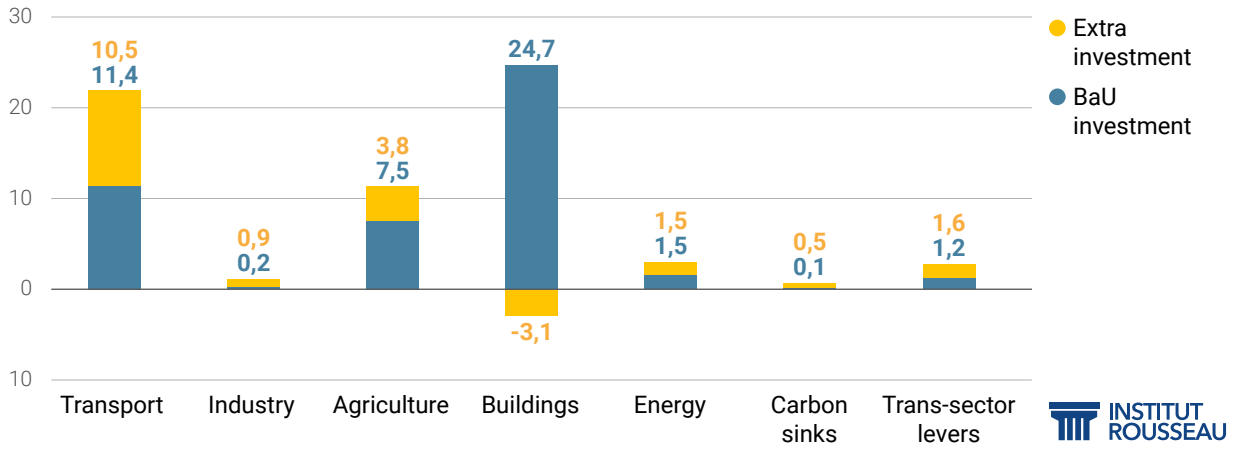


3 Public investment required

This study also outlines 73 public policy proposals to catalyse these investments, categorised for each of the 37 decarbonisation levers.

The total public cost of these measures for Italy is estimated at €62 billion annually, with €16 billion exceeding the trend scenario. This is equivalent to a +30% increase in average annual public investment.

Fig. 7 **Italian public trend investment, extra-investment and total investment per sector, in billion euros per year, on average, by 2050.**

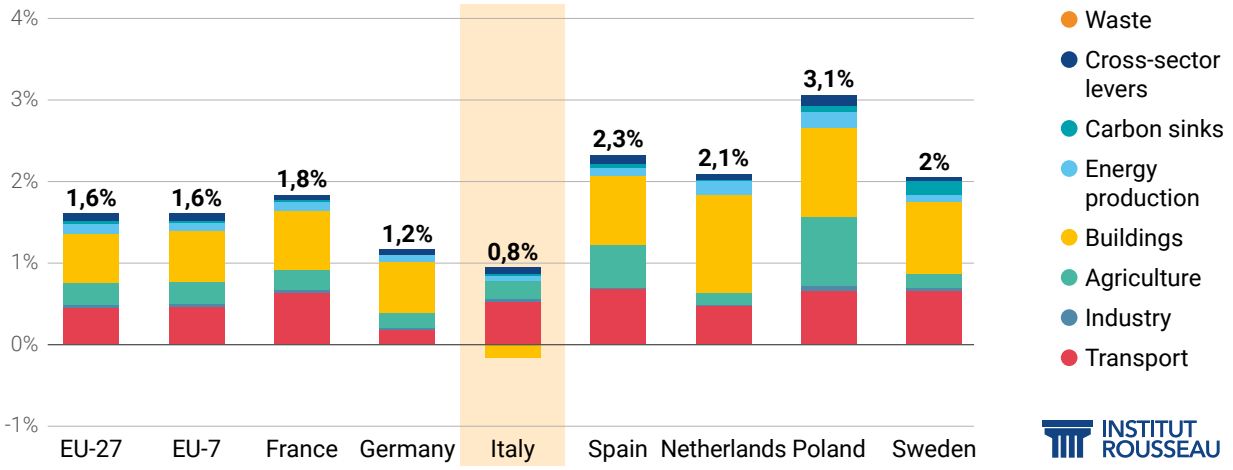


The sectoral breakdown of the €62 billion investments shows that the buildings sector (35%) and the transport sector (35%), together account for 70% of the required public investment. Agriculture stands for 18%, which brings these three sectors to a total of 88% of the essential public investments.

When considering extra public investments, the ranking changes. Transport accounts for more than half of the investment needed (56%), with another quarter on agriculture (24%). Energy production and infrastructure (5%) and cross-sector measures (4.5%) come next. Quite exceptionally, this ranking is not consistent with total public investment needs, since the **buildings sector actually requires a decrease in public investment** (- €3 billion per year or -12% ; cf. below). This is due to the 2020 launch of the 'Superbonus 110%', which resulted in a surge in tax credit commitments. This law necessitates reform, including integrating independent pre- and post-control mechanisms for renovations and adjusting subsidy rates for better balance. Public extra investments in the energy sector remain relatively modest due to the high penetration of increasingly cost competitive solar PV generation in the electricity system.

This negative extra public investment needed in the renovation sector leads to a very low total extra public investment for Italy, at €16 billion per year or approximately 0,8% of current Italian GDP, i.e. half of the EU average. Excluding this specific factor, Italy's additional public investment needs would align with the EU-27 average.

Fig. 8 **Yearly public extra investment needed by sector per country (in % of GDP 2022)**



The situation in Italy reflects a multifaceted landscape across various sectors:

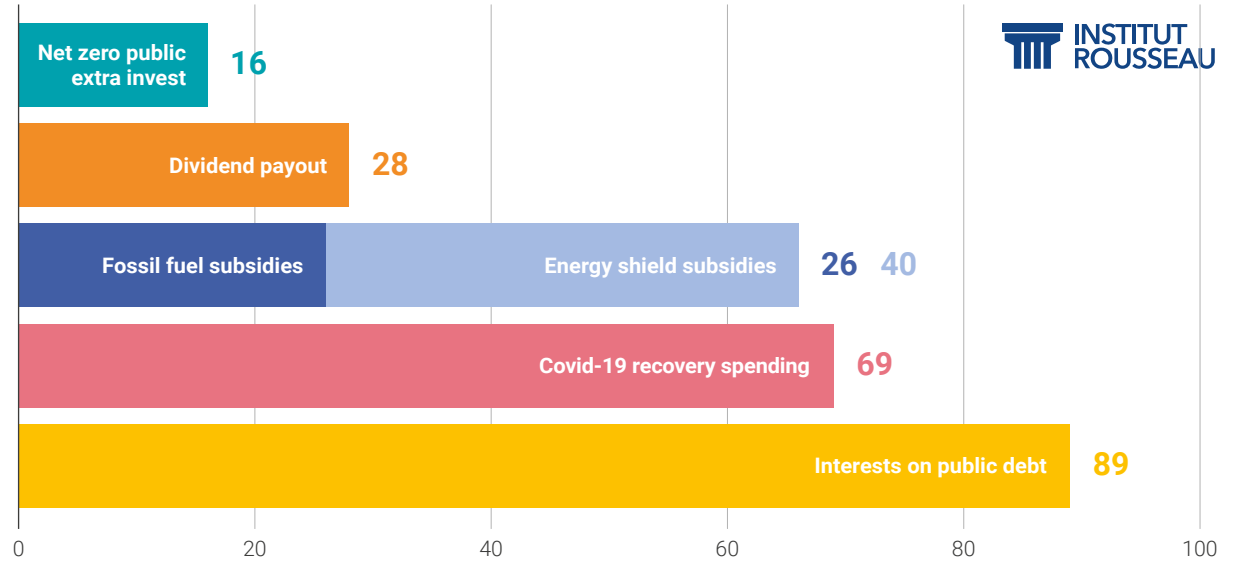
- **Public investment requirements are significant for the development of railway infrastructure and the promotion of train modal share**, particularly limited in Italy. However, recent increases in railway investments help temper extra investment needs, with spending levels already much higher than France (especially in new lines and extensions of existing ones) and nearing Germany's public investments.

- **Despite already substantial public support for organic farming and other Agro-Environmental and Climate Measures (AECMs), public support needs to be increased.** More precisely, high-performance standards in agro-ecological transition found in some regions (typically in the south) must extend to underperforming regions, notably in the north of Italy.

- **Italy's backing for transition-related R&D demands a significant boost**, given the current limited support in both energy and agriculture sectors.

Contextualising the proposed €16 billion per year is crucial. This amount, allocated to empower public authorities in stimulating, encouraging, and overseeing all stakeholders while setting the necessary pace to meet the European Union's climate objectives, must be viewed in perspective (cf. Figure 9). **€16 billion per year is around four times less than what Italy spent on fossil fuel subsidies (including price caps) in 2022 or its Covid-19 recovery spending. It is also one fifth of the country's interests on public debt.**

Fig. 9 **Contrasting extra public investment with known yearly budget (2022 values)**



This additional investment plan :

- Can be fully financed by redirecting existing fossil fuel subsidies.
- Will be offset in the short term by a significant decrease in energy costs for households, businesses, and public authorities.
- Is approximately six times less expensive than the potential cost of inaction[1][2].
- Will generate numerous local jobs, amounting to several million net positions at the European scale. All conventional sectors affected by the transition to net zero will require social support through a dedicated Just Transition Fund, included in the investment plan.
- Will yield returns by reducing the need for future public expenditure, such as unemployment insurance, energy bills, and costs related to climate change adaptation.
- Is nearly 50% less expensive than the investment plan proposed by the European Commission[3] (on a similar scope of sectors), thanks to a reduction in final energy consumption achieved through both efficiency and sufficiency measures.

If sufficiency and local production options are prioritized, it will also enhance the EU's energy security, economic sovereignty, competitiveness, and trade balance.

Images: Storyset.com/Freepik.com, Unsplash.com

Notes

1. Kotz & al., The economic commitment of climate change, published in the journal Nature in April 2024.
2. Additionally, ADEME estimates adaptation costs for France alone at €260 billion per year; 'Climate risks and their costs for France: to preserve the economy, the urgency to act now', December 2023. To be compared to a + €70 billion per year of global (public + private) net zero extra investment in our scenario, i.e. a × 4 ratio.
3. European Commission 2040 climate target, feb 2024.