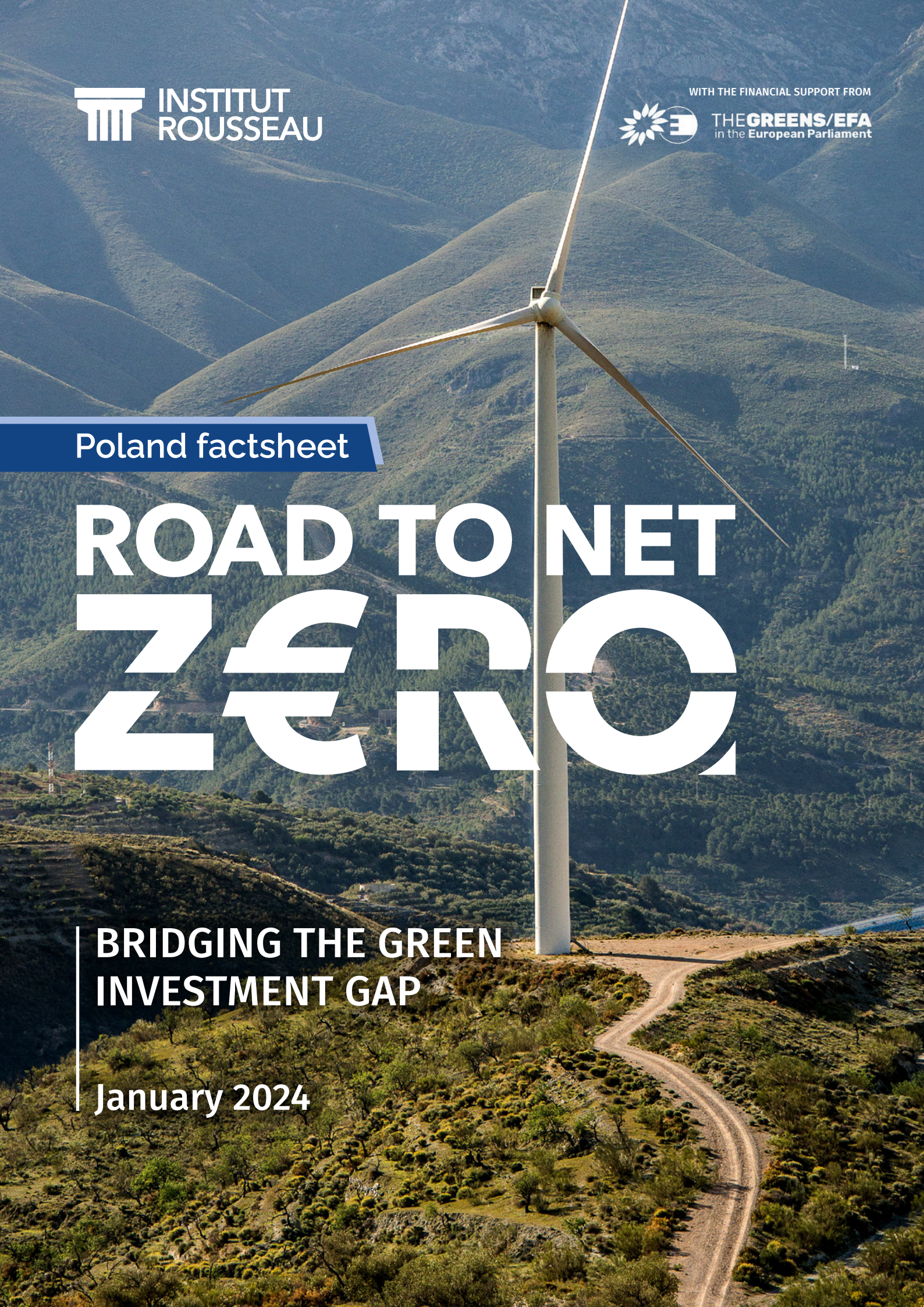
INSTITUT ROUSSEAU

WITH THE FINANCIAL SUPPORT FROM
THE GREENS/EFA in the European Parliament



Poland 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 €25 billion investment is needed by 2050 to decarbonise the Polish economy, averaging around 3.6% of current GDP** yearly. **It is the country showing the highest needs among studied countries**, mainly due to greater efforts needed in the energy, transport and agriculture sectors.
- This extra-investment plan can be **partially 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**.
- **Poland's public expenditure should almost triple** from €13 to €33 billion per year. **This additional public investment of €20 billion per year amounts to around 3.1% of the current GDP**. Biggest needs for additional public support are in the **buildings, agriculture and transport sectors**.

ENERGY PRODUCTION AND INFRASTRUCTURE

Poland shows a higher share of energy investments in %GDP than any other studied country because of the current fossil-based mix. This implies additional efforts both at the production and grid levels.

TRANSPORT

Significant public extra-investments to be done for the decarbonation of road vehicle fleets, by strongly reinforcing the subsidies policies (to be tripled) as well as for public transportation development (current public investments to be doubled).

BUILDINGS

Extra-investments in efficient renovation remain affordable for Poland thanks to relatively low renovation cost/m² and surfaces, but an acceleration is urgent given the very high share of energy-intensive buildings to be renovated (84% vs. around 70% in most countries, due to rather energy-intensive construction until the late 2000s).

AGRICULTURE

Poland needs a much higher level of extra investment for agricultural transition, mostly due to a very high agricultural area/GDP ratio and the still marginal development of organic practices.

CARBON SINKS (LULUCF)

Poland's wetlands and peatlands aren't costly to protect but essential to reach high levels of decarbonization. **If half of Poland's peatlands were to be degraded, additional 4.2 Mha of forest** (almost half the total wooded area) **would need to be planted** to temporarily offset such a loss.

CROSS-SECTOR/R&D

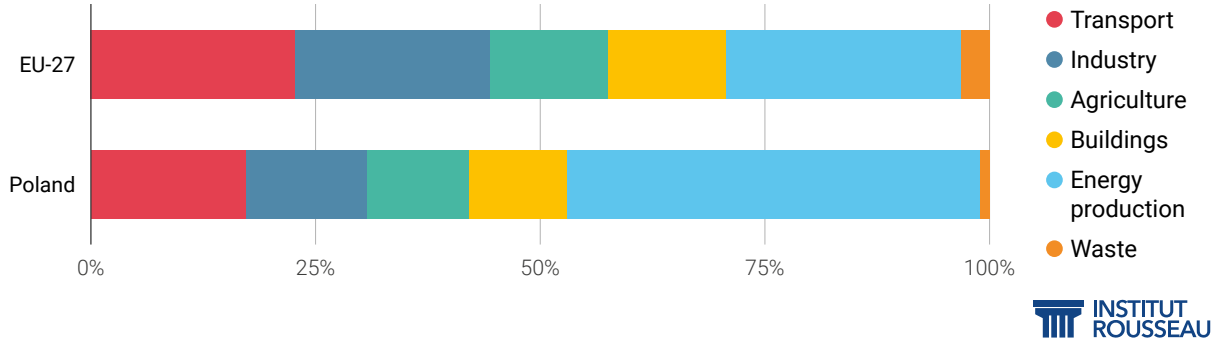
Despite a steady increase since 2019, Poland support for research on transition topics still needs to be at least tripled given its very limited initial level.

1 Current GHG emissions, decarbonisation potential and action levers available

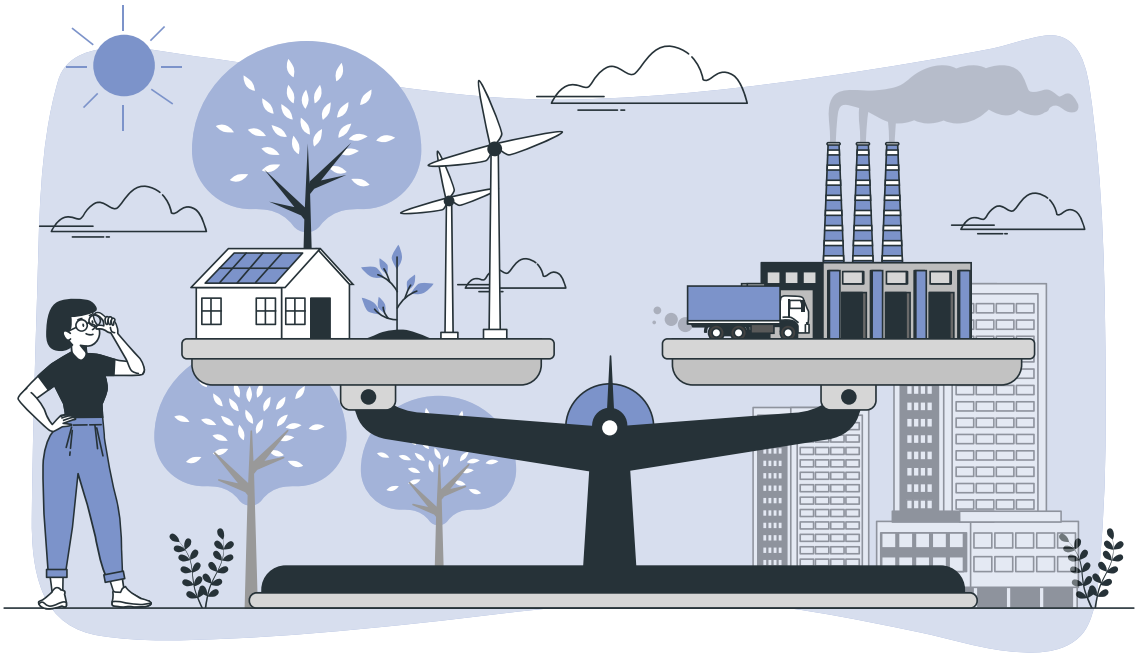
1.1 Current GHG emissions profile

Poland's territorial emissions are primarily due to energy production (46%) and transport (17%). Industry follows with 14%, before agriculture and buildings (which consume energy for heating, cooking, etc.) with 11% each. Waste management constitutes the remaining 1%, primarily attributed to methane emissions resulting from the natural decomposition of organic waste in landfills.

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



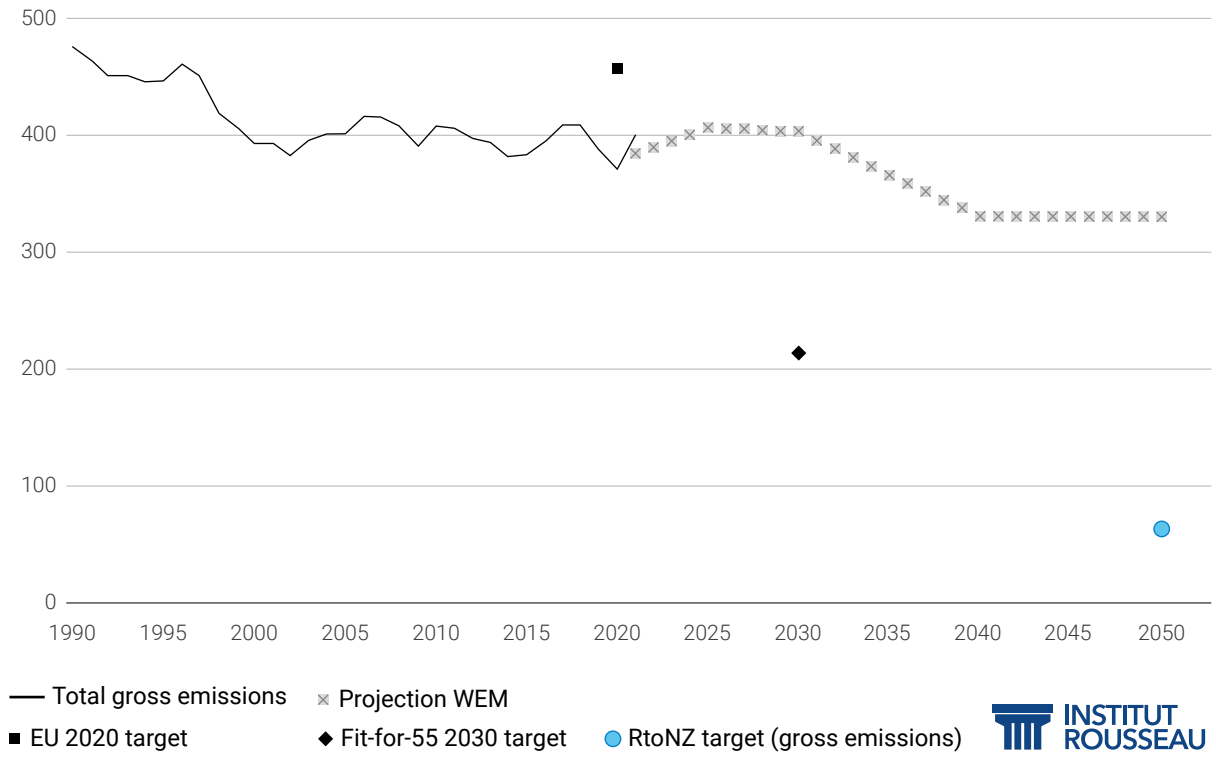
Compared to the rest of the EU, Poland stands out with a much more carbon-intensive energy mix (due to the extensive use of coal for electricity production). As a result, all the other sectors carry proportionally less weight in Poland than the EU average.



1.2 GHG emissions trend

Poland is the fourth greenhouse gas emitter in Europe, behind Germany, Italy and France. It contributed 400 million tons of CO_2-eq in 2021, approximately 12% of the European Union's emissions. Since 1990, the country's emissions have decreased by 16% or 2.4 million tons per year on average (compared to -29% for EU-27), as shown on Figure 2.

Fig. 2 **Poland'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 Polish 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

INSTITUT ROUSSEAU

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

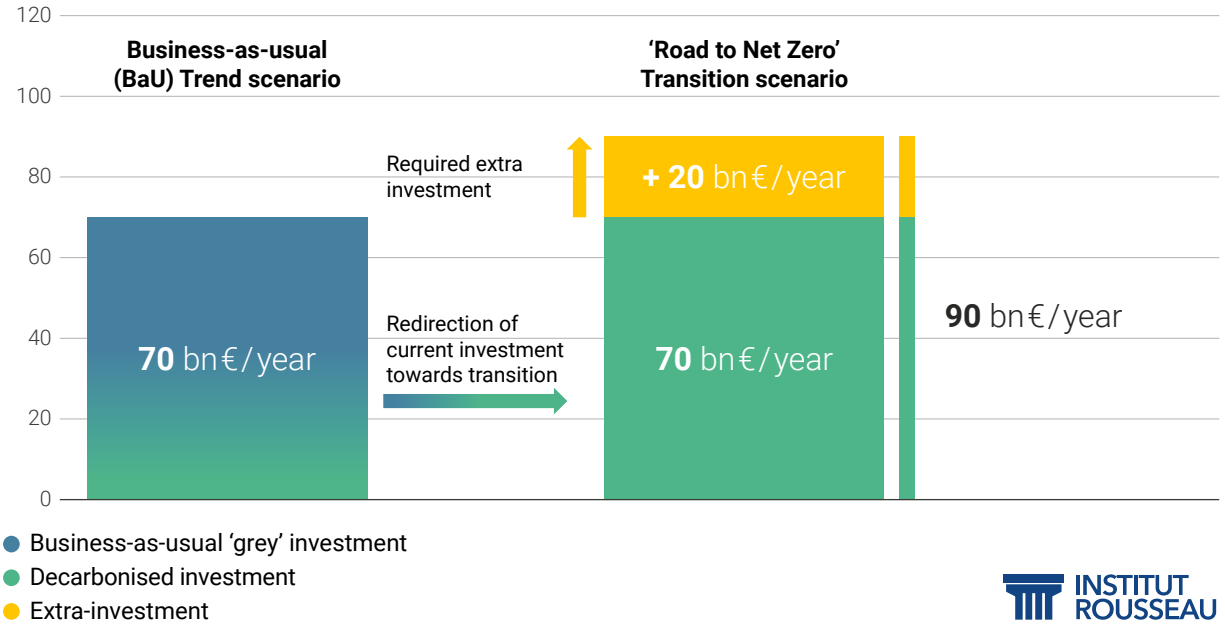
CROSS-SECTOR LEVERS

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 €2.4 trillion by 2050, averaging €90 billion yearly (Figure 4). This equals almost 13.6% of current GDP. This contrasts with the ongoing business-as-usual (BaU) scenario, estimated at around €1.75 trillion between now and 2050, averaging €65 billion per year (10% of current GDP). The difference, about €650 billion or an average of €25 billion per year, represents the 'extra investment' needed for carbon neutrality. This extra investment represents a 36% increase compared to the baseline scenario and around 3.6% 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)**



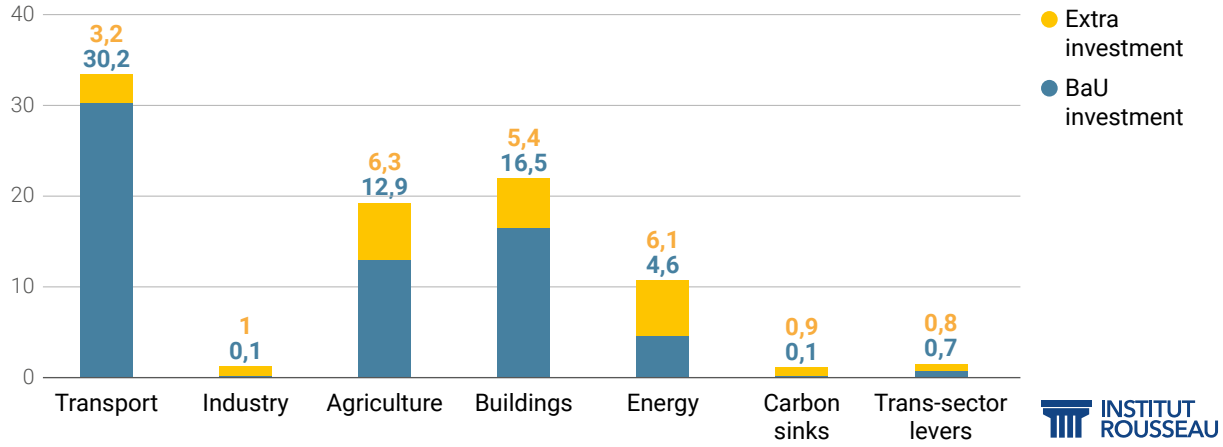
These estimates are correct only under the express condition that all BaU investments are actively redirected towards the transition by 2050. This implies a massive divestment from sectors that have become partially to completely obsolete. Without this active shift, not only will carbon neutrality not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

In terms of total investment (Figure 5), approximately 84% is focused on three sectors: transport (38% of overall investment, €33 billion annually), **buildings (25%**, €22 billion annually) **and agriculture (22%**, €19 billion annually). This is due to the large-scale nature of the first two sectors, which invest in tens of millions of vehicles and buildings, and a particularly high agricultural surface / GDP ratio in Poland. These sectors are followed by energy production and infrastructure (12%, €11 billion annually). Industry (€1.1 billion annually), cross-sector measures (€1.5 billion annually), carbon sinks (€1 billion annually) and waste management require only 4% of total investment.

When considering extra investment compared to the business-as-usual trend, the top four sectors remain the same, but the ranking changes. Energy production and infrastructure and agriculture come first, with 26% each. Buildings and transport follow, with respectively 23% and 14% of the total extra investment

required. Compared to the previous ranking, the transport sector's decrease in extra investment ranking is mainly due to reducing the private car fleet in the transition scenario compared to the trend.

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

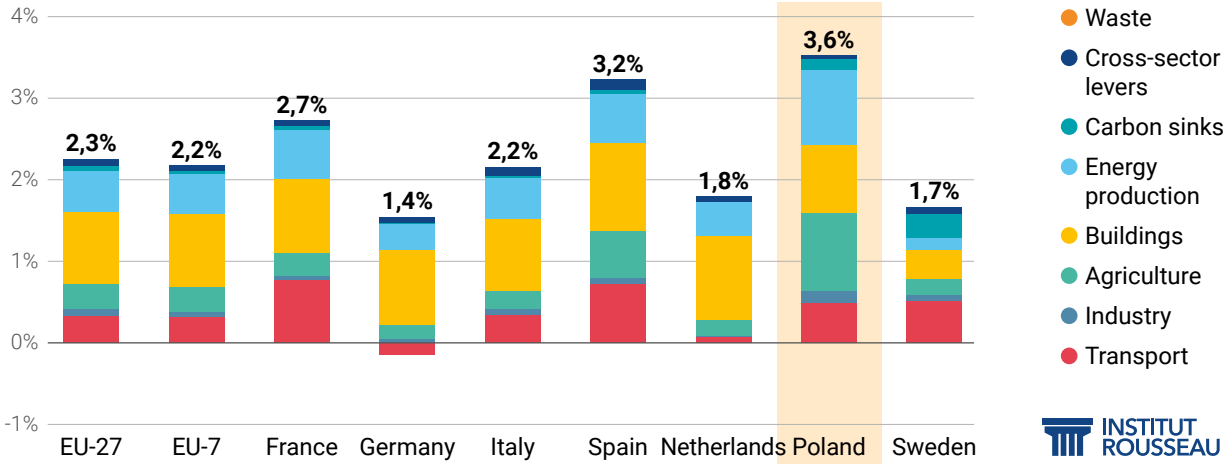


All sectors taken into account, Poland necessitates the most substantial additional investments among the examined countries, as illustrated in Figure 6, for two primary reasons:

- **A proportionally higher investment need in the energy production and infrastructure sector**. The scenario assumes robust electrification, contrasting with the predominantly fossil-based current production mix, resulting in a twofold increase in electricity consumption compared to the trend scenario. This necessitates substantial additional renewable capacity and significant investments in the power grid.

- **The agricultural transition also demands proportionally higher extra investment** due to the combination of a notably high agricultural area/GDP ratio and relatively limited current support for alternative agricultural practices.

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



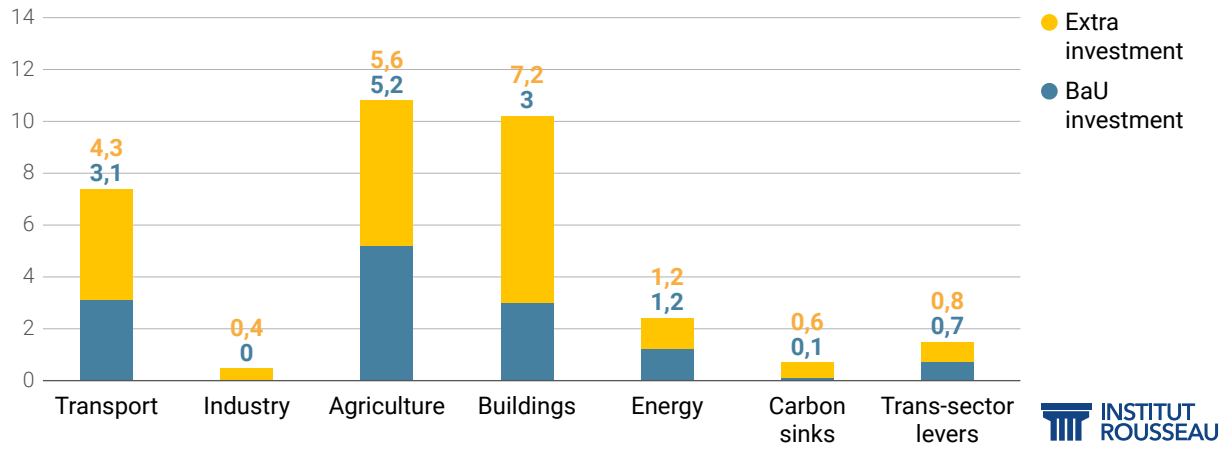
To a lesser degree, Poland requires significant additional investments in the modernisation of its railway network, particularly to enhance the existing infrastructure and establish more appealing lines for passengers (cf. details hereafter).

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 Poland is estimated at €33 billion annually, with €20 billion exceeding the trend scenario. This is equivalent to multiplying the average annual public investment by a 2.5 ratio.

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

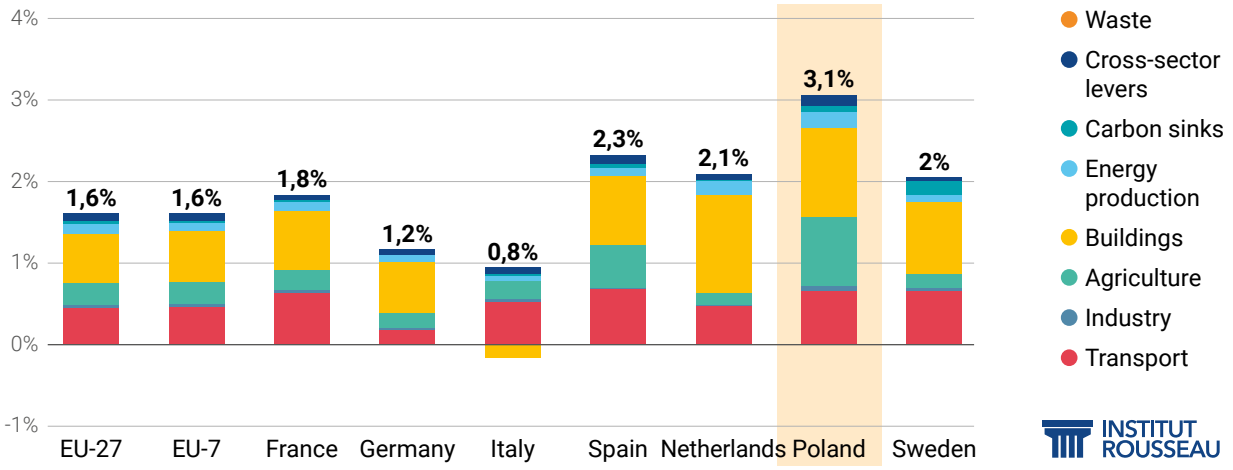


The sectoral breakdown of the €33 billion investments shows that the agriculture sector (32%) and the buildings sector (30%), together account for 62% of the required public investment Transport stands for 22%, which brings these three sectors to a total of 85% of the essential public investments.

When considering extra public investments, the same three sectors account for 85% of the extra public investment needs: buildings (36%), agriculture (28%) and transport (21%). Energy production and infrastructure (6%) and cross-sector measures (4%) come next, far behind. The ranking remains consistent with total public investment needs, since public support allocations are generally calculated within the same scope between the transition and reference scenarios.

These €20 billion per year of extra public investment equal approximately 3.1% of current Polish GDP. This is the highest need among studied countries, primarily driven by the significant support required for agricultural transition. Similar to Spain, this heightened level of additional support is largely attributed to Poland's notably high agricultural area/GDP ratio, compounded by the existing limited support for organic practices.

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



In addition to agriculture, Poland's public investments necessitate notable shifts in other sectors:

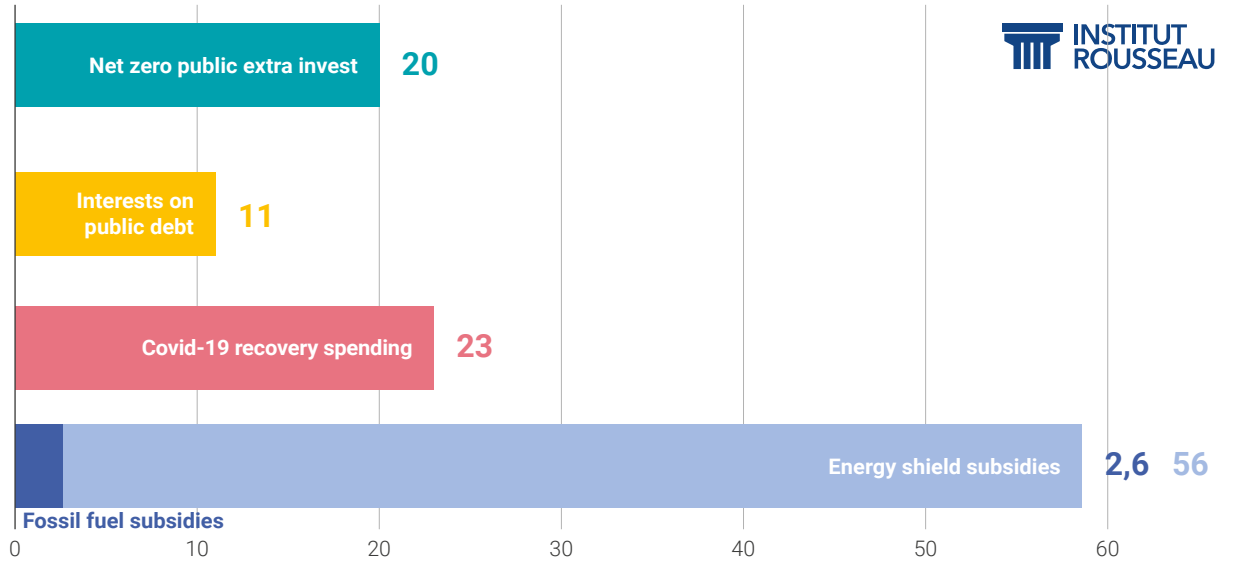
- **Building renovation in Poland requires a substantial increase in public support**, driven by a high proportion of energy-consuming buildings (80%) and current limited levels of public support for residential renovation..

- **In the transportation sector, there are high public investment needs for railway and soft mobility infrastructure.** Despite a relatively dense railway network, there are considerable requirements for renewal and upgrade investments, with several high-speed rail projects planned to enhance the modest modal share for passengers (currently below the EU average). Meanwhile, although the share of rail freight is declining, it remains above average.

- **Regarding research and development (R&D), Poland's support for transition-related R&D must be significantly bolstered**, given the limited support observed over the past decade.

Contextualising the proposed €20 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). **€20 billion per year is comparable to Poland's Covid-19 recovery spending and around three times less than what the country spent on fossil fuel subsidies (including price caps) in 2022.**

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



This additional investment plan :

- Can be partially 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.