



EUROPEAN
COMMISSION

Brussels, 4.6.2025
SWD(2025) 205 final

COMMISSION STAFF WORKING DOCUMENT

2025 Country Report - Germany

Accompanying the document

Recommendation for a COUNCIL RECOMMENDATION

on the economic, social, employment, structural and budgetary policies of Germany

{COM(2025) 205 final}

Germany

2025 Country Report



ECONOMIC DEVELOPMENTS AND KEY POLICY CHALLENGES

New impulses expected to support recovery

Germany has been through a prolonged period of economic stagnation. Since the COVID-19 pandemic, it has recorded one of the weakest recoveries in the EU. The gap to the EU average has widened, with Germany being the only major EU economy ⁽¹⁾ to contract in 2024 (Graph 1.1). The energy shock in 2021 hit Germany particularly hard given the large share of manufacturing in its economy. Production in energy-intensive industries fell by 15% between late 2021 and early 2025. At the same time, weak export dynamics weighed on growth. German exporters began losing global market share as China shifted from a key market to a direct competitor, especially in machinery, automotive and green technologies ⁽²⁾. Broadly stagnating domestic demand delayed the recovery further: in 2024, households increased their savings amid heightened uncertainty, while investment in housing declined. Companies cut their investment and remained net lenders. Overall, investment declined sharply, by 6.3% between 2019 and 2024, driven partly by increased financing costs. Net investments were the lowest in the EU (Graph 1.2).

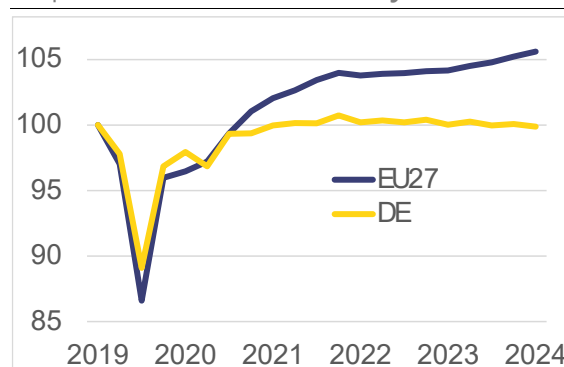
⁽¹⁾ Germany, France, Italy, Spain, the Netherlands and Poland.

⁽²⁾ Projektgruppe Gemeinschaftsdiagnose, 2024, *Deutsche Wirtschaft im Umbruch*, [gemeinschaftsdiagnose.de](https://www.gemeinschaftsdiagnose.de).

Looking ahead, growth is set to resume slowly despite rising global trade tensions.

In 2025, GDP is projected to stagnate, before accelerating in 2026 to 1.1%. The rebound is mainly driven by a catch-up in private consumption. Investment is set to benefit from improving financing conditions and a slight uptick in construction orders. However, these positive trends are partly offset by new trade restrictions and ongoing global uncertainty, particularly linked to US trade policy. US tariff increases impact Germany especially severely, as it is one of the most exposed countries in the EU. In particular, the car and machines industries are hit hard.

Graph 1.1: GDP level in Germany and the EU



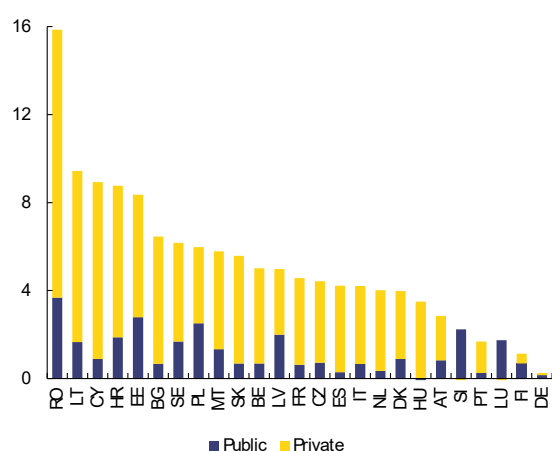
Source: Eurostat; Q4-2019 = 100

Box 1: UN Sustainable Development Goals (SDGs)

Germany performs above the EU average and is further improving on most SDGs related to productivity (SDGs 8 and 9) but needs to catch up with the EU average on quality education (SDG 4).

Worsening education outcomes, a high number of young people leaving school early and weak basic digital skills risk exacerbating the skills shortages and further hampering economic growth and competitiveness. Out of the 17 indicators, 7 SDGs remain below the EU average. These relate to quality education (SDG 4), environmental sustainability (SDGs 2, 12 and 13) and fairness (SDGs 5, 7 and 10) (Annex 15).

Graph 1.2: Net investment



2024, % of GDP. IE omitted as an outlier.

Source: AMECO

The turnaround in fiscal policy could rekindle short- and long-term growth. In March 2025, a constitutional amendment was adopted allowing the government to take on additional debt. The reform exempts - and security-related spending above 1% of GDP from the debt brake. Moreover, the regional governments (*Länder*) are granted up to 0.35% of GDP for structural new borrowing. A new special infrastructure fund of up to EUR 500 billion has been set up for 12 years, allowing for additional public investment. The growth impact could be significant but will depend on spending priorities, timely and efficient implementation, and progress in removing bottlenecks to public investment (see Section 2). In previous years, the level of

public investment had been insufficient to meet spending needs, with the resulting investment gap estimated to be between EUR 40 and 130 billion yearly (1-3% of GDP) ⁽³⁾.

More sustained public investment could contribute to a rebalancing of the economy towards stronger domestic demand. Germany has recorded a high current account surplus for two decades, reflecting sluggish domestic demand, with savings considerably exceeding investment. The recently undertaken in-depth review under the macroeconomic imbalance procedure shows that the current account remains high, even if it has declined from the heights recorded in the past two decades ⁽⁴⁾. Looking ahead, higher domestic demand combined with weaker export dynamics are expected to lead to a shrinking of the current account surplus to levels below the 5.7% of GDP registered in 2024.

(3) Studies by BDI, IW Köln/IMK and Dezernat Zukunft. For an overview see European Commission, 2025, In-Depth Review for Germany, *Institutional Paper 307*, ec.europa.eu;

(4) European Commission, 2025, In-Depth Review for Germany, *Institutional Paper 307*, ec.europa.eu

Structural challenges call for an economic transformation

Germany's potential GDP growth is among the lowest in the EU. Potential growth is the long-term rate at which an economy grows when using its resources – labour, capital and technology – at a normal level. For Germany, it is projected to average just 0.5% annually over the period 2025-2029, placing it at the back end among EU economies. This reflects a combination of structural challenges, which pre-date recent crises. Demographic ageing is dampening economic growth as a shrinking labour force in combination with low and declining hours worked intensifies a shortage of skilled workers. Without significant policy changes the number of workers is expected to shrink, weighing on GDP growth by –0.1 pps in the period 2025-2029. This is a sharp decline compared to the 0.6 pps GDP growth contribution each year in 2010-2019. In addition, low public and private investment over many years has led to an ageing capital stock weighing on growth potential and starting to impact export competitiveness ⁽⁵⁾.

While Germany's competitiveness is under pressure, its strong economic foundations offer potential for transformation. In the past, the country's comparative advantage came from the large clusters surrounding its industrial production. However, technological shifts and still relatively high energy prices cast doubt on the future of this model. Sectors such as automotive and chemicals have experienced downturns, impacting overall economic performance. Manufacturing is

no longer driving growth, and it is not certain how the gap should be filled. Yet, the diversified economy with a strong industrial base and dynamic small and medium-sized enterprises provides a strong foundation for addressing the need to modernise and adapt the economy.

The business environment is deteriorating. Germany's business environment still has many strengths, including the large market size, a relatively well-developed infrastructure and a highly trained workforce. However, productivity and competitiveness are hampered by considerable red tape, limited disruptive innovation and business dynamism, and delays in expanding digital networks and services (see Section 2). These challenges are also reflected in the global competitiveness ranking by the International Institute for Management Development, in which Germany fell from 6th to 24th place in less than a decade.

The labour market remains relatively robust but shortages persist. In the last years, declining employment in manufacturing was largely offset by job growth in public services, education and the health sector. Unemployment increased only slightly (from 3.2% end 2023 to 3.5% end 2024) and remains well below the EU average. Although employment growth came to a halt by the end of 2024 and labour market tightness eased slightly, 28% of companies still reported labour shortages as of February 2025. Broad-based wage increases, benefiting in particular lower earners, have helped real wages recover to near pre-pandemic level. Looking ahead, shortages are likely to further intensify. Germany's working-age population is projected to decline more sharply than in other EU countries, with the 20-64 age group falling from 50 million in

⁽⁵⁾ European Commission, 2025, In-Depth Review for Germany, *Institutional Paper* 307, ec.europa.eu

2023 to 46 million by 2035 ⁽⁶⁾. Average hours worked are among the lowest in the EU and continue to decline. Low and deteriorating education outcomes coupled with a very high share of early school leavers further aggravate the situation (see Section 4).

Accelerating the green transition is essential for achieving sustainable growth. Germany plays an important role in both the supply of and demand for clean technologies (Annex 7). It is one of the leaders on eco-innovation and performs strongly on green patents ⁽⁷⁾. The expansion of renewable energy has also made considerable progress. However, major challenges remain in balancing this expansion with affordable energy prices and a stable supply. Meeting this objective requires cost-effective grid development. In addition, further progress on decarbonisation will depend on faster electrification and targeted emission reductions across all sectors (see Section 3).

Fiscal policies loosen, making it even more important to focus on the quality of public finances

Germany's public debt has gone down since the COVID shock, but public expenditure stays high. The debt-to-GDP ratio has been on a downward trajectory from its peak at 68.1% in 2021, until levelling out in recent years (62.9% in 2023 and 62.5% in 2024). It remains far below the euro area average of 89%. The headline deficit decreased slightly from 3.2% (2021)

to 2.8% (2024). Government expenditure however has remained high since the pandemic. It increased from 45.6% of GDP in 2019 to 49.5% of GDP in 2024, negatively affecting overall fiscal space for new spending. This was mainly driven by government consumption, social benefits and subsidies. Revenues have been lower than expected for two years ⁽⁸⁾ but are still elevated due to wage growth ⁽⁹⁾. These developments will be assessed in the medium-term fiscal-structural plan, to be submitted by Germany this year.

Net expenditure growth is expected to decline in 2025. In 2024, net expenditure⁽¹⁰⁾ in Germany grew by 4.0% (see Annex 1). This increase is mainly driven by intermediate consumption and social transfers. In 2024, discretionary revenue measures of 0.4% of GDP are subtracted from net expenditure growth. In 2025, net expenditure is forecast by the Commission to grow by 2.1%. The decline is due to lower expenditure growth across most categories and a higher volume of discretionary revenue measures.

Large parts of the federal budget are still earmarked for recurring transfers, which risks crowding out productive spending. In particular, payments from the federal budget to the pension system have consistently been over EUR 100 billion

⁽⁶⁾ European Commission, 2024, *2024 Ageing Report*. economy-finance.ec.europa.eu.

⁽⁷⁾ German Patent and Trade Mark Office, 2022, *Germany is leading in the field of climate-friendly innovations*, dpma.de.

⁽⁸⁾ Germany's 168th tax estimate, bmf.de.

⁽⁹⁾ European Commission, 2025, *European Economic Forecast Spring 2025, Institutional Paper 318*, ec.europa.eu/Commission.

⁽¹⁰⁾ Net expenditure is defined in Article 2(2) of Regulation (EU) 2024/1263 as government expenditure net of (i) interest expenditure, (ii) discretionary revenue measures, (iii) expenditure on programmes of the Union fully matched by revenue from Union funds, (iv) national expenditure on co-financing of programmes funded by the Union, (v) cyclical elements of unemployment benefit expenditure, and (vi) one-off and other temporary measures.

(around 25% of federal government expenditure) in recent years ⁽¹¹⁾, around five times as high as federal spending on research and development outside of higher education ⁽¹²⁾. Exploring the use of individual or national investment funds could help finance the pension system and channel long-term savings towards investment ⁽¹³⁾. There are several levers that could enhance the sustainability of the pension system as well, including reducing incentives for early retirement, adjusting pension indexation and revising contribution ceilings ⁽¹⁴⁾. In addition, the efficiency of public spending can be enhanced by conducting spending reviews. The state subsidy ratio in Germany remains high at around 6.6% of GDP since 2022 ⁽¹⁵⁾, leaving room for assessing which subsidies could be phased out or replaced.

⁽¹¹⁾ Bundesministerium für Arbeit und Soziales (BMAS), 2024, *Rentenversicherungsbericht 2024*, [bmas.de](https://www.bmas.de).

⁽¹²⁾ Bundesministerium für Finanzen (BMF), 2025, *Overview of federal budgetary and financial data*, [bmf.de](https://www.bmf.de).

⁽¹³⁾ GCEE, 2023, *Annual Report 2023*, [svr.de](https://www.svr.de).

⁽¹⁴⁾ GCEE, 2024, *Annual report*, [svr-wirtschaft.de](https://www.svr-wirtschaft.de).

⁽¹⁵⁾ Kiel Institute 2025, *Kiel Subsidy Report 2024*, [ifw-kiel.de](https://www.ifw-kiel.de).

Barriers to private and public investment

Over the past decades, overall investment has fallen short of investment needs. According to studies from Germany's economic institutes ⁽¹⁶⁾ and surveys from the European Investment Bank, the most important factors slowing private investments are:

- **Burdensome bureaucracy.** Extensive obligations regarding documentation and reporting, long administrative processes, in particular for permitting, as well as regulatory differences between regions hamper innovation and the growth of private businesses.
- **Lack of skilled labour.** Despite a slight easing due to the recession, large parts of the economy are still curbed by a lack of skilled workers, which might further intensify in the future.
- **High energy costs.** The unprovoked Russian war of aggression against Ukraine has led to an upward shift in energy prices and a strong contraction of energy-intensive industry, which is significantly affecting investment plans.

Public investment is also affected by these factors. The newly legislated special fund for infrastructure will create fiscal space, but other bottlenecks for public investment remain. Two decades of low public investment have resulted in a considerable downscaling of planning capacities ⁽¹⁷⁾. Complexity inherent in federal structures and divided responsibilities might hinder a timely and efficient implementation of investment projects. Successful absorption of infrastructure investments was previously held back by a lack of clear planning, strategies and goals ⁽¹⁸⁾.

The implementation of Germany's RRP is well underway. At present, Germany has fulfilled 54% of the milestones and targets in its RRP. While Germany has leveraged STEP to reallocate some Cohesion Policy resources towards this priority, it can further support the development or manufacturing of critical technologies in the areas of digital and deep tech, clean and resource efficient technologies, and biotechnologies.

It remains important to accelerate the implementation of cohesion policy programmes. The mid-term review offers opportunities to speed up progress and better address EU strategic priorities related to competitiveness, defence, housing, water resilience and the energy transition.

Ausweitung kommunaler Investitionen, [ktw.de](https://www.ktw.de).

⁽¹⁸⁾ Bundesrechnungshof, 2024, *Annual Report*, [Bundesrechnungshof.de](https://www.bundesrechnungshof.de).

INNOVATION, BUSINESS ENVIRONMENT AND PRODUCTIVITY

Fostering business dynamism and innovation

As part of its economic transformation, Germany would benefit greatly from boosting business dynamism. The country's weak business dynamism, marked by declining firm entry rates⁽¹⁹⁾ in the last years and weak post-entry growth of firms in almost all sectors of the economy, poses challenges to its economic transformation. To foster innovation and find new sources of growth, it would be beneficial to create a more supportive environment for firm entry, innovation and expansion. For example, starting a company still involves significant red tape due to the lack of a 'one-stop shop' ⁽²⁰⁾.

The innovation activity of the private sector is highly concentrated and the uptake of new technologies has been slow. While private R&D spending is high, it is concentrated in large companies and specific regions (Annex 17). Crucially, R&D expenditure by small and medium-sized enterprises (SMEs) remains low (0.20% in 2021 vs 0.42% EU average, Annex 3). The declining share of SMEs engaged in innovation activities risks slowing productivity growth and the broader adoption of new technologies. Fine-tuning of R&D tax allowances could enhance the

innovation of SMEs. The slow shift towards new tech fields, notably compared to the United States, is also reflected in the low start-up rate, particularly in high-tech sectors.

Public research performance has been stagnating and commercialisation remains weak. Public R&D spending has stagnated over the last years (0.92% of GDP in 2023, 0.90% in 2015). The innovation environment could benefit from more public funding for deep tech/transformational innovation. R&D output has fallen when measured as a share of most cited publications and patent applications (Annex 3). Germany struggles to turn excellent research into successful products, partly because knowledge transfer is not viewed as a holistic, continuous process ⁽²¹⁾. There are positive examples of universities, like the Technical University of Munich (TUM), that include entrepreneurship in engineering or science curricula and have dedicated transfer offices and start-up accelerators. However, a more widespread and structured initiative to bridge research and commercialisation is still lacking, and dedicated budgets for universities and research institutions to support commercialisation and entrepreneurship are limited.

Venture capital financing has improved but remains insufficient. Besides red tape and a shortage of skilled labour, financing remains a key challenge for young

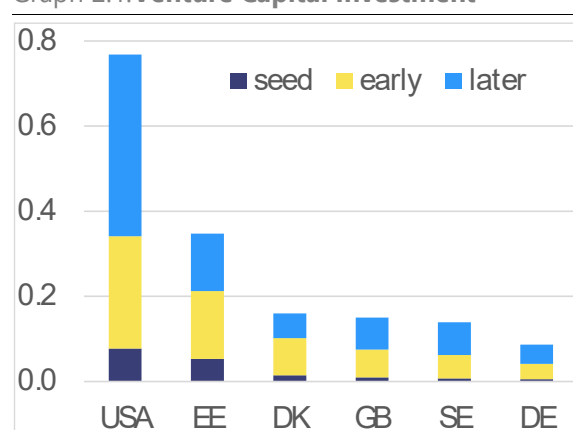
⁽¹⁹⁾ Eurostat [Business demography statistics](#)

⁽²⁰⁾ OECD, 2025, *Economic Survey Germany*, forthcoming.

⁽²¹⁾ EFI, 2025, *Forschungs- und Innovationspolitik stärken*, wirtschaftsdienst.eu.

entrepreneurs⁽²²⁾. With an average yearly venture capital investment of 0.084% of GDP between 2021 and 2023, Germany is behind its international competitors (Graph 2.1)⁽²³⁾. While improvements can be observed, the access to growth capital remains a bottleneck for the start-up sector. Regulations on portfolio management in funds of institutional investors limit the amount of exposure to high-yielding asset classes. Strengthening the role of institutional investors as capital providers could help deepen capital markets and improve efficiency and investment growth.

Graph 2.1: Venture Capital Investment



(1) As a share of GDP, 3-year rolling average 2021-2023

Source: OECD

Reducing red tape to enhance private investment

The bureaucratic burden is high and growing. According to the National Regulatory Control Council, the costs of complying with national legislation have

⁽²²⁾ Startup Verband, 2024, *Innovation Agenda 2030*, startupverband.de.

⁽²³⁾ Other sources like Dealroom.co have substantially higher VC figures for EU countries. However, a substantial gap to the US remains, see kfw.de.

risen significantly since 2021. Efforts to reduce red tape, such as the Bureaucracy Relief Act IV (*Bürokratie-entlastungsgesetz IV*) of October 2024, provided some limited relief but did not reverse the overall upward trend⁽²⁴⁾. Often it is the interaction with authorities more than the laws themselves which are seen as the main problem by companies. Concerns include lengthy administrative procedures, multiple data entries and the lack of communication between authorities⁽²⁵⁾. These issues are linked to the lagging digitalisation of public administration, reflected in a low digital decade score for digital public services for businesses (78.6 vs 85.4 EU average)⁽²⁶⁾.

Lengthy and complex administrative procedures have been holding back investment. 90% of firms report that bureaucracy and tight regulation constitute a barrier to investment for them. This makes bureaucracy the most important obstacle, followed by energy costs (80%) and a lack of skilled labour (79%)⁽²⁷⁾.

A lack of digitalisation of the public services has limited the progress made in cutting red tape. The new coalition agreement for the incoming government includes the target to reduce bureaucracy by 25% in the next four years which could help to make the simplification efforts more binding. A considerable reduction of the administrative burden could be achieved by digitalising public services and limiting compliance costs in existing and new legislation. Furthermore, modernising

⁽²⁴⁾ National Regulatory Control Council, 2024, *Annual Report*, normenkontrollrat.bund.de.

⁽²⁵⁾ German Business Panel, 2024, *GBP-Monitor*, research-in-germany.org.

⁽²⁶⁾ European Commission, 2024, *Digital Decade country report Germany*, digital-strategy.ec.europa.eu.

⁽²⁷⁾ Ifo, 2024, *Der Investitionsstandort Deutschland aus Unternehmenssicht*, ifo.de.

public registries with the 'once-only' principle based on the sharing of data across federal states could lead to further simplifications ⁽²⁸⁾.

Easing public investment bottlenecks to support competitiveness

Addressing bottlenecks for public investment is key. Strategic sectors like energy, education or research may present opportunities for targeted public investment to help boost innovation and sustainable economic growth ⁽²⁹⁾ in the context of the infrastructure fund. However, addressing bottlenecks for public investment (see box 2 in Section 1) will be of crucial importance. The German recovery and resilience plan (RRP) includes measures to accelerate planning and permit approval procedures, for example by digitalising public services and revising building legislation. These initiatives could help improve the overall framework for private and public investment. This would allow for a swift and effective use of both EU and national funds. Beyond that, encouraging more cooperation across regional authorities offers potential for creating synergies and avoiding parallel structures, for example in Germany's more than 10 500 municipalities. Germany could also build further on its efforts to strengthen capacity and knowledge of public procurers at regional level (Annex 4).

The private sector could contribute more to building and maintaining public

infrastructure. As it takes time to build public investment management capacities and investment needs are sizeable, involving the private sector in the design, realisation and, potentially, in the maintenance of public service provision could help to ensure that public services are rolled out more quickly. Public-private partnerships can leverage private sector expertise and financial capacity to improve the delivery of public services. A careful design of these partnerships is key for ensuring that risks and responsibilities are allocated between public and private stakeholders according to their relative advantages. Public services would also benefit from regular performance checks to make sure they match the public interest ⁽³⁰⁾. Several highways, airports and rail subsidiaries have already profited from private funding to complete construction projects more quickly ⁽³¹⁾.

Optimising the tax mix to foster inclusive growth and sustainable competitiveness

Germany's tax and benefit system discourages longer working hours. This reduces labour supply at a time of labour shortfall. Workers in Germany face the second highest level of taxes and social security contributions on earnings in the EU (Annex 2). The structure of the German tax and benefit system creates disincentives to entering employment or increasing working hours. High marginal tax rates and benefit withdrawal rules limit financial gains from additional work, particularly for low-income

⁽²⁸⁾ National Regulatory Control Council, 2025, *Empfehlungen für eine Reformagenda der nächsten Bundesregierung*, normenkontrollrat.bund.de.

⁽²⁹⁾ German Council of Economic Experts, 2023, *Annual Report*, sachverstaendigerat-wirtschaft.de.

⁽³⁰⁾ European Commission, 2024, *The future of European competitiveness – In-depth analysis and recommendations*, commission.europa.eu.

⁽³¹⁾ BMDV, 2020, *PPP contracts*, bmdv.bund.de.

earners and second earners, who are often women (Annex 2). This hinders a more efficient use of untapped labour market potential. Flattening the steep tax progression for middle incomes (*Mittelstandsbauch*) could further increase incentives to work more ⁽³²⁾. Furthermore, research has consistently shown that a reform of the joint taxation system (*Ehegattensplitting*) towards a system of individual taxation could increase labour supply by second earners ⁽³³⁾.

Germany has one of the highest corporate income tax rates in the EU, including the local trade tax (*Gewerbesteuer*). These tax rates have a combined effect of creating a complex and opaque system. Consequently, tax compliance costs are among the highest in the EU (Annex 2). The corporate taxation system also provides few incentives for investment and innovation. The tax burden on investment returns is the third highest in the EU ⁽³⁴⁾. Temporary enhancement of depreciation options and R&D tax credits – as foreseen in the coalition agreement – can be cost-effective ways of stimulating investment ⁽³⁵⁾ (see also above).

Environmental taxes and other less distorting taxes remain underused. Germany's tax mix is highly reliant on labour taxation, which accounts for 55.5% of total taxation. At the same time, environmental taxes appear to be underused: revenue from environmental taxes in Germany (1.8% of GDP) has

remained below the EU average (2.4%) and has strongly declined as a percentage of total tax revenues since 2012 (Annex 2). Similarly, revenue from property taxes and from recurrent taxes on immovable property has remained below the EU average in the past 15 years. Shifting the tax burden towards less distorting tax types of this kind could support sustainable growth and competitiveness ⁽³⁶⁾.

Accelerating the digital transition

Public administration is digitalising slowly. Germany is lagging behind the EU average on key digital decade targets regarding the provision of digital public services for (76 in 2024, EU average 79) and businesses (79 in 2024, EU average 85). When it comes to the uptake of digital public services, people in Germany are second least likely to use electronic identification (eID) and third least likely to use the internet for interactions with public authorities. Data registers are of low quality and poorly connected ⁽³⁷⁾, so that Germans have fewer pre-filled forms than other Europeans (DESI indicator score: 41 vs 71) ⁽³⁸⁾. The Recovery and Resilience Facility (RRF) includes measures to create an online European identity system and modernise data registers. Under the RRF, Germany has digitalised more than 200 services at federal and state (*Länder*) level. Progress has been made especially for the services that are most used by the public, such as registration. transformative, the distribution of legal and financial responsibilities between different government levels has

⁽³²⁾ Ifo, 2025, *Elemente einer grundlegenden Reform für das Steuer- und Abgabensystem in Deutschland*, [ifo.de](https://www.ifo.de).

⁽³³⁾ German Council of Economic Experts, 2023, *Annual Report 2023/2024*, [svr-wirtschaft.de](https://www.svr-wirtschaft.de).

⁽³⁴⁾ OECD, *Corporate tax statistics*, [oecd.org](https://www.oecd.org).

⁽³⁵⁾ IW Köln, 2024, *Der Effekt von Sofortabschreibungen auf die Attraktivität des Steuerstandorts*, [iwkoeln.de](https://www.iwkoeln.de).

⁽³⁶⁾ Leodolter et al., 2020, *Taxation of residential property in the euro area*, economy-finance.ec.europa.eu.

⁽³⁷⁾ National Regulatory Control Council, see above.

⁽³⁸⁾ European Commission, 2024, *Digital Decade country report Germany*, digital-strategy.ec.europa.eu.

led to inconsistent implementation of services between federal, state and municipal levels⁽³⁹⁾. In addition, studies have criticised the slowness with which public services have been digitalised⁽⁴⁰⁾⁽⁴¹⁾. More cooperation among governmental levels, guidance by the federal government and, where feasible, standardisation, are needed to ensure interoperability and uptake of IT solutions. In addition, streamlining and simplification, for instance by supervising data protection at federal government level, will allow for faster and more coherent digitalisation.

Germany still lags behind the digital decade gigabit connectivity target despite a positive dynamic. The country lags behind, especially on very high-capacity networks in rural areas (38%, EU average 56%). Fibre to the premises coverage is insufficient, with only 30% of households covered, considerably below EU average. The trend for 2024 appears positive but is not yet confirmed in new EU-level data. At 98%, Germany is close to reaching overall 5G coverage, but 5G coverage on the 3.4-3.8 GHz spectrum band, essential for enabling advanced applications requiring large spectrum bandwidth, remains considerably below the EU average⁽⁴²⁾.

Increasing housing supply through investment and simplified regulation

Housing investment fell for the fourth year in a row. Investment in housing has

contracted by 15% since 2020. The government's goal of 400 000 new homes every year has consistently been missed. In 2023, only around 290 000 new dwellings were completed. A quick turnaround is not projected, given that in 2024 only 215 900 housing permits were issued, 43% less than in 2021. Estimations of the gap between housing supply and demand go up to 600 000 dwellings⁽⁴³⁾. This shortage exacerbates housing affordability challenges (Annexes 11 and 17) and has macroeconomic implications, as it hinders labour mobility: more than half of companies and workers consider that the housing shortage is directly linked to the shortage of labour⁽⁴⁴⁾. Addressing this challenge requires a more dynamic business environment in the construction sector, supported by innovation in building practices. These include, for example, modular and serial construction, digital planning, and simplified and harmonised regulations (such as building type E, which simplifies standards for certain residential buildings). To increase the supply of housing and ease bottlenecks for construction, building land could be made available through improved land-use plans allowing for densification and better transport links to suburban areas. Furthermore, reducing gold plating and shortening procedures could help to reduce costs⁽⁴⁵⁾. Rent regulation measures such as rent caps and limits on rent increases do not address the underlying causes of housing shortages in tight markets. If regulation is too restrictive, it

⁽³⁹⁾ Nationaler Normenkontrollrat, see above.

⁽⁴⁰⁾ BMWK, 2024, *Digitalisierungsindex*, de.digital.

⁽⁴¹⁾ Bundesrechnungshof, 2024, *Bericht zur Umsetzung des Onlinezugangsgesetzes*, bundesrechnungshof.de.

⁽⁴²⁾ Digital Decade Country Report 2024: Germany

⁽⁴³⁾ Pestel-Institut, 2025, *Wohnungsbau und Wohnungsmärkte*, dgfm.de; zia-deutschland.de.

⁽⁴⁴⁾ German Council of Economic Experts, see above and PWC, 2025, *Wohnungsnot und die Folgen für den Arbeitsmarkt*, pwc.de; DIHK, 2024, *Wie die Wohnungsnot den Arbeitsmarkt beeinflusst*, dihk.de.

⁽⁴⁵⁾ IW Köln, 2024, *Optionen für bezahlbaren Neubau*, iwkoeln.de; ARGE, 2024, *Wohnungsbau 2024 in Deutschland*, arge-ev.de.

can weaken private investment incentives in the housing sector and hinder the efficient use of available housing

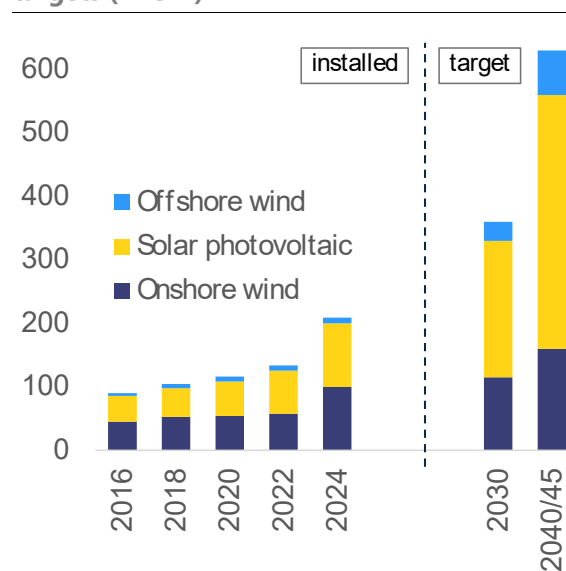
DECARBONISATION, ENERGY AFFORDABILITY AND SUSTAINABILITY

Addressing grid congestion to reap full benefits of renewables expansion

Germany continues to expand its renewable energy capacity, with clean energy now accounting for a majority share of electricity generation. In 2024, renewables made up 57.5% of the electricity mix (Annex 8). This growth, mainly due to the increase in solar and wind energy sources (Graph 3.1), reflects ongoing policy efforts, technological advancements and investment in clean energy infrastructure. Germany has made progress in accelerating its energy transition, including through the Recovery and Resilience Plan (RRP), which features the Wind Energy on Land Act and the Offshore Wind Energy Act to speed up wind power deployment. Additional policy measures beyond the RRP have simplified approval processes for grid expansion, supported electricity storage and promoted the uptake of renewable and low-carbon hydrogen fuels. However, structural challenges remain in terms of integrating higher shares of renewables into the energy system and the very high costs of the system. These challenges imply that Germany has the highest electricity prices of the EU Member States. In this respect, the fiscal package, including the EUR 500 billion infrastructure fund (out of which EUR 100 billion is specifically for the Climate and Transformation Fund), has the potential to remedy Germany's overall investment gaps in energy-related

infrastructure (see also Section 1). Nevertheless, the additional investment would benefit from being undertaken in a cost-efficient manner, taking into account the overall system costs into account.

Graph 3.1: Installed capacity of the main renewable energy sources and national targets (in GW)



Source: Bundesnetzagentur

The geographical mismatch between energy generation and consumption leads to grid congestion and inefficiencies, which have an impact not only on Germany but also on its neighbours. Wind power is concentrated in the northern regions, while industrial demand and urban consumption are highest in the south and west⁽⁴⁶⁾. This limits the full utilisation of renewable energy due to network bottlenecks. In

⁽⁴⁶⁾ Bundesministerium für Wirtschaft und Klimaschutz, 2024, *Ein Stromnetz für die Energiewende*, [bmwk.de](https://www.bmwk.de).

addition, higher grid charges in renewable abundant regions, mainly in wind power, act as a disincentive for industry to establish itself in locations where energy is generated, thereby increasing the mismatch⁽⁴⁷⁾. Since January 2025, the Federal Network Agency's requirement for a fairer distribution of grid costs for the integration of renewable energies has been in effect. However, further efforts remain necessary for a fairer distribution of grid costs. Germany still has a long way to go to finalise its approximately 16 800 km of transmission grid expansion projects. This is despite progress being made in streamlining permitting procedures as a result of updates to the Energy Industry Act and the enactment of the Network Expansion Acceleration Act. A more coordinated, cost-efficient and strategic approach to grid investment would be beneficial to accelerate infrastructure expansion, particularly for north-south transmission corridors and distribution grid reinforcement. However, to ensure a cost-efficient integration of renewable energy sources, limited feed-in in times of high supply and optimisation of existing grid capacity could also be explored⁽⁴⁸⁾. To this end, market mechanisms, such as balancing obligations and negative prices, could be applied to renewable energy sources, and government support, for instance for rooftop photovoltaic systems, could be restricted to guarantee efficient feed-in. Expanding digitalisation and the roll-out of demand response mechanism would help align electricity demand with renewable generation, thereby improving system efficiency, flexibility and reliability⁽⁴⁹⁾. For example, the roll-out of smart meters in

Germany, which lags significantly behind the EU average, could be accelerated in line with the EU smart meter framework by reducing legal and bureaucratic hurdles.

Powering affordability: addressing high and volatile energy prices

Germany is among the Member States with the highest electricity prices for households and industry in the EU (2024 figures), placing considerable financial pressure on consumers (Annex 8, Graph A8.1). Compared to the EU average, German households pay a substantial premium of almost 40%. This comes as a result of structural factors, such as high taxes, levies and grid-related costs. Electricity prices, and electricity taxation in particular, are higher than gas prices for industries (but also for consumers, for whom levies and taxes represent 29% of the electricity bill). This disincentivises electrification (see Annex 7). In addition, electricity prices also experienced high volatility in the autumn and winter of 2024. This was driven by an increased demand for heating and by a 'Dunkelflaute' (low wind and solar output) (see Annex 8), causing uncertainty for consumers. Temporary government relief payments ceased at the end of 2023. This further exacerbated affordability concerns, as previously implemented price caps and reduced tax rates were phased out, leading to a full return to market-driven electricity pricing. A draft to reduce electricity taxes to an EU-wide minimum for all final consumers is currently underway.

Subsidies are not enough to address affordability concerns. The primary measures introduced over the last years include the transfer of renewable energy source (EEG) charges from the consumer to the federal budget, the 2023 electricity

⁽⁴⁷⁾ OECD, 2023, *Economic Surveys: Germany*, [oecd.org](https://www.oecd.org/).

⁽⁴⁸⁾ IMK, 2024, *Ausbau der Stromnetze: Investitionsbedarfe*, [boeckler.de](https://www.boeckler.de/).

⁽⁴⁹⁾ Agora Energiewende, 2025, *Die Energiewende in Deutschland*, [agora-energiewende.de](https://www.agora-energiewende.de/).

price cap, rebates for energy intensive industry and the one-off energy price allowance ⁽⁵⁰⁾. While many of these subsidies expired by 2024, Germany introduced additional measures via the electricity price package at the end of 2023. These measures included an electricity tax reduction for industry from 1.5 cents per kilowatt hour to the EU minimum amount of 0.05 cents, an extension of electricity price compensation to offset prices for industry under the EU's emissions trading scheme (ETS) and additional measures for industry and households ⁽⁵¹⁾. Also, the new coalition agreement from 9 April 2025 between CDU/CSU and SPD foresees a reduction of the electricity price by 5 cents per kWh, notably via a reduction of the electricity tax for all, a reduction of surcharges and network charges, and a permanent cap on network charges. However, the price difference to the EU average remains significant, making cost-efficient expansion of renewable electricity and reliance on market mechanisms advisable. Additional measures, such as locational signals (regional and local price signals that support better regional load management), could help mitigate upward pressure on grid fees. This includes phasing out cost-inefficient practices, such as feed-in tariffs for small installations, compensation for curtailed renewables and support mechanisms that incentivise generation during periods of negative prices. Further efforts to enhance affordability could also include targeted adjustments to electricity taxes and ensuring that levies take into account the need to minimise the fiscal cost and preserve price incentives to save energy. Expanding support for energy efficiency

⁽⁵⁰⁾ [Bundesfinanzministerium - Schnelle und spürbare Entlastungen in Milliardenhöhe](#)

⁽⁵¹⁾ [Strompreispaket für energieintensive Unternehmen | Bundesregierung](#)

improvements, such as home retrofits and smart energy management technologies, would provide additional tools for energy savings and effective cost reductions.

Further reducing fossil fuel reliance to enhance energy security

Despite growing renewable electricity production, Germany's energy system still relies heavily on fossil fuels. Oil (37%), natural gas (25%), and coal (17%) accounted for significant parts of gross inland consumption in 2023, while renewables contributed only 19% ⁽⁵²⁾. Germany aims to phase out coal by 2038 and to replace fossil gas with cleaner alternatives by 2045.

Progress has been made in strengthening Germany's security of energy supply, but key challenges remain in the transition towards a more sustainable and resilient energy system.

Germany is phasing out its dependency on Russian gas, with an increasing share of energy now supplied via alternative pipelines (from Belgium, the Netherlands and Norway). Imports of liquefied natural gas (LNG), mainly from the US, have also increased through the commissioning of floating storage regasification units (FSRUs). This diversification via pipeline gas and via LNG has made energy procurement more flexible and reduced exposure to geopolitical risks, thus strengthening Germany's energy resilience (Annex 8). While the transition to renewables and a more diversified energy supply continues, rising energy demand requires investment in additional sources of flexibility to ensure security of supply. This includes building on

⁽⁵²⁾ [Energy Balances - Eurostat](#)

previous government proposals by advancing mechanisms, such as auctions, not only for non-fossil flexibility (e.g. demand response and storage), but also for firm capacity from gas-fired power plants – and potentially hydrogen in the future.

Delivering on decarbonisation goals across all sectors

Germany is aiming for climate neutrality in 2045 and is making advances in emission cuts, but key sectors continue to fall behind.

Germany has set itself the goal of reaching climate neutrality by 2045 and is on track to cut its greenhouse gas emissions by 65% by 2030, meeting its own intermediary climate goal. However, under EU rules (Effort Sharing Regulation), which set limits for emissions in areas like transport, existing buildings and farming, Germany may still exceed its allowed emissions ⁽⁵³⁾. While emission reductions have been largely driven by the energy sector and to a smaller degree by the industry sector, further climate mitigation policies are needed in the effort sharing sectors.

Electric vehicle uptake is slowly increasing, but infrastructure expansion remains a challenge.

Battery electric vehicles (BEVs) represented 13.5% of the market share of new registrations in February 2024 ⁽⁵⁴⁾. The charging network has expanded, supported by RRP-funded investments in new charging points and enhanced grid connections. Germany is on track to meet the mandatory deployment

targets for Light-Duty Vehicle (LDV) charging infrastructure, with market forces playing a central role in delivering a comprehensive and user-friendly network. However, regional disparities remain, and it is important to ensure that sufficient charging infrastructure is available across all regions, including in rural areas. As electric trucks increasingly enter the market, it would be beneficial to accelerate the rollout of dedicated infrastructure for Heavy-Duty Vehicles (HDVs) and to ensure a competitive environment for the development and operation of this infrastructure. Distribution networks could therefore be further expanded, which could enable powerful home charging stations to be installed. As part of this process, flexibility options could be used and measures taken which allow the distribution networks to be expanded cost-efficiently. To boost the uptake of electric vehicles, the German RRP provides purchase subsidies and makes provision for the extension of the initial registration period for granting a 10-year tax exemption for fully electric vehicles.

Significant improvement to the public transport infrastructure would still be beneficial.

While some investment, notably through the support of the RRF, has been made to modernise rail networks and increase the capacity of public transport, delays in major railway projects have slowed progress. Germany also supports the electrification of municipal and commercial fleets through grants for vehicle purchases and charging infrastructure. In particular, freight transport remains heavily dependent on road haulage. Investing in the expansion of rail networks could help shift freight to rail. The development of alternative propulsion systems for heavy-duty transport has seen some progress, with RRP-backed initiatives supporting the adoption of hydrogen-powered and battery electric trucks and

⁽⁵³⁾ Umweltbundesamt, 2025, *Aktuelle Treibhausgas-Projektionen*, umweltbundesamt.de.

⁽⁵⁴⁾ European Alternative Fuels Observatory, 2025, *Germany: BEV market share at 13.5%*, alternative-fuels-observatory.ec.europa.eu.

buses. However, their deployment is still in its early stages, and cost barriers remain high ⁽⁵⁵⁾.

The building sector faces significant hurdles in reducing emissions. This is caused in particular by the slow pace of renovations and the need to modernise heating systems. In Germany, as in other Member States, many buildings are old and inefficient, requiring substantial investment to meet modern energy standards. However, with the current renovation rate at only 1% per year, progress remains too slow to bring this sector into line with climate goals (Annex 7). These challenges are compounded by broader economic conditions: heightened uncertainty, high construction and financing costs, and a subdued investment environment have contributed to a sharp decline in housing investment, which fell by 6.3% between 2019 and 2024. The RRP plays a key role in addressing these challenges via numerous measures, such as energy-efficient building renovations and municipal living labs serving as real-world testing grounds for integrated energy solutions in urban neighbourhoods. Complementary support is provided by the European Regional Development Fund for the energy renovation of public and social infrastructure, businesses and research institutes. Further policy action would be beneficial.

Addressing environmental and climate vulnerabilities to ensure sustainable growth

Nature degradation and water pollution create significant risks to biodiversity and to the economy. In Germany, 100% of surface water bodies fail to achieve a good chemical status (Annex 9), due to ubiquitous substances like mercury. Chemical pollutant emissions from industry and energy sectors are the leading cause for the failure of the surface water bodies. Also, the condition of many ecosystems has continued to deteriorate, due to agriculture and changes in land use together with nitrogen deposition from agriculture and traffic sources. Further restoration measures and changes in land use practices could potentially make these ecosystems contribute more to sustainable economic growth and reverse the trend of falling net carbon removals.

Germany faces severe climate challenges, inflicting significant societal and economic damage. Germany is among the EU Member States to suffer the greatest economic losses as a result of weather- and climate-related extremes, including when expressed per square kilometre or per capita ⁽⁵⁶⁾. By mid-century, resource-dependent sectors will be increasingly threatened by climate risks. Despite making progress in climate adaptation, Germany is still facing issues such as insurance coverage gaps and problems relating to funding and local adaptation planning (see Annex 9).

⁽⁵⁵⁾ Burke et al., 2023, *Projections of the costs of medium- and heavy-duty battery-electric and fuel cell vehicles*, [sciencedirect.com](https://www.sciencedirect.com).

⁽⁵⁶⁾ European Environment Agency, 2025, *Economic losses from weather- and climate-related extremes in Europe*, eea.europa.eu

SKILLS, QUALITY JOBS AND SOCIAL FAIRNESS

Addressing skilled labour shortages and declining hours worked

Labour shortages are already a major bottleneck for the German economy.

At the end of 2024, the number of vacancies had declined by 19% compared with the year before, reflecting the deterioration in the economic situation. Still, there were 1.4 million vacancies and around one third of companies reported being affected by labour shortages in Q4 2024 compared to 39% end 2023 ⁽⁵⁷⁾. Shortages affect, in particular, skilled positions, the care and IT sectors, the construction sector, and scientific and technical professions. Yet the proportion of employers expecting labour shortages to limit their production was at or above the EU average across all sectors in Q4-2024.

Labour shortages and labour hoarding make it more difficult for the economy to adjust and transform.

Labour shortages are limiting companies' ability to expand production, thus directly harming productivity. This also results in low growth rates among new German firms. Labour shortages also harm productivity indirectly, by incentivising labour hoarding ⁽⁵⁸⁾. Labour hoarding in Germany is among the highest in the EU according to the EU business survey and might be intensified by the

doubling of the duration of short-time work arrangements (*Kurzarbeit*) to two years until the end of 2025. To increase productivity and address frictions in the labour market, training measures which help employees to transition into new sectors could be strengthened ⁽⁵⁹⁾.

Ageing is reducing the labour supply, only partly compensated for by labour migration.

The working-age population is projected to shrink (Section 1) and life expectancy to grow by close to two years between 2030 and 2040 ⁽⁶⁰⁾. Yet the legal retirement age is set to remain unchanged at 67 from 2031. More than half of retiring workers leave the workforce before reaching the legal retirement age with almost one third leaving early without any reduction in pension entitlements. This means that often people who are well educated and in good health leave the labour market ⁽⁶¹⁾. Labour migration is important to help cushion the effects of ageing on labour supply. After the first stage of the Skilled Immigration Act came into force in November 2023, applications for visas and recognition of foreign qualifications rose significantly ⁽⁶²⁾. Yet

⁽⁵⁷⁾ KfW-ifo Skilled Labour Barometer, 2024, [kfw.de](https://www.kfw-ifo.de/).

⁽⁵⁸⁾ Labour hoarding refers to the practice of keeping more workers than currently needed. This also occurs out of fear of difficulties in hiring new staff later.

⁽⁵⁹⁾ IAB, 2024, *Impulse für Konjunktur und Transformation statt Verlängerung von Kurzarbeit*, iab.de; Weber, E., 2025, *Beschäftigungssicherung: Kurzarbeit plus Qualifizierung*, wirtschaftsdienst.eu.

⁽⁶⁰⁾ European Commission, 2024, *Ageing Report*, europa.eu

⁽⁶¹⁾ DIW, 2024, *Rente nach 45 Jahren: Auch Personen mit geringer Arbeitsbelastung gehen frühzeitig abschlagsfrei in Ruhestand*, diw.de.

⁽⁶²⁾ BMI, 2024, *The new Skilled Immigration Act one year on*, bund.de.

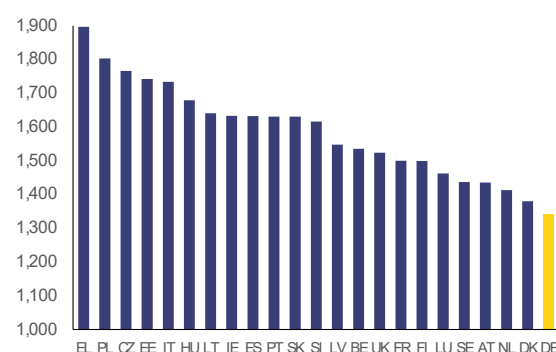
there is further potential for speeding up administrative procedures for labour and education-related migration.

Low hours worked weigh on labour supply, in particular amongst women.

The employment rate is high, but hours worked per employee are among the lowest in the EU at 1 343 hours in 2023 (Graph 4.1), falling further by a further 0.3% in 2024 according to the Institute for Employment Research. Half of female employees work part-time, one of the highest levels in the EU. Caring for children and elderly relatives is a frequent reason for working part-time, partly driven by a gap in the provision of quality, flexible early childhood education and care. The Recovery and Resilience Facility (RRF) is supplementing national investments in funding places in early childhood education and care (ECEC). Yet for children under three, there was a shortfall of over 306 000 places in 2024 ⁽⁶³⁾. Whole-day schools are also an important lever facilitating the employment of parents and the skills development of pupils. Still, they are suffering from staff shortages and lack of adequate infrastructure, and the further need for whole-day primary school places is estimated to 342 000 by 2026/2027 ⁽⁶⁴⁾. In addition, the tax and benefits system creates strong disincentives for low-earners and second earners to work more hours (see also Section 2) ⁽⁶⁵⁾. Reform proposals show that it would be possible to increase labour supply with no or limited budgetary cost, for example by unifying benefits ⁽⁶⁶⁾,

and by creating a transferable tax allowance between spouses ⁽⁶⁷⁾. The current mini-job system effectively locks people into working very few hours. This system could be made more flexible ⁽⁶⁸⁾.

Graph 4.1: Average hours worked



(1) 2023 data

Source: OECD

Strengthening active labour market policies and skills

Beyond the cyclical weakness, the labour market is increasingly facing structural challenges and employment shifts ⁽⁶⁹⁾.

The reallocation of labour across sectors and job profiles, also linked to the announced downsizing of the car and supplier industry, calls for effective labour market and benefit policies to support transitions. Basic income support for jobseekers (*Bürgergeld*) provides a continuing education and training benefit to incentivise upskilling, but its activation component is sometimes seen as weak and

⁽⁶³⁾ Institut der deutschen Wirtschaft: *IW Report 40/2024*, [iwkoeln.de](https://www.iwkoeln.de).

⁽⁶⁴⁾ BMFSFJ, 2024, *Zweiter Bericht der Bundesregierung zum Ausbaustand der ganztägigen Bildungs- und Betreuungsangebote für Grundschul Kinder*, [bmfsfj.de](https://www.bmfsfj.de).

⁽⁶⁵⁾ ifo, 2024, *Elemente einer grundlegenden Reform für das Steuer- und Abgabensystem in Deutschland*, [ifo.de](https://www.ifo.de).

⁽⁶⁶⁾ Blömer, M. J., Hansen, E., Peichl A., 2024, *Die Ausgestaltung des Transferentzugs in der*

Interdependenz mit dem Bürgergeld, der Kindergrundsicherung und dem Wohngeld, *ifo Forschungsberichte* 145, [ifo.de](https://www.ifo.de).

⁽⁶⁷⁾ German Council of Economic Experts, 2023, *Annual Report 2023/24*, Chapter 4, [sachverstaendigenrat-wirtschaft.de](https://www.sachverstaendigenrat-wirtschaft.de).

⁽⁶⁸⁾ OECD, 2025, *Economic survey of Germany*.

⁽⁶⁹⁾ IAB, 2024, *Konjunktur und Transformation: die kritische Gemengelage am Arbeitsmarkt*, [iab.de](https://www.iab.de).

rules on supplementary income lead to high marginal effective tax rates ⁽⁷⁰⁾, posing a barrier to people taking up jobs. Furthermore, a significant proportion of the adult population, especially disadvantaged groups, has limited access to training (Annex 12). Upskilling and reskilling efforts, coupled with targeted support, could significantly unlock potential, address poverty risks in a sustainable manner and guide people towards sectors with shortages. This is especially important for laid-off workers and groups who are under-represented in the labour market, like the low-skilled and people born outside the EU.

Digital skills remain weak, complicating the digitalisation of the economy. The government has set its national digital decade target at 80% of adults (16-74 year-olds) having at least basic digital skills by 2030. However, only slightly more than half met this criterion in 2023, still below the EU average, with particular challenges for young people and those born outside the EU. At the same time, businesses identify a lack of know-how as a hindrance to their use of data, which is essential for innovation and competitiveness ⁽⁷¹⁾. The Recovery and Resilience Facility helps to digitalise education through the provision of mobile devices to teachers and educational platforms and centres of excellence. Beyond that, Germany could benefit from comprehensively embedding digital education in the school curriculum, expanding vocational training focused on digital competencies and promoting lifelong learning initiatives ⁽⁷²⁾.

⁽⁷⁰⁾ Ortmann, T., Thode, E., Wink, R., 2025, *Bürgergeld: Anspruch, Realität*, [bertelsmann-stiftung.de](https://www.bertelsmann-stiftung.de); IAB, 2025, *Macht Bürgergeld Arbeit unattraktiv?*, [iab.de](https://www.iab.de).

⁽⁷¹⁾ DIHK, 2025, *Digitalisierungsumfrage*, [DIHK-Digitalisierungsumfrage 2025](https://www.dihk.de).

⁽⁷²⁾ Bitkom, 2025, *Digitale Bildung*, [bitkom.org](https://www.bitkom.org).

Improving education outcomes and skills, especially for disadvantaged groups

Basic skills levels have deteriorated and are strongly linked to pupils' socio-economic background. Underachievement has significantly increased over the last decade, with a quarter of all pupils now performing poorly in mathematics, reading and science (Annex 12). Every second pupil from a disadvantaged socio-economic background and two thirds of those born abroad perform poorly in mathematics. In addition, a significant proportion of young people leave education and training early (12.8%), one of the highest rates in the EU. Concerns are also growing over the basic skills of apprentices, reflecting a broader decline in educational performance, while many young people still lack apprenticeship opportunities (Annex 12). The introduction of an apprenticeship guarantee (*Ausbildungsgarantie*) in 2024 is helping applicants who did not find an apprenticeship to obtain a place at a VET (vocational education and training) college. This could be combined with action to strengthen the foundational skills of potential apprentices and promote language skills ⁽⁷³⁾. Providing more support to schools facing difficulties, including high drop-out rates, by ensuring that target schools are supported through the 'Startchancen' programme or regional support schemes could further address the declining level of basic skills.

Limited participation of disadvantaged children in early childhood education and care weighs on future performances and increases inequalities. Disadvantage starts early with consequences throughout

⁽⁷³⁾ OECD, 2025, *Economic survey Germany*.

life. Children from wealthier households participated in ECEC nearly twice as often as their less affluent peers. A language other than German is primarily spoken in 18% of households. Access to quality ECEC can help mitigate early disadvantages due to family background and language deficiencies. Increasing the provision of quality inclusive ECEC could foster equal opportunities for children regardless of their socio-economic and/or migrant background.

Staff shortages impede both the expansion of childcare and early education places and the improvement of quality. Although ECEC staff more than doubled between 2003 and 2023, a staff shortage of up to 367 000 exists, limiting supply, opening hours and quality ⁽⁷⁴⁾. Working conditions are not sufficiently attractive, and a high proportion of ECEC graduates and workers seek employment outside the sector for which they trained. Schools also face a serious shortage of teachers, especially in STEM disciplines like mathematics. The annual shortage of teachers is estimated to reach between 23 500 and 40 000 by 2035 ⁽⁷⁵⁾. Despite relatively high wages, teaching in Germany is losing its appeal, as seen in the declining numbers of teaching graduates. Meanwhile, the proportion of teachers without a teaching diploma more than doubled from 4% to 10% between 2015 and 2022. Reliance on 'career changers' (*Quereinsteiger*) needs to be accompanied by continuous training, updating teachers' skills.

Rising tertiary attainment and high numbers of international students support competitiveness, while lower skills outcomes weaken it. Tertiary attainment has increased but trails about 5% behind the EU average. The fact that German universities attract a high proportion of foreign students at Master's and PhD level allows some of the existing skills gaps to be closed. The fall in the proportion of high-performing pupils, as reflected in PISA scores, on the one hand, and declining basic skills, on the other, are a concern for longer-term competitiveness.

⁽⁷⁴⁾ Autor:innengruppe Bildungsberichterstattung, 2024, *Bildung in Deutschland 2024*, bildungsbericht.de.

⁽⁷⁵⁾ Autor:innengruppe Bildungsberichterstattung, 2022, *Bildung in Deutschland*, bildungsbericht.de; Robert Bosch Stiftung, 2025, *Lehrermangel – so reagieren die Länder auf die Prognose*, deutsches-schulportal.de.

KEY FINDINGS

In the areas of competitiveness, decarbonisation and skills, Germany would benefit from:

- **implementing the RRP**, including the REPowerEU chapter; swiftly implementing **cohesion policy**, taking advantage of the opportunities under the mid-term review and making optimal use of EU instruments, including **InvestEU** and **STEP**, to improve competitiveness;
- **boosting innovation** by improving the commercialisation of research and funding for disruptive innovation;
- **supporting start-ups and expanding venture capital access**, notably by strengthening institutional investors as capital providers;
- **cutting red tape to enhance competitiveness and private investment** by simplifying regulations and procedures where possible;
- **accelerating the digitalisation of public administration** including by linking data registers and facilitating cooperation of governmental levels;
- **speeding up the digital infrastructure roll-out** of very high-capacity networks, especially fibre optics, and working towards achieving the digital decade targets;
- **strengthening public investment**, with a focus on growth-enhancing investments by addressing bottlenecks in planning and execution;
- **enhancing the quality of federal public finances** by containing recurrent pension transfers and reviewing the efficiency of spending;
- **optimising the tax mix to boost inclusive growth and sustainable competitiveness**, notably through increasing hours worked by reducing the labour tax wedge or by making corporate taxation support investment;
- **increasing housing supply and affordability** by mobilising additional building land, reviewing rental law, simplifying rules and procedures;
- **expanding and modernising grid infrastructure cost efficiently** to better integrate renewables, reduce north-south imbalances and provide planning security for industry;
- **lowering electricity costs** through taxes and levies, and by ensuring a cost-efficient expansion of the electricity system with market mechanisms and dynamic pricing;
- **making further progress to decarbonise the transport and building sectors** by increasing

electrification and energy efficiency, and renovating the rail network;

- **addressing labour shortages and low working hours** by boosting participation of women, low-income earners and older workers, expanding early childhood education and care (ECEC) and whole day schools, and attracting talent from third countries;
- **boosting skills and activation** through better access to training, including on digital skills, especially for disadvantaged groups; and
- **improving education outcomes** by supporting schools and ECEC to attract staff and improve infrastructure.

ANNEXES

LIST OF ANNEXES

Fiscal	28
A1. Fiscal surveillance and debt sustainability	28
A2. Taxation	34
Productivity	37
A3. Innovation to business	37
A4. Making business easier	43
A5. Capital markets, financial stability and access to finance	48
A6. Effective institutional framework	56
Sustainability	61
A7. Clean industry and climate mitigation	61
A8. Affordable energy transition	68
A9. Climate adaptation, preparedness and environment	74
Fairness	80
A10. Labour market	80
A11. Social policies	84
A12. Education and skills	88
A13. Social Scoreboard	92
A14. Health and health systems	93
Horizontal	95
A15. Sustainable development goals	95
A16. CSR progress and EU funds implementation	97
A17. Competitive regions	104

LIST OF TABLES

A1.1. General government balance and debt	30
A1.2. Net expenditure growth	31
A1.3. Net expenditure (outturn and forecasts) deviations vis-à-vis the recommendation	32
A1.4. Defence expenditure	32
A1.5. Macroeconomic developments and forecasts	32
A1.6. General government budgetary position	33
A1.7. Debt developments	31
A1.8. RRF – Grants	34

A1.9.	Projected change in age-related expenditure in 2024-2040 and 2024-2070	34
A1.10.	Fiscal Governance Database Indicators	35
A2.1.	Taxation indicators	39
A3.1.	Key innovation indicators	46
A4.1.	Making Business Easier: indicators.	53
A5.1.	Financial indicators	63
A6.1.	Selected indicators on administrative burden reduction and simplification	65
A6.2.	Key Digital Decade targets monitored through the Digital Economy and Society Index	66
A7.1.	Key clean industry and climate mitigation indicators: Germany	76
A8.1.	Key Energy Indicators	83
A9.1.	Key indicators on progress on climate adaptation, preparedness and environment	90
A13.1.	Social Scoreboard for Germany	107
A14.1.	Key health indicators	109
A16.1.	Selected EU funds with adopted allocations - summary data (million EUR)	117
A16.2.	Summary table on 2019-2024 CSRs	118
A17.1.	Selected indicators at regional level in Germany	123

LIST OF GRAPHS

A1.1.	Accounting maturity by government sector (2025, 2030)	36
A2.1.	Tax revenue shares in 2023	37
A2.2.	Tax wedge for single and second earners, % of total labour costs, 2024	38
A2.3.	VAT compliance gap (as % of VAT total tax liability)	39
A3.1.	Sectoral distribution of R&D investment among the world's top 2 000 R&D investors, in Germany (blue) and worldwide (red)	42
A3.2.	Start-up rate in Germany by economic sector (2010-2023)	43
A4.1.	Making Business Easier: selected indicators.	49
A5.1.	Net savings-investment balance in Germany	54
A5.2.	International investment position of Germany	54
A5.3.	Capital markets and financial intermediaries in Germany	56
A5.4.	Composition of NFC funding as a % of GDP	59
A5.5.	Composition of HH financial assets per capita and as a % of GDP	61
A6.1.	Trust in justice, regional / local authorities and in government	64
A6.2.	Indicators of Regulatory Policy and Governance (iREG)	65
A6.3.	Participation rate of 25-64 year olds in adult learning (%) by occupation	67
A7.1.	GHG emission intensity of manu-facturing and energy-intensive sectors, 2022	72
A7.2.	Manufacturing industry production: total and selected sectors, index (2021 = 100), 2017-2023	72
A7.3.	Greenhouse gas emissions in effort sharing sectors, 2005 and 2023	73
A8.1.	Retail energy price components for household and non-household consumers, 2024	77
A8.2.	Monthly average day-ahead wholesale electricity prices and European benchmark natural gas prices (Dutch TTF)	78
A8.3.	Germany's installed renewable capacity (left) and electricity generation mix (right)	80
A9.1.	Direct dependency(1) on ecosystem services(2) of the gross value added generated by economic sector in 2022	87
A9.2.	Investment needs and gaps in EUR million, in 2022 constant prices	87
A10.1.	Key labour market indicators (2024)	92
A10.2.	Part-time employment by sex (ages 20-64, 2023)	93
A10.3.	Labour shortages in key sectors for the green transition in Germany and the EU (Q4-2024)	95
A11.1.	At-risk-of poverty or social exclusion rate for Germany and its components	97
A11.2.	Risk of poverty or social exclusion in different age groups	98
A11.3.	Housing cost overburden in different population groups (2023)	100
A12.1.	Underachievement rates by field, PISA 2012, 2018 and 2022 (%)	102
A12.2.	Population with at least basic digital skills, by age, country of birth and educational attainment	105
A14.1.	Life expectancy at birth, years	108
A14.2.	Treatable mortality	108
A15.1.	Progress towards the SDGs in Germany	111
A16.1.	Distribution of RRF funding in Germany by policy field	115
A16.2.	Distribution of cohesion policy funding across policy objectives in Germany	115
A17.1.	Labour productivity per hour	122
A17.2.	Access to healthcare and primary education in rural areas, 2023	126

LIST OF MAPS

A17.1.	GDP per head (in purchasing power standard PPS), 2023	121
A17.2.	Real GDP per head growth (2014-2023)	121
A17.3.	Regional Competitiveness Index 2.0, 2022 edition	122
A17.4.	Housing cost overburden, 2024	126

This Annex contains a series of tables relevant for the assessment of the fiscal situation in Germany, including how Germany is responding to Council recommendations issued under the reformed Economic Governance Framework.

The reformed framework, which entered into force on 30 April 2024⁽⁷⁶⁾, aims to strengthen debt sustainability and promote sustainable and inclusive growth through growth-enhancing reforms and priority investments. The medium-term fiscal-structural plans (hereinafter, MTPs or plans) constitute the cornerstone of the framework, setting the budgetary commitment of Member States over the medium term. The latter is defined in terms of net expenditure growth, which is the single operational indicator for fiscal surveillance.

Germany has not yet submitted its medium-term plan.

The Annex is organised as follows. First, developments in **government deficit and debt** are presented based on the figures reported in Table A1.1. Then, an assessment of the **fiscal situation** of Germany follows, including developments of net expenditure growth and data on defence expenditure, based on the relevant figures presented in Tables A1.2 to A1.8. The fiscal situation of Germany is described on the basis of outturn data from Eurostat, the Commission Spring 2025 Forecast, and the Annual Progress Report (APR), that Germany submitted on 24 April 2025.

The Annex also provides information on the **cost of ageing** and the **national fiscal framework**. Fiscal sustainability risks are discussed in the Debt Sustainability Monitor 2024⁽⁷⁷⁾.

Developments in government deficit and debt

Germany's government deficit amounted to 2.8% of GDP in 2024. Based on the Commission's Spring 2025 Forecast, it is projected to decrease to 2.7% of GDP in 2025. The government debt-to-GDP ratio amounted to 62.5% at the end of 2024 and, according to the Commission, it is projected to increase to 63.8% end-2025. Before this, the debt-to-GDP ratio had been on a downward trajectory from its peak of 68.1% in 2021, until levelling out in recent years.

Table A1.1: **General government balance and debt**

	Variables		2024	2025		2026	
			Outturn	APR	COM	APR	COM
1	General government balance	% GDP	-2.8	-2 1/2	-2.7	na.	-2.9
2	General government gross debt	% GDP	62.5	62 3/4	63.8	na.	64.7

Source: Commission Spring 2025 Forecast (COM), Annual Progress Report (APR)

⁽⁷⁶⁾ Regulation (EU) 2024/1263 of the European Parliament and of the Council (EU) on the effective coordination of economic policies and on multilateral budgetary surveillance, together with the amended Regulation (EC) No 1467/97 on the implementation of the excessive deficit procedure, and the amended Council Directive 2011/85/EU on the budgetary frameworks of Member States are the core elements of the reformed EU economic governance framework.

⁽⁷⁷⁾ Commission (2025) 'Debt Sustainability Monitor 2024,' *European Economy-Institutional Papers* 306.

Developments in net expenditure

The net expenditure⁽⁷⁸⁾ growth of Germany in 2025 is forecast by the Commission⁽⁷⁹⁾ to be 2.1% in 2025.

Germany has requested the activation of the national escape clause for defence. This request will be assessed together with the medium-term fiscal-structural plan (MTP) once it is submitted.

Table A1.2: **Net expenditure growth**

	Annual			Cumulative*		
	REC	APR	COM	REC	APR	COM
	Growth rates					
2024	na.	3.8%	4.0%	na.	na.	na.
2025	na.	2 1/2	2.1%	na.	6 1/2	2.1%
2026	na.	na.	3.2%	na.	na.	5.4%

* The cumulative growth rates in the APR are calculated by reference to the base year of 2023. The COM figures are calculated by reference to 2024.

Source: Annual Progress Report (APR) and Commission's calculation based on Commission Spring 2025 Forecast (COM).

General government defence expenditure in Germany amounted to 1.0% of GDP in 2021, 1.0% of GDP in 2022 and 1.1% of GDP in 2023⁽⁸⁰⁾. According to the Commission 2025 Spring Forecast, expenditure on defence is projected at 1.3% of GDP in 2024 and 1.3% of GDP in 2025.

⁽⁷⁸⁾ Net expenditure is defined in Article 2(2) of Regulation (EU) 2024/1263 as government expenditure net of (i) interest expenditure, (ii) discretionary revenue measures, (iii) expenditure on programmes of the Union fully matched by revenue from Union funds, (iv) national expenditure on co-financing of programmes funded by the Union, (v) cyclical elements of unemployment benefit expenditure, and (vi) one-off and other temporary measures.

⁽⁷⁹⁾ Commission Spring 2025 Forecast, *European Economy-Institutional paper 318*, May 2025.

⁽⁸⁰⁾ Eurostat, government expenditure by classification of functions of government (COFOG).

Table A1.3: **Net expenditure (outturn and forecast)**

	Variables		2023	2024	2025	2026
			Outturn	Outturn	COM	COM
1	Total expenditure	bn NAC	2025.0	2131.6	2214.4	2297.4
2	Interest expenditure	bn NAC	36.6	45.4	48.4	50.6
3	Cyclical unemployment expenditure	bn NAC	-1.3	5.0	8.8	2.3
4	Expenditure funded by transfers from the EU	bn NAC	9.5	5.9	8.8	8.4
5	National co-financing of EU programmes	bn NAC	2.0	1.7	1.2	1.2
6	One-off expenditure (levels, excl. EU funded)	bn NAC	0.0	0.0	0.0	0.0
7=1-2-3-4-5-6	Net nationally financed primary expenditure (before discretionary revenue measures, DRM)	bn NAC	1978.2	2073.6	2147.2	2234.8
8	Change in net nationally financed primary expenditure (before DRM)	bn NAC		95.4	73.6	87.7
9	DRM (excl. one-off revenue, incremental impact)	bn NAC		16.8	29.6	18.7
10=8-9	Change in net nationally financed primary expenditure (after DRM)	bn NAC		78.6	44.0	69.0
11	Outturn / forecast net expenditure growth*	% change		3.97%	2.1%	3.2%
12	Recommended net expenditure growth	% change		n.a.	n.a.	n.a.
13=(11-12) x 7	Annual deviation	bn NAC		n.a.	n.a.	n.a.
14 (cumulated from 13)	Cumulated deviation	bn NAC		n.a.	n.a.	n.a.
15=13/17	Annual balance	% GDP		n.a.	n.a.	n.a.
16=14/17	Cumulated balance	% GDP		n.a.	n.a.	n.a.
17	p.m. Nominal GDP	bn NAC	4185.6	4305.3	4409.0	4553.8

* For Germany no quantitative assessment can be undertaken in the absence of the medium-term plan.

Source: Commission Spring 2025 Forecast and Commission's calculation.

Table A1.4: **Defence expenditure**

			2021	2022	2023	2024	2025	2026
1	Total defence expenditure	% GDP	1.0	1.0	1.1	1.3	1.3	1.4
2	of which: gross fixed capital formation	% GDP	0.2	0.2	0.2	0.2	0.2	0.2

Source: Eurostat (COFOG), Commission Spring 2025 Forecast and Commission's calculation.

Table A1.5: **Macroeconomic developments and forecasts**

	Variables		2024	2025		2026	
			Outturn	APR	COM	APR	COM
1=7+8+9	Real GDP	% change	-0.2	0.3	0.0	n.a.	1.1
2	Private consumption	% change	0.3	0.5	0.7	n.a.	1.1
3	Government consumption expenditure	% change	3.5	1.5	1.9	n.a.	1.3
4	Gross fixed capital formation	% change	-2.7	0.4	0.2	n.a.	2.6
5	Exports of goods and services	% change	-1.1	-0.3	-1.9	n.a.	1.1
6	Imports of goods and services	% change	0.2	1.9	0.9	n.a.	1.5
	Contributions to real GDP growth						
7	- Final domestic demand	pps	0.3	1.2	0.9	n.a.	1.4
8	- Change in inventories	pps	0.0	0.4	0.2	n.a.	-0.2
9	- Net exports	pps	-0.6	-0.9	-1.1	n.a.	-0.1
10	Output gap	% pot GDP	-1.4	-1.9	-1.7	n.a.	-0.9
11	Employment	% change	0.2	0.0	-0.2	n.a.	0.2
12	Unemployment rate	%	3.4	3.3	3.6	n.a.	3.3
13	Labour productivity	% change	-0.4	0.3	0.1	n.a.	0.9
14	HICP	% change	2.5	n.a.	2.4	n.a.	1.9
15	GDP deflator	% change	3.1	2.1	2.4	n.a.	2.2
16	Compensation of employees per head	% change	5.2	3.0	3.4	n.a.	2.9
17	Net lending/borrowing vis-à-vis the rest of the world	% GDP	5.1	n.a.	4.4	n.a.	4.4

Source: Commission Spring 2025 Forecast (COM), Annual Progress Report (APR)

Table A1.6: **General government budgetary position**

	Variables (% GDP)	2024	2025		2026	
		Outturn	APR	COM	APR	COM
1=2+3+4+5	Revenue	46.8	48	47.5	na.	47.6
	<i>of which:</i>					
2	- Taxes on production and imports	10.3	10 1/2	10.4	na.	10.4
3	- Current taxes on income, wealth, etc.	12.8	12 3/4	12.8	na.	12.8
4	- Social contributions	17.5	18 1/2	18.2	na.	18.3
5	- Other (residual)	6.1	5 3/4	6.2	na.	6.2
8=9+16	Expenditure	49.5	50 1/2	50.2	na.	50.5
	<i>of which:</i>					
9	- Primary expenditure	48.5	49 1/2	49.1	na.	49.3
	<i>of which:</i>					
10	- Compensation of employees	8.3	8 1/4	8.3	na.	8.3
11	- Intermediate consumption	6.6	6 1/2	6.6	na.	6.6
12	- Social payments	25.4	26	26.1	na.	26.3
13	- Subsidies	1.3	1 1/4	1.2	na.	1.2
14	- Gross fixed capital formation	2.9	3 1/4	3.0	na.	3.0
15	- Other	4.0	4	3.9	na.	3.9
16	- Interest expenditure	1.1	1	1.1	na.	1.1
18=1-8	General government balance	-2.8	-2 1/2	-2.7	na.	-2.9
19=1-9	Primary balance	-1.7	-1 1/2	-1.6	na.	-1.7
20	Cyclically adjusted balance	-2.1	na.	-1.8	na.	-2.4
21	One-offs	0.0	0.0	0.0	na.	0.0
22=20-21	Structural balance	-2.1	-1 1/2	-1.8	na.	-2.4
23=22+16	Structural primary balance	-1.0	- 1/2	-0.7	na.	-1.3

Source: Commission Spring 2025 Forecast (COM), Annual Progress Report (APR)

Table A1.7: **Debt developments**

	Variables	2024	2025		2026	
		Outturn	APR	COM	APR	COM
1	Gross debt ratio* (% of GDP)	62.5	62 3/4	63.8	na.	64.7
2=3+4+8	Change in the ratio (pps. of GDP)	-0.4	1/2	1.3	na.	0.9
	Contributions**					
3	Primary balance	1.7	1 1/2	1.6	na.	1.7
4=5+6+7	'Snow-ball' effect	-0.7	- 1/4	-0.4	na.	-0.9
	<i>of which:</i>					
5	- Interest expenditure	1.1	1	1.1	na.	1.1
6	- Real growth effect	0.1	- 1/4	0.0	na.	-0.7
7	- Inflation effect	-1.9	-1 1/4	-1.5	na.	-1.4
8	'Stock-flow' adjustment	-1.4	- 3/4	0.1	na.	0.1

* End of period.

** The 'snow-ball' effect captures the impact of interest expenditure on accumulated general government debt, as well as the impact of real GDP growth and inflation on the general government debt-to-GDP ratio (through the denominator). The stock-flow adjustment includes differences in cash and accrual accounting (including leads and lags in Recovery and Resilience Facility grant disbursements), accumulation of financial assets, and valuation and other residual effects.

Source: Commission Spring 2025 Forecast and Commission's calculation (COM), Annual Progress Report (APR).

Table A1.9: Projected change in age-related expenditure in 2024-2040 and 2024-2070

	age-related expenditure 2024 (% GDP)	change in 2024-2040 (pps GDP) due to:					age-related expenditure 2040 (%GDP)	
		pensions	healthcare	long-term care	education	total		
DE	24.3	0.7	0.2	0.4	0.2	1.5	25.8	DE
EU	24.3	0.5	0.3	0.4	-0.3	0.9	25.2	EU

	age-related expenditure 2024 (% GDP)	change in 2024-2070 (pps GDP) due to:					age-related expenditure 2070 (%GDP)	
		pensions	healthcare	long-term care	education	total		
DE	24.3	1.0	0.5	0.4	0.2	2.1	26.4	DE
EU	24.3	0.2	0.6	0.8	-0.4	1.3	25.6	EU

Source: 2024 Ageing Report (EC/EPC).

Table A1.8: RRF – Grants

Revenue from RRF grants (% of GDP)								
		2020	2021	2022	2023	2024	2025	2026
1	RRF grants as included in the revenue projections	na.	0.2	0.1	0.1	0.0	0.1	0.1
2	Cash disbursements of RRF grants from EU	na.	0.1	0.0	0.1	0.3	0.1	0.1

Expenditure financed by RRF grants (% of GDP)								
		2020	2021	2022	2023	2024	2025	2026
3	Total current expenditure	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4	Gross fixed capital formation	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Capital transfers	0.0	0.0	0.0	0.0	0.0	0.1	0.1
6=4+5	Total capital expenditure	0.0	0.1	0.0	0.0	0.0	0.1	0.1

Other costs financed by RRF grants (% of GDP)								
		2020	2021	2022	2023	2024	2025	2026
7	Reduction in tax revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Other costs with impact on revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Financial transactions	0.0	0.0	0.0	0.0	0.0	0.0	na.

Source: Annual Progress Report

Cost of ageing

Total age-related spending in Germany is projected to rise from about 24.5% of GDP in 2024 to around 26% in 2040 and about 24.5% in 2070 (see Table A1.9). This increase results from the projected rise in pension spending and, to a more limited extent, healthcare and long-term care spending. The rise in public pension spending is concentrated in the medium term, with a projected increase of 0.7 pps of GDP by 2040 and an additional 0.3 pps by 2070.

Public healthcare expenditure is projected at 7.7% of GDP in 2024 (above the EU average of 6.6%) and is expected to increase by 0.2 pps by 2040 and by a further 0.3 pps by 2070⁽⁸¹⁾. Public expenditure on long-term care is projected at 1.9% of GDP in 2024 (above the EU average of 1.7%) and is expected to increase by 0.4 pps of GDP by 2040 and by a further 0.1 pp of GDP by 2070. Not included in the projections are the expenditure of the compulsory private insurances in Germany that cover roughly 10% of the population.

⁽⁸¹⁾ Key performance characteristics, recent reforms and investments of the German healthcare system are discussed in Annex 11 'Health and health systems'.

National fiscal framework

The German Independent Fiscal Institution (IFI), The Advisory Board of the Stability Council, has a very narrow mandate and thin resources. Its independence could be strengthened by expanding its resources and improving its access to information. Its annual budget of EUR 150.000, which has not changed since 2017, is only sufficient to finance a research assistant working at 75%, secretarial support, teaching substitutions for the chairperson and some fees. The Advisory Board does not have a legally based right to sufficient access to information and lacks access to important information, in particular on state-level budgets and on extra-budgetary funds. For greater impact, there is ample room to improve the policy dialogue with the government and the parliament, for example by enshrining the process in law. Similarly, the IFI's media presence could also be improved. Although Board members usually have a high degree of expertise, they are not subject to any formal CV requirements.

Table A1.10: **Fiscal Governance Database Indicators**

2023	Germany	EU Average
Country Fiscal Rule Strength Index (C-FRSI)	14.33	14.52
Medium-Term Budgetary Framework Index (MTBFI)	0.68	0.73

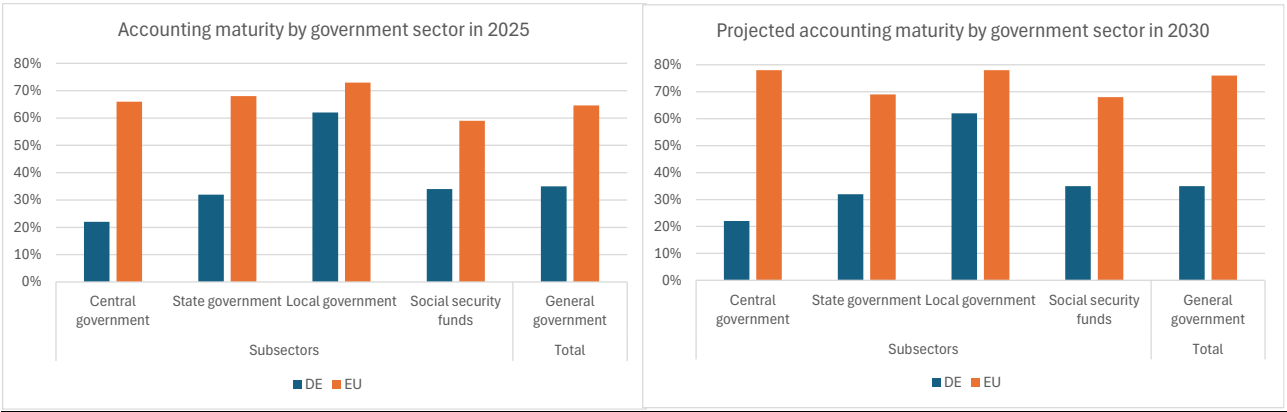
The Country Fiscal Rule Strength Index (C-FRSI) shows the strength of national fiscal rules aggregated at the country level based on i) the legal base, ii) how binding the rule is, iii) monitoring bodies, iv) correction mechanisms, and v) resilience to shocks. The Medium-Term Budgetary Framework Index (MTBFI) shows the strength of the national MTBF based on i) coverage of the targets/ceilings included in the national medium-term fiscal plans; ii) connectedness between these targets/ceilings and the annual budgets; iii) involvement of the national parliament in the preparation of the plans; iv) involvement of independent fiscal institutions in their preparation; and v) their level of detail. A higher score is associated with higher rule and MTBF strength.

Source: [Fiscal Governance Database](#)

Public Accounting

Germany is less advanced in implementing accrual accounting for government relative to the EU average. This applies in particular at the federal and state levels of government (see Graph A1.1, left chart). Furthermore, Germany has no plans to move towards accrual accounting in the medium term (see Graph A1.1, right chart). Accrual accounting as a public accounting standard provides a comprehensive and transparent overview of a public body's financial position and performance and can support sustainability and intergenerational equity.

Graph A1.1: Accounting maturity by government sector (2025, 2030)



Source: tables 3 and 19 of [Updated accounting maturities of EU governments and EPSAS implementation cost](#)

This annex provides an indicator-based overview of Germany's tax system. It includes information on: (i) the tax mix; (ii) competitiveness and fairness aspects of the tax system; and (iii) tax collection and compliance.

Germany has one of the highest labour tax burdens in Europe, at 56.5% of total taxes collected in 2023, which is the second highest burden in the EU after Sweden (at 57%) and well above the EU average of 51.2%. A significant driver of this elevated labour tax burden are social security contributions, which made up 40.2% of all tax collected in 2023, the fourth highest social security contributions burden in the EU, and well above the EU average of 32.6%. At the same time, capital taxation accounts for 18.3% of all tax collected in Germany, 3.6 pps below the EU average. Looking at the overall tax burden, it is at 39% of GDP and therefore at the exact same level as the EU average in 2023. Moreover, compared with 2021 and 2022 this overall tax burden has decreased (it was 40.3% in 2022 and 40.7% in 2021). Germany's tax-revenue-to-GDP ratio remains close to the EU average. Tax revenue (including social security contributions) as a percentage of GDP decreased slightly from 40.3% in 2022 to 39.0% in 2023, the same as the EU average for 2023.

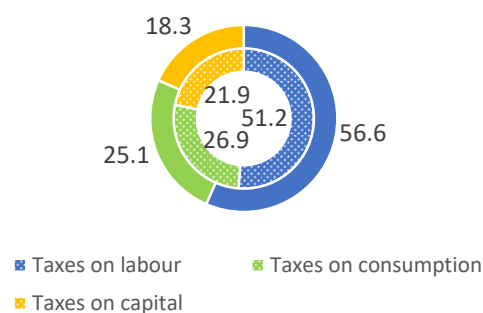
Taxes on capital have remained underrepresented in Germany's overall tax mix in recent years. They are at 7.1% of GDP in 2023, below the EU average of 8.5% in the same year. The corporate tax revenues are almost at the EU average level (3.1% of GDP in Germany in 2023 vs 3.2% of GDP in the EU).

Both property and environmental taxes are used to a lesser extent in Germany than in the EU overall. As in previous years, property taxes as a percentage of GDP in Germany remain lower than the EU average. Total taxes on property were equivalent to 1% of GDP in 2023 (the EU aggregate for 2023 is 1.9%). Environmental taxes were equivalent to 1.7% of GDP in Germany in 2022, below the EU aggregate of 2% in the same year. Moreover,

Germany continues to grant substantial environmentally harmful subsidies (see Annex 6). At the same time, the effective carbon-tax rate in Germany is higher than the EU average (EUR 96.90 per tonne of CO₂ equivalent in Germany in 2023 vs an EU average of EUR 84.80 per tonne) (see Annex 6).

Graph A2.1: Tax revenue shares in 2023

Tax revenue shares in 2023, Germany (outer ring) and EU (inner ring)



Source: Taxation Trends Data, DG TAXUD

Germany has one of the highest statutory and effective corporate tax rates in the EU.

The country's tax system is also relatively complex⁽⁸²⁾ and German SMEs face one of the highest perceived tax-compliance costs in the EU⁽⁸³⁾. In 2024 Germany ranked 16th in investment as a share of GDP in the EU, slightly below the EU-27 average⁽⁸⁴⁾.

Germany passed the Growth Opportunities Act (*Wachstumschancengesetz*) at the end of March 2024.

This law aims to accelerate economic growth and boost competitiveness. Its focus is: (i) to increase investment and innovation by companies; (ii) to simplify the tax system; (iii) to reduce the bureaucratic burden on businesses; and (iv) to introduce some tax allowances. The Growth Initiative (*Wachstumsinitiative*) included measures to boost growth by increasing labour supply and

⁽⁸²⁾ Tax Complexity Index, <https://www.taxcomplexity.org/> where Germany ranks 17th out of the 27 Member States in the Tax Complexity Index.

⁽⁸³⁾ European Investment Bank, [EIB investment survey 2024](https://www.eib.org/en/press/2024/eib-investment-survey-2024). See also Annex 5 on Making Business Easier.

⁽⁸⁴⁾ EU Commission calculations.



productivity such as (i) measures to boost investment such as accelerated depreciation; (ii) measures to boost the labour supply; (iii) measures to simplify the tax situation; and (iv) overall reductions in red tape. While these measures were mostly not implemented due to the collapse of the coalition, they could still serve as inspiration for future policies addressing similar challenges.

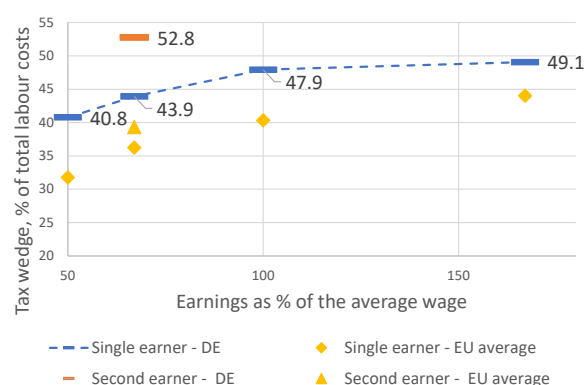
Germany has been introducing R&D tax incentives gradually since 2019. The German Research Allowance Act (*Forschungszulagengesetz*) introduced a federal R&D subsidy in 2019. Under the Act, a tax-free subsidy of 25% of salaries and wages as well as certain acquisition and production costs of a depreciable movable fixed asset (as of 2024) for certain R&D purposes is guaranteed up to a limit of EUR 500 000 per year. The Growth Opportunities Act (*Wachstumschancengesetz*) increased the research allowance rates, raised funding caps and expanded eligible costs. The overall effectiveness of these incentives still needs to be assessed (see also Annex 1).

Germany ranks close to the EU average in venture-capital financing as a percentage of GDP. Germany does not offer any specific incentives for start-ups or for venture-capital investments. The tax treatment of employment stock options has been improved in 2024, including by increasing the tax-free amount for all employee share plans.

The labour tax burden is considerably higher and less progressive than the EU average. Graph A13.2 shows that the labour tax wedge⁽⁸⁵⁾ for Germany in 2024 was much higher than the EU average, not only for single

people at the average wage level, but also for those earning low wages (50% and 67% of the average wage) and high wages (167% of the average wage). The tax wedge for second earners at 67% of the average wage whose partners are at 100% of the average wage was clearly above the EU average. In addition, the difference between the tax wedge for these second earners at 67% of the average wage and for single people at the same wage level was particularly high in Germany, which is indicative of the significant role that the joint taxation system for couples plays in reducing work incentives for second earners. The difference between the tax wedge for high- and low-wage earners (i.e. those at 167% and 50% of the average wage respectively) is considerably lower for Germany than for the EU as a whole, indicating the low progressivity of the labour tax system. The tax-benefit system helped reduce income inequality (as measured by the Gini coefficient) by more than the EU average in 2023 (see Table A13.1).

Graph A2.2: **Tax wedge for single and second earners, % of total labour costs, 2024**



The tax wedge for second earners assumes a first earner at 100% of the average wage and no children. For the full methodology, see OECD, 2016, *Taxing Wages 2014-2015*.
Source: European Commission

Germany performs relatively well on tax compliance. Total revenue from value added tax (VAT) was EUR 286 billion in Germany in 2022⁽⁸⁶⁾. The VAT compliance gap was

⁽⁸⁵⁾ The tax wedge is defined as the sum of personal income taxes and employee and employer social-security contributions net of family allowances, expressed as a percentage of total labour costs (the sum of the gross wage and social-security contributions paid by the employer).

⁽⁸⁶⁾ European Commission: Center for Social and Economic Research (CASE), Directorate-General for Taxation and Customs Union, Oxford Economics, Syntesia, Bonch-

Table A2.1: Taxation indicators

		Germany					EU-27				
		2010	2021	2022	2023	2024	2010	2021	2022	2023	2024
Tax structure	Total taxes (including compulsory actual social contributions) (% of GDP)	36.9	40.7	40.3	39.0		37.8	40.2	39.7	39.0	
By tax base	Taxes on labour (% of GDP)	20.6	22.5	22.3	22.0		19.8	20.5	20.1	20.0	
	of which, social security contributions (SSC, % of GDP)	14.9	15.8	15.6	15.7		12.9	13.0	12.7	12.7	
	Taxes on consumption (% of GDP)	10.9	10.6	10.5	9.8		10.9	11.2	10.9	10.5	
	of which, value added taxes (VAT, % of GDP)	6.9	7.1	7.3	6.8		6.8	7.3	7.4	7.1	
	Taxes on capital (% of GDP)	5.4	7.6	7.5	7.1		7.1	8.5	8.7	8.5	
Some tax types	Personal income taxes (PIT, % of GDP)	8.0	9.5	9.5	9.0		8.6	9.6	9.4	9.3	
	Corporate income taxes (CIT, % of GDP)	2.0	3.0	3.1	3.1		2.2	2.9	3.2	3.2	
	Total property taxes (% of GDP)	0.8	1.3	1.2	1.0		1.9	2.2	2.1	1.9	
	Recurrent taxes on immovable property (% of GDP)	0.4	0.4	0.4	0.4		1.1	1.1	1.0	0.9	
	Environmental taxes (% of GDP)	2.4	2.2	1.8	1.7		2.5	2.4	2.1	2.0	
	Effective carbon rate in EUR per tonne of CO ₂ equivalents	NA	91.8	NA	96.9		NA	86.0	NA	84.8	
Progressivity & fairness	Tax wedge at 50% of average wage (single person) (*)	41.7	41.3	41.0	40.3	40.8	33.9	31.8	31.5	31.5	31.8
	Tax wedge at 100% of average wage (single person) (*)	49.0	48.1	48.3	47.7	47.9	40.9	39.9	39.9	40.2	40.3
	Corporate income tax - effective average tax rates (1) (*)	29.7	29.7	29.7	29.7		21.3	19.3	19.1	18.9	
	Difference in Gini coefficient before and after taxes and cash social transfers (pensions excluded from social transfers) (2) (*)	9.5	9.9	11.2	11.3		8.6	8.2	7.9	7.7	
	Outstanding tax arrears: total year-end tax debt (including debt considered not collectable) / total revenue (in %) (*)		2.6	2.7				35.5	32.6		
Tax administration & compliance	VAT gap (% of VAT total tax liability, VTTL) (**)		4.4	4.3				6.6	7.0		

(1) Forward-looking effective tax rate (KPMG).

(2) A higher value indicates a stronger redistributive impact of taxation.

(*) EU-27 simple average.

(**) For more details on the VAT gap, see European Commission, Directorate-General for Taxation and Customs Union, VAT gap in the EU - 2024 report, <https://data.europa.eu/doi/10.2778/2476549>

For more data on tax revenues as well as the methodology applied, see the Data on Taxation webpage, https://ec.europa.eu/taxation_customs/taxation-1/economic-analysis-taxation/data-taxation_en.

Source: European Commission, OECD

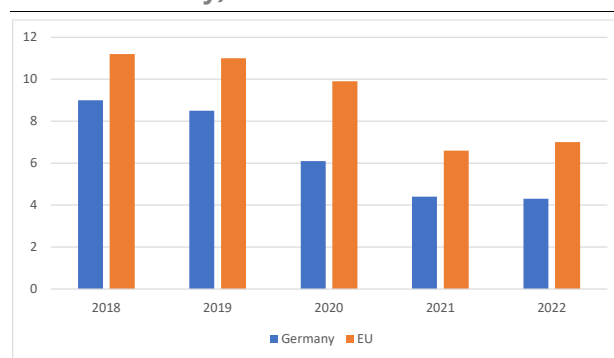
estimated at EUR 12.9 billion or 4.3% of the VAT total tax liability, a decrease of 0.1 percentage points compared with 2021. With an EU VAT compliance gap of approximately 7.0% on average, Germany ranked eighth among the EU Member States (i.e. 19 other EU Member States have larger VAT compliance gaps). Between 2018 and 2022, the VAT compliance gap decreased from 9.0% to 4.3%.⁽⁸⁷⁾

Germany has introduced a number of tax-law changes that took effect from 2025. These changes include: (i) a reform of the property tax system; (ii) mandatory e-invoicing; (iii) a tax-free subsidy for photovoltaic systems; and (iv) a shorter (eight-year) retention period for accounting documents.

Osmolovskiy, M. et al., *VAT gap in the EU – 2024 report*, Poniatowski, G.(editor), Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2778/2476549>

⁽⁸⁷⁾ Ibid.

Graph A2.3: VAT compliance gap (as % of VAT total tax liability)



The VAT total tax liability is the estimated amount of VAT that is theoretically collectable based on the VAT legislation and ancillary regulations, assuming full compliance.

Source: European Commission, Directorate-General for Taxation and Customs Union, VAT gap in the EU - 2024 report

The government has invested in IT infrastructure as part of its broader digital strategy to: (i) reduce manual completion of tasks that can more easily be completed electronically or automatically; (ii) improve government data-analytics capabilities; and (iii) improve fraud detection. These investments

include modernising hardware and software systems, which are crucial for processing and managing tax data efficiently. Since 2014, the German tax authorities have been offering taxpayers pre-filled personal income tax returns for private individuals (except for the self-employed), which are based on existing electronic data and certificates that have been sent to the tax authorities via ELSTER, the electronic tax return gateway in Germany ⁽⁸⁸⁾. For VAT returns, the pre-fill option is currently only partially possible. Overall, as part of the German KONSENS ⁽⁸⁹⁾ project, IT solutions are currently being developed to drive forward the digitalisation of the tax administration, including by promoting the electronic filing of tax returns.

⁽⁸⁸⁾ Bundeszentralamt für Steuern, Elster, [bzst.de](https://www.bzst.de)

⁽⁸⁹⁾ steuer-it-konsens.de

Germany remains a strong performer in research and innovation (R&I) but faces growing global competition. The 2024 European Innovation Scoreboard ranks Germany as a 'strong innovator', with performance above the EU average (111.6%) albeit slightly decreasing ⁽⁹⁰⁾. Germany's R&D intensity (gross domestic expenditure on R&D as a percentage of GDP) exceeds the EU average, but has stagnated since 2018 (at around 3.1%), falling short of its own target of 3.5% by 2025 ⁽⁹¹⁾. Reliance on mid-tech sectors underlines the need to promote disruptive innovation and accelerate the commercialisation (bringing to market) of research outputs to close the innovation gap with the USA. Germany's R&D intensity is also subject to considerable regional disparities (see Annex 17). Despite solid performance in adopting digital technologies by small and medium-sized enterprises (SMEs) and the uptake of advanced technologies by firms in general – contributing to the EU's Digital Decade targets ⁽⁹²⁾ – the development of the start-up environment in Germany harbours potential for improvement, although recently positive trends can be observed.

Science and innovative ecosystems

Germany has a strong public research base, but its scientific performance compared to

certain peer countries could be improved. Its science system builds on a well-established network of public research institutions and is supported by numerous R&I funding programmes ⁽⁹³⁾. Nonetheless, the quality of research outputs (as measured by the share of scientific publications within the top 10% most cited publications worldwide as a percentage of total publications) is just above the EU average (10.2% vs 9.6%) and below that of several EU peers such as Sweden, Denmark, Finland and Austria. Public R&D expenditure as a percentage of GDP is the fourth highest in the EU (0.92% vs EU average of 0.72% in 2023). However, to reach the expected 3.5% target it should be increased to at least 1.16% (i.e. one third of 3.5%) ⁽⁹⁴⁾. Increasing the budget for the Excellence Strategy ⁽⁹⁵⁾ could further advance scientific excellence in the country and create a critical mass of support for top-tier research ⁽⁹⁶⁾. In addition, strengthening Germany's research base requires transparent and stable career paths for young researchers. This makes the ongoing discussions on the Temporary Contract Law ⁽⁹⁷⁾ and those on the creation of more permanent positions of key importance ⁽⁹⁸⁾. Furthermore, there is a pressing need to make R&I funding more agile

⁽⁹⁰⁾ European Commission, 2024, *European Innovation Scoreboard (EIS), country profile: Germany*, ec.europa.eu.

⁽⁹¹⁾ Moreover, international competitors such as the USA (at 3.45% in 2023) are rapidly advancing, while others such as China are catching up (2.43% in 2021). The 3.5% R&D intensity target was reiterated in *Germany's 'Future Research and Innovation Strategy'* (2023), the main strategic document for R&I at national level.

⁽⁹²⁾ The Digital Decade policy programme sets out a pathway for the EU's digital transformation, including concrete commitments from Member States to commonly achieve objectives (e.g. competitiveness, resilience, sovereignty) and digital targets by 2030.

⁽⁹³⁾ [Bundesbericht Forschung und Innovation](#) (2024).

⁽⁹⁴⁾ The literature considers a one third / two third split between public and private R&D expenditure as the most suitable mix. See for example OECD, 2003, [Targeting R&D: Economic and Policy Implications of Increasing R&D Spending](#).

⁽⁹⁵⁾ The Excellence Strategy, established in 2005, supports top-tier research and global competitiveness at universities through targeted funding.

⁽⁹⁶⁾ See for example Schubert et al (2024): [Research, Technology and Innovation Policy Must Focus on the Generation of Critical Mass](#).

⁽⁹⁷⁾ The German Temporary Contract Law (Wissenschaftszeitvertragsgesetz, WissZeitVG) regulates fixed-term employment in academia, primarily for doctoral and postdoctoral researchers.

⁽⁹⁸⁾ See for example Expertenkommission Forschung und Innovation, 2023, *Gutachten zu Forschung, Innovation und Technologischer Leistungsfähigkeit Deutschlands 2023*, [efi.de](https://www.efi.de).

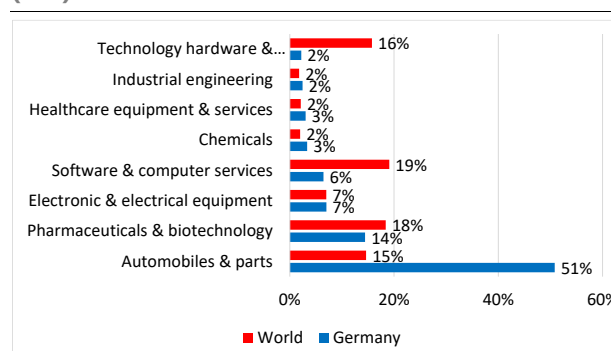
by implementing streamlined, digital processes and improving programme coherence, guided by mission-oriented R&I governance ⁽⁹⁹⁾.

Business Innovation

Germany's reliance on mid-tech industries, fewer high-tech start-ups and a weaker innovation output rate suggest lock-in effects and signal difficulties in adapting to emerging technologies. Business expenditure on R&D as a percentage of GDP is well above the EU average (2.12% vs 1.49%), but differs greatly between regions ⁽¹⁰⁰⁾. Moreover, it is concentrated in large companies in mid-tech sectors, such as automotive ⁽¹⁰¹⁾, and has broadly stagnated since 2018 (2.10%). According to the EU Industrial R&D Investment Scoreboard, 7 of the 10 top private R&D investors in 2023 were the same as in 2003 (e.g. Volkswagen, Siemens, Bosch), underlining a heavy reliance on mid-tech industries (see also Graph A3.1) ⁽¹⁰²⁾. The size of the ICT sector is below the EU average (5% vs 5.5% in gross value added in 2021), and its R&D business expenditure amounts to 11.4% of total R&D expenditure, which is low compared to other EU Member States ⁽¹⁰³⁾. The slow shift towards new tech fields, in particular compared to the USA, is also reflected in a steady decline in patenting activity which, though still high by

average EU standards, has decreased in recent years ⁽¹⁰⁴⁾. To tackle these challenges and encourage a shift towards high-tech fields and transformative innovation, Germany established the Agency for Disruptive Innovation (SPRIN-D) in 2019. Since 2023, the SPRIN-D Freedom Act has granted the agency greater autonomy, enabling it to overcome bureaucratic constraints like rigid procurement processes. While some room for further flexibility remains ⁽¹⁰⁵⁾, SPRIN-D marks a positive step towards a more agile R&I landscape. Its impact on supporting breakthrough innovations and integrating new players in the German R&I system will need to be assessed.

Graph A3.1: **Sectoral distribution of R&D investment among the world's top 2 000 R&D investors, in Germany (blue) and worldwide (red)**



Source: European Commission, 2024 EU Industrial R&D Investment Scoreboard.

SMEs are not investing sufficiently in R&D, while Germany's start-up rate in high-tech sectors is decreasing. R&D expenditure by SMEs as a percentage of GDP (0.20% in 2021, last data available, vs 2022 EU average of

⁽⁹⁹⁾ Mission-oriented governance is a whole-of-government approach that sets bold, time-bound goals to drive innovation and tackle societal challenges. See for example Expertenkommission Forschung und Innovation, 2025, Gutachten zu Forschung, Innovation und Technologischer Leistungsfähigkeit Deutschlands 2025, e-fi.de.

⁽¹⁰⁰⁾ In the top-performing regions (Baden-Württemberg), business R&D expenditure as a % of GDP was 4.63% in 2021, while in Saxony-Anhalt it was only 0.42%. See Annex 17 for more information.

⁽¹⁰¹⁾ OECD, 2022, Innovation Review: Germany 2022, oecd-ilibrary.org.

⁽¹⁰²⁾ European Commission, 2023 EU Industrial R&D Investment Scoreboard, ec.europa.eu.

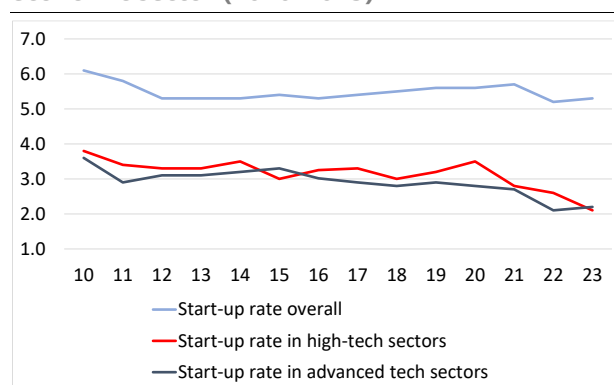
⁽¹⁰³⁾ Eurostat, [ICT sector size](#) and [R&D in ICT sector](#), all data from 2021.

⁽¹⁰⁴⁾ Patent applications filed under the Patent Cooperation Treaty per billion of GDP (in purchasing power standards €) stood at 5.4 in 2021 (EU average 3.2), compared with 6.3 in 2015 and 7.6 in 2010. Other sources also show a slower increase in patents in R&D intensive technologies compared with other countries worldwide, see: <https://www.e-fi.de/dashboard/dev/patente/patentintensitaet>.

⁽¹⁰⁵⁾ Expertenkommission Forschung und Innovation, 2024, Gutachten zu Forschung, Innovation und Technologischer Leistungsfähigkeit Deutschlands 2024, e-fi.de.

0.40%) remains extremely low, and the declining share of SMEs engaged in innovation activities risks slowing productivity growth and the broader adoption of new technologies ⁽¹⁰⁶⁾. Despite a rise in the start-up rate (2023 and 2024) ⁽¹⁰⁷⁾, it remains uncertain whether long-term stagnation can be overcome (see blue line, Graph A3.2) and if the decline in high-tech and advanced sectors can be reversed (see red and grey lines in Graph A3.2). To promote the innovation activity of SMEs more broadly, the German government significantly increased R&D tax allowances with its Growth Opportunities Act (March 2024). It is important to further fine-tune the scheme following the evaluation planned in 2025. First findings indicate that there is a need to address administrative hurdles and increase visibility in order to improve SME access to the scheme ⁽¹⁰⁸⁾.

Graph A3.2: **Start-up rate in Germany by economic sector (2010-2023)**



(1) High-tech encompasses industries with the highest R&D intensity and advanced technology industries with moderate R&D intensity (see Neuhaeusler et al. (2022) for more information). The start-up rate is calculated as the number of start-ups in relation to the number of companies.

Source: Based on the German Commission of Experts for R&I (2025).

The adoption of digital technologies by firms is slowly gaining traction, and Germany is also very active in developing digital technologies and infrastructure. The country performs above the EU average in its level of basic digital intensity for SMEs and in the share of firms that have taken up advanced digital technologies (i.e. AI, cloud or data analytics), although cloud uptake is around the EU average. To support the further adoption and development of digital technologies, Germany is making the most of national measures and investment under its recovery and resilience plan. These initiatives range from increasing the uptake of digital technologies by SMEs for example via European Digital Innovation Hubs, the Digital Hub Initiative and the SME digital programme Mittelstand-Digital, to the development of digital technology and infrastructure. Key focus areas include semiconductors via Important Projects of Common European Interest (IPCEI) on Microelectronics and Communication Technologies to stimulate the design, testing at industrial scale, and manufacturing capacities for EU semiconductor companies and investment under the European Chips Act. Furthermore, Germany is developing interoperable and accessible European data

⁽¹⁰⁶⁾ Hottenrott et al (2024): [What's the State of the Innovation Capacity in Germany?](#)

⁽¹⁰⁷⁾ Recent sources show an uptick in the start-up rate as of late 2023 (year-to-year growth between 2023 and 2024 11%). See Start-up Verband (2025): [Startup-Neugründungen in Deutschland](#).

⁽¹⁰⁸⁾ Stifterverband (2023): [Drei Jahre Forschungszulage: Ein erstes Fazit zur Resonanz](#).

processing technologies via the IPCEI on Next Generation Cloud Infrastructure and Services. Additionally, cohesion policy programmes include several measures to support SME innovation in order to boost digitalisation and decarbonisation of industry.

Business-science linkages are strong but are skewed towards large companies, while challenges in the commercialisation of research outputs hinder broader economic transformation efforts.

The number of public-private scientific co-publications as a percentage of total publications remains high and well above the EU average (11.8% vs 7.7% in 2023). Research and development activities carried out by public research organisations and universities for private companies remain at a very high level and are driven by players such as the Fraunhofer-Gesellschaft⁽¹⁰⁹⁾. However, this model has mainly been effective in promoting incremental innovation within existing industries. Overall, Germany's performance in commercialising research has been mixed, as illustrated by the relatively low – and slowly increasing – number of academic spin-offs⁽¹¹⁰⁾. Commercialisation of research and entrepreneurship still plays a subordinate role at Germany universities and is not included as a mandatory task in some federal states' higher education laws⁽¹¹¹⁾. This is reflected in support structures for commercialisation such as technology transfer offices⁽¹¹²⁾. These often face unstable levels of financial support, leading to limited capacity to advise researchers on topics linked to technology

transfer⁽¹¹³⁾. In addition, bureaucratic hurdles linked to the transfer of intellectual property persist⁽¹¹⁴⁾. To improve the environment for commercialising research, Germany has introduced several initiatives like IP Transfer 3.0 to streamline intellectual property transfer and the Start-up Factories programme to promote spin-offs. Going forward, it is crucial to swiftly implement the remaining measures from the Start-up Strategy⁽¹¹⁵⁾ such as those that facilitate regulatory sandboxes, and to launch the envisaged Agency for Transfer and Innovation (DATI) to provide a new impetus for science-business collaboration in an agile manner. This should follow and take into account the dedicated expert recommendations⁽¹¹⁶⁾.

Regulatory barriers to innovation remain, particularly on data regulation.

Inconsistent interpretation of data privacy laws, such as the General Data Protection Regulation, continue to hamper the usability of public data for research purposes. While adoption of the Health Data Utilisation Act is an important step, other initiatives, such as the Research Data Act, face legal and administrative hurdles in balancing data protection with open access. However, making progress on the provision and use of data is essential for driving data applications and digital transformation⁽¹¹⁷⁾. The proposed Regulatory Sandboxes Act, designed to formalise controlled testing of

⁽¹⁰⁹⁾ 'Contractual research' as measured in public R&D expenditure financed by business enterprises as a percentage of GDP is the highest in the EU (0.11% vs EU average 0.05%).

⁽¹¹⁰⁾ OECD, 2022, Innovation Review: Germany 2022, oecd-ilibrary.org.

⁽¹¹¹⁾ Roessler, Isabel (2024): Third Mission Aspekte in den Hochschulgesetzen der Bundesländer.

⁽¹¹²⁾ A technology transfer office (TTO) facilitates the commercialisation of research by connecting universities and research institutions with industry, supporting patenting, licensing and the creation of spin-offs.

⁽¹¹³⁾ OECD, 2022, Innovation Review: Germany 2022, oecd-ilibrary.org.

⁽¹¹⁴⁾ See for example Expertenkommission Forschung und Innovation, 2024, Gutachten zu Forschung, Innovation und Technologischer Leistungsfähigkeit Deutschlands 2024, e-fi.de and OECD, 2022, Innovation Review: Germany 2022, oecd-ilibrary.org.

⁽¹¹⁵⁾ Germany's [Start-up Strategy](#) from 2022 focuses on promoting innovation and entrepreneurship through support mechanisms like funding and regulatory simplification.

⁽¹¹⁶⁾ [Empfehlungen der Gründungskommission zum Auf- und Ausbau der DATI](#), 2024.

⁽¹¹⁷⁾ Expertenkommission Forschung und Innovation, 2024, Gutachten zu Forschung, Innovation und Technologischer Leistungsfähigkeit Deutschlands 2024, e-fi.de.

innovative technologies, has yet to be adopted. It is essential that the experimentation clauses are broadly defined to provide flexibility in testing diverse innovations, adapt to unforeseen changes and ensure a lasting impact ⁽¹¹⁸⁾.

Financing innovation

Venture capital financing in Germany has shown a slight upward trend in recent years, but the market fails to meet the demand of young, innovative firms. Seed funding has stagnated at around 0.005% of GDP, while there has only been a moderate increase in investment in start-up activities, from 0.028% of GDP in 2019 to 0.036% of GDP in 2023 ⁽¹¹⁹⁾. The number of companies that received seed and start-up funding decreased in 2023, with the average deal volume also showing a downward trend ⁽¹²⁰⁾. The start-up rate is stagnating, but showed a slight increase in 2023 (see also Graph A3.2) ⁽¹²¹⁾. For young entrepreneurs, raising funds remains a key challenge, with 28% of respondents in a KfW survey citing this as a barrier, ranking it one of the top 5 biggest obstacles. Moreover, the share of young entrepreneurs who have to rely on their own financial resources has risen significantly, from 56% in 2019 to 69% in 2023 ⁽¹²²⁾. While the German government's Start-up Strategy and its Future Fund aim to improve Germany's venture capital system, a majority of measures are targeted towards firms that already went through several financing rounds ⁽¹²³⁾. Given the market dynamics described above, measures explicitly

targeting start-ups' access to seed and early-stage funding could benefit the German start-up ecosystem.

Due to recent reforms the market for later stage funding has shown signs of improvements, but a significant financing gap remains. The amount of capital available for later-stage funding has increased significantly, rising from 0.018% of GDP in 2019 to 0.045% of GDP in 2023, well above the EU average of 0.03% GDP ⁽¹²⁴⁾, but still below the level of international competitors such as the USA. This indicates a picking up of investment for companies in more mature stages of development. The German government has contributed to this positive trend through initiatives like the High-Tech Gründerfonds (HTGF) Opportunity and the WIN Initiative, both part of the Start-up Strategy. These programmes target the funding gaps in the later stages of start-up financing, with a focus on technology and innovation. The HTGF Opportunity Fund, with a budget of EUR 660 million, supports successful scale-ups in later financing stages, and an additional EUR 1.75 billion has been allocated to strategic sectors such as AI, clean-tech and biotechnology ⁽¹²⁵⁾. Nevertheless, access to larger deals during later financing rounds remains the decisive bottleneck for start-ups to scale up in Germany. It remains crucial for the German government to continue implementing its Start-up Strategy and ensure the continued flow and absorption of funds for venture capital market growth.

Innovative talent

The shortage of skilled workers affects Germany's innovation capacity. Between 2020 and 2022, a third of companies reported

⁽¹¹⁸⁾Ibid.

⁽¹¹⁹⁾OECD, Venture capital investments (market statistics).

⁽¹²⁰⁾ InvestEurope.

⁽¹²¹⁾Next Generation: Startup-Neugründungen in Deutschland, 2019-2023.

⁽¹²²⁾ [KfW Entrepreneurship Monitor 2024](#).

⁽¹²³⁾[Die Start-up-Strategie der Bundesregierung](#).

⁽¹²⁴⁾ OECD.

⁽¹²⁵⁾[Zweiter Fortschrittsbericht zur Umsetzung der Start-up-Strategie der Bundesregierung](#).

that skills shortages hindered their innovation efforts⁽¹²⁶⁾. This bottleneck is also visible in fields such as AI, where nearly half of employers in Germany cite a lack of skills as a barrier to adopting AI⁽¹²⁷⁾. This is illustrated by the number of graduates in the field of computing per thousand of the population aged 25-34, which remains below EU average (3.3 vs 3.6 in 2022). At the same time, the share of STEM graduates is among the highest in the EU (see Annex 12). While tertiary educational attainment remains low, Germany registers the highest rate for PhD graduates (1.3 vs EU 0.4), contributing to its innovation potential. Germany updated its 'Skilled Labour Strategy' in 2022 to attract foreign skilled workers and promote life-long learning.

Entrepreneurship education is not a priority for schools in Germany, although it is offered at higher education levels. In school education, there is no standardised national or Laender-specific definition for entrepreneurship education. While there are some national and Laender initiatives that aim to develop students' entrepreneurship skill, it is not embedded in education policy or in the curriculum across the board. Furthermore, according to Kienbaum⁽¹²⁸⁾, Germany performs worse in school entrepreneurship education than other EU countries. The situation is different in higher education – there is a growing number of programmes and initiatives that aim to support entrepreneurship.

Germany is actively addressing the growing shortage of skilled workers. While having workers with the right skills was considered important for their business model, nearly 6 in 10 companies (54%) had issues retaining them. In 2023, Germany granted approximately

70 000 EU Blue Cards⁽¹²⁹⁾. This represents 78% of the total across the EU, a clear indicator of the country's appeal as a destination for highly skilled professionals. Germany also admitted 70% of family members of EU Blue Card holders, the highest proportion in the EU. In the same year, the country issued about one third of all EU authorisations for study and research⁽¹³⁰⁾, cementing its position as a leading global destination for university students and entrepreneurs. However, there is room for improvement in attracting highly educated workers and start-up founders, including by speeding up administrative procedures⁽¹³¹⁾. To address these gaps, Germany has simplified legislative requirements since 2023, making it easier for employers to recruit skilled workers from non-EU countries. Notable measures include the Recognition of Foreign Qualifications initiative and the Qualified Professionals Pathway for skilled workers.

⁽¹²⁶⁾ Hottenrott et al (2024): [Wie steht es um die Innovationsfähigkeit Deutschlands?](#)

⁽¹²⁷⁾ OECD (2024): [Artificial Intelligence Review of Germany](#).

⁽¹²⁸⁾ Kienbaum (2018): [Entrepreneurship in schools - current trends and developments, sustainability of projects, transparency and success indicators](#).

⁽¹²⁹⁾ The EU Blue Card is a fast-track tool for recruiting highly skilled non-EU nationals with higher education or equivalent experience (Source for data: Eurostat).

⁽¹³⁰⁾ Germany issued 8 813 permits specifically for job-seeking or entrepreneurial purposes in 2023 (Source: Eurostat).

⁽¹³¹⁾ OECD 2023 Attractiveness Index.

Table A3.1: Key innovation indicators

Germany	2012	2017	2020	2021	2022	2023	2024	EU average (1)	USA
Headline indicator									
R&D intensity (gross domestic expenditure on R&D as % of GDP)	2.82	2.99	3.09	3.08	3.07	3.11	:	2.24	3.45
Science and innovative ecosystems									
Public expenditure on R&D as % of GDP	0.90	0.92	1.03	1.02	0.93	0.92	:	0.72	0.64
Scientific publications of the country within the top 10% most cited publications worldwide as % of total publications of the country	11.2	10.6	10.3	10.2	:	:	:	9.6	12.3
Researchers (FTE) employed by public sector (Gov+HEI) per thousand active population	3.8	4	4.3	4.4	4.2	:	:	4.2	:
International co-publications as % of total number of publications	45.3	49.8	53.4	53.5	53.9	54.6	:	55.9	39.3
R&D investment & researchers employed in businesses									
Business enterprise expenditure on R&D (BERD) as % of GDP	1.92	2.06	2.06	2.06	2.07	2.12	:	1.49	2.70
Business enterprise expenditure on R&D (BERD) performed by SMEs as % of GDP	0.2	0.17	:	0.2	:	:	:	0.4	0.3
Researchers employed by business per thousand active population	4.8	6.1	6.6	6.7	7	:	:	5.7	:
Innovative outputs									
Patent applications filed under the Patent Cooperation Treaty per billion GDP (in PPS €)	6.8	6.3	5.7	5.4	:	:	:	2.8	:
Employment share of high-growth enterprises measured in employment (%)	14.74	13.59	12.30	:	:	:	:	12.51	:
Digitalisation of businesses									
SMEs with at least a basic level of digital intensity % SMEs (EU Digital Decade target by 2030: 90%)	:	:	:	:	77.35	:	79.87	72.91	:
Data analytics adoption % enterprises (EU Digital Decade target by 2030: 75%)	:	:	:	:	:	37.08	:	33.17	:
Cloud adoption % enterprises (EU Digital Decade target by 2030: 75%)	:	:	:	31.83	:	38.5	:	38.86	:
Artificial intelligence adoption % enterprises (EU Digital Decade target by 2030: 75%)	:	:	:	10.56	:	11.55	19.75	13.48	:
Academia-business collaboration									
Public-private scientific co-publications as % of total number of publications	10.1	10.9	11.2	11.3	11.8	11.8	:	7.7	8.9
Public expenditure on R&D financed by business enterprises (national) as % of GDP	0.112	0.11	0.119	0.11	:	:	:	0.05	0.02
Public support for business innovation									
Total public sector support for BERD as % of GDP	:	0.081	:	0.083	:	:	:	0.204	0.251
R&D tax incentives: foregone revenues as % of GDP	:	:	:	0.001	0.004	0.011	:	0.102	0.141
BERD financed by the public sector (national and abroad) as % of GDP	:	0.081	:	0.083	:	:	:	0.1	0.11
Financing innovation									
Venture capital (market statistics) as % of GDP, total (calculated as a 3-year moving average)	0.02	0.03	0.05	0.08	0.08	6.40	:	0.08	:
Seed stage funding share (% of total venture capital)	6.30	5.30	6.30	5.90	6.40	6.40	:	7.30	:
Start-up stage funding share (% of total venture capital)	51.40	52.90	58.30	46.10	46.00	41.90	:	44.00	:
Later stage funding share (% of total venture capital)	42.30	41.80	35.40	48.00	47.70	51.70	:	48.70	:
Innovative talent									
New graduates in science and engineering per thousand population aged 25-34	16.7	16.6	17.6	18.5	18.6	:	:	17.6	:
Graduates in the field of computing per thousand population aged 25-34	2.2	2.5	2.8	3.1	3.3	:	:	3.6	:

(1) EU average for the last available year or the year with the largest number of country data.

Source: Eurostat, DG JRC, OECD, Science-Metrix (Scopus database), Invest Europe, European Innovation Scoreboard

Germany still has a favourable and stable business environment but faces various structural challenges. Germany's business environment still has many strengths, including the large market size, well-developed infrastructure, and highly trained workforce. Germany therefore remains an attractive business location, including for foreign direct investment. However, productivity and competitiveness are hampered by a high administrative burden and delays in expanding digital networks and services. Moreover, the transport infrastructure increasingly requires maintenance and upgrading. Germany is still lagging behind in the digitalisation of public services. Regulatory barriers remain higher in Germany than in comparable countries for a number of professions. Germany therefore has considerable scope for making business easier and reducing administrative and regulatory barriers.

Investment climate

The low growth dynamic is weighing on investment. The challenging economic situation led to further reductions in private investment in 2024. For example, investment in equipment fell by about 6% in 2024. The perceived investment gap in Germany is higher than the EU average, with 18% of firms reporting underinvestment over the past three years (compared with the EU average of 14%). German firms also invest slightly less in new products or services than the EU average (11% vs 13% EU average) but more in replacing existing equipment (58% vs 52%)⁽¹³²⁾. The ifo index for investment expectations fell noticeably in 2024, indicating that businesses have adjusted their investment plans⁽¹³³⁾. The foreign direct investment (FDI) stock has gradually increased in recent years to around

45% of GDP in 2022⁽¹³⁴⁾, reflecting Germany's central role in the EU economy and still attractive location for foreign direct investment.

Lack of skilled staff, uncertainty, energy costs and complexity of business regulations are highlighted as investment obstacles.

According to the EIB Investment Survey, the main long-term obstacles to investment reported by German firms are the availability of skilled staff (90%), energy costs (83%), uncertainty about the future (80%), and complexity of business regulations (82%)⁽¹³⁵⁾. The availability of skilled staff is a key concern as the working-age population is projected to shrink sharply. Moreover, PISA results show urgent need for action (see Annexes 10 and 12). The share of businesses facing acute labour shortages is higher than the EU average (25.0% vs 20.2%) but has decreased slightly compared to 2023 (33.5%). The share of businesses facing material supply constraints decreased noticeably in 2024 (13.1% vs 37.5% in 2023, see Table A4.1)⁽¹³⁶⁾. With regard to energy costs, Germany is at a clear disadvantage to North America and China, even though energy prices have already fallen substantially since the easing of the energy crisis. However, energy-intensive industries in particular are still feeling the burden of high energy costs (see also Annexes 7 and 8)⁽¹³⁷⁾.

The challenging economic situation has triggered an increase in the number of insolvencies. Overall, German SMEs still have good access to finance, though companies report a tightening of credit conditions and more restrictive bank lending due to higher interest rates, increased uncertainty and the general macroeconomic situation⁽¹³⁸⁾ (see

⁽¹³²⁾European Investment Bank, [EIB investment survey 2024](#).

⁽¹³³⁾ifo Institute, 2024, [Investitionserwartungen sinken deutlich](#).

⁽¹³⁴⁾Eurostat, data on FDI stock: <https://ec.europa.eu/eurostat>.

⁽¹³⁵⁾European Investment Bank, [EIB investment survey 2024](#).

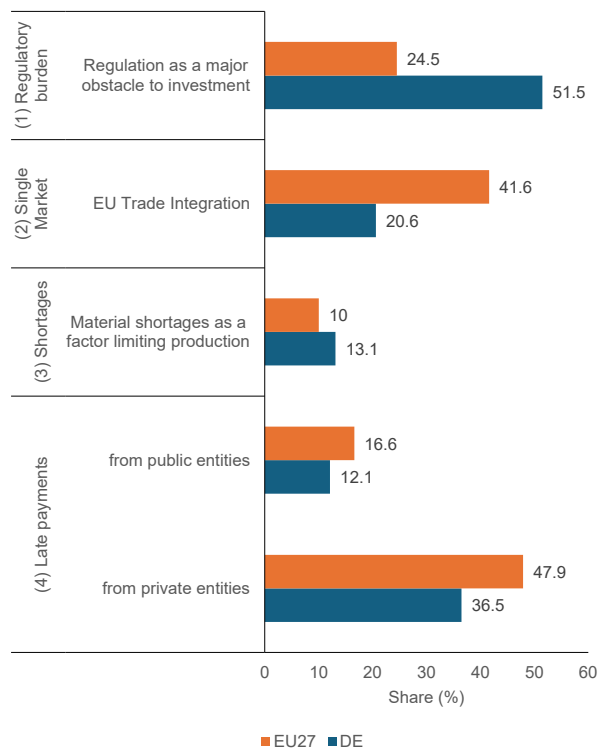
⁽¹³⁶⁾European Commission, 2025, [Business and consumer surveys](#).

⁽¹³⁷⁾KfW Research, 2024, [Germany's competitiveness – from 'sick man of Europe' to superstar and back: Where does the economy stand?](#).

⁽¹³⁸⁾KfW, 2024, KfW-ifo-Kredithürde, [kfw.de](#).
ECB, 2024, Survey on the access to finance of enterprises, [ecb.europa.eu](#).

Annex 5). With regard to late payments, the business-to-business and public sector payment gaps are in line with the EU average (see Table A4.1). Overall, the share of SMEs experiencing late payments is considerably below the EU average (33.7% vs 48.7%)⁽¹³⁹⁾. However, insolvencies increased noticeably in 2024 due to the difficult macroeconomic environment. In December 2024, insolvencies were 24% higher than one year earlier and 54% above the 2016-2019 average (before COVID-19)⁽¹⁴⁰⁾.

Graph A4.1: **Making Business Easier: selected indicators.**



Share of (1) enterprises, (2) average intra-EU exports and imports in GDP, (3) firms, (4) SMEs.

Sources: (1) EIB IS, (2) Eurostat, (3) ECFIN BCS, (4) SAFE survey.

Despite the challenging economic environment, the number of start-ups has increased in the past year. Last year, 2 766 companies were founded (around 11% more than the 2 498 start-ups in the previous year),

⁽¹³⁹⁾Intrum, 2024, [European payment report 2024](#).

⁽¹⁴⁰⁾ Leibniz-Institut für Wirtschaftsforschung Halle (IWH), 2024, Insolvenztrend, [iwh-halle.de](#).

according to data from the start-up association⁽¹⁴¹⁾. Most companies were founded in the IT sector, driven also by developments in AI. Access to venture capital has further improved in recent years, but Germany still lags behind some European and international peers regarding the availability of venture and growth capital (see Annex 3). Furthermore, business dynamism in a wider sense remains weak. Firm entry rates are below the EU average and declined in the last years⁽¹⁴²⁾.

Germany's transport infrastructure is well-developed but increasingly requires maintenance and upgrading. By international standards, Germany has a very well-developed transport infrastructure, for both road and rail transport. For example, it is ranked 3rd with Canada (after Singapore and Switzerland) out of the 139 countries covered by the World Bank Logistic Performance Index. However, the existing road and rail infrastructure is increasingly in need of maintenance and upgrading. According to the EIBIS survey⁽¹⁴³⁾, 55% of German businesses considered the state of transport infrastructure an obstacle to investment in 2024 (vs 45% in the EU).

Digital infrastructure has substantially improved in Germany, but there is still room for improvement in fibre connectivity. Germany has made considerable progress in digital infrastructure, especially in the area of connectivity. Fibre to the premises (FTTP) coverage increased substantially by 10.5 percentage points to 29.8% in 2023, though this was still well below the EU average of 64%. Coverage in rural areas also increased by 8.7 percentage points to 25.6%, which was much lower than the EU average of 53%. The 2023 increase in the coverage of very high-capacity networks to 74.7% was more moderate (only 4.6 percentage points), but it is now getting closer to the EU average of 78.8%. As regards

⁽¹⁴¹⁾Start-up-Verband, 2024, [Anstieg der Startup-Gründungen um 11 % gegenüber 2023](#).

⁽¹⁴²⁾ Eurostat: Business Demography Statistics

⁽¹⁴³⁾European Investment Bank, [EIB investment survey 2024](#).

mobile coverage, overall 5G coverage increased to 98.1% (above the EU average of 89.3%), close to saturation levels. In total, Germany has provided EUR 21 billion in funding for fibre optic funding (including EUR 110 million for the Gap Closure Pilot Programme). Regarding the resilience of digital infrastructures, cybersecurity awareness in enterprises is increasing.

Regulatory and administrative barriers

German businesses are calling for a reduction in the administrative and regulatory burden. The national regulatory control council reports a noticeable increase in compliance costs in the last legislative period⁽¹⁴⁴⁾. Efforts to reduce red tape provided only marginal relief. It therefore calls for an objectively measurable reduction target and a reform of the “one in, one out” scheme. Moreover, business surveys indicate a view that the bureaucratic burden in Germany is high. According to the EIB Investment Survey, the burden of business regulation was reported as an obstacle by 82% of businesses in 2024, which was considerably higher than the EU average of 66%⁽¹⁴⁵⁾ (see also Annex 6).

The federal and regional governments have taken steps to reduce red tape, but there is still scope for further progress. Germany has taken several measures to improve the business environment, including under Germany’s recovery and resilience plan⁽¹⁴⁶⁾, such as the modernisation of registers and implementation of the Online Access Act (see also Annex 6). The federal and regional authorities agreed to streamline planning and

permitting procedures⁽¹⁴⁷⁾. The fourth Bureaucracy Relief Act adopted In September 2024 provided some limited relief, i.a. by reducing the retention period for accounting documents and abolishing several written-form requirements.⁽¹⁴⁸⁾

Germany has a complex tax system. The German tax system is considered to be quite complex and burdensome⁽¹⁴⁹⁾ (see also Annex 2). Taxes are levied by the federal government, states and municipalities, while the responsibility for collecting taxes is largely devolved to regional administrations⁽¹⁵⁰⁾. A reduction in the complexity of the tax system would make operating easier for businesses, particularly SMEs. For example, value added tax (VAT) rates were reduced for certain products and services for perfectly sound reasons but dealing with different VAT rates also made life more complicated for many businesses. The fact that different assessment bases and calculations are used for trade tax and corporate tax also adds complexity.

Digitalisation remains a challenge in Germany, despite positive developments in digital public services and e-government. Germany is still lagging behind in the digitalisation of public services in the context of the Digital Decade targets. Germany’s provision of online public services has been stagnating and the take-up of digital public services is low. Germany is nevertheless making progress (for example, in the implementation of e-IDs). Overall, Germany still has considerable scope to accelerate the digitalisation of public services in line with its Digital Decade targets⁽¹⁵¹⁾ (see also Annex 6).

⁽¹⁴⁴⁾ National Regulatory Control Council, 2024, Annual Report, normenkontrollrat.bund.de

⁽¹⁴⁵⁾ European Investment Bank, [EIB Investment Survey 2024](#).

⁽¹⁴⁶⁾ European Commission, 2024, [Germany’s recovery and resilience plan](#).

⁽¹⁴⁷⁾ Bundesregierung, „Pakt für Planungs-, Genehmigungs- und Umsetzungsbeschleunigung“, 2025, [Beschleunigungspakt zwischen Bund und Ländern](#).

⁽¹⁴⁸⁾ Deutscher Bundestag, 2024, [Bürokratieentlastungsgesetz IV passiert Bundestag](#).

⁽¹⁴⁹⁾ European Commission, 2022, [Tax compliance costs for SMEs](#).

⁽¹⁵⁰⁾ OECD, 2024, [Tax Administration 2024](#).

⁽¹⁵¹⁾ European Commission, 2024, [Report on the state of the Digital Decade 2024](#).

Single market

Germany has an open and diversified economy but is particularly vulnerable due to its strong export orientation.

With an exports-to-GDP ratio of about 47% in 2024, German businesses have a strong export orientation (both within the single market and beyond). Two thirds of German firms are engaged in international trade⁽¹⁵²⁾. The US overtook China as Germany's largest trading partner in 2024. Trade between Germany and the US reached EUR 255 billion in 2024 (a year-on-year increase of 0.8%), while trade with China decreased by 2.9% to EUR 247 billion. Other important trading partners include France, Italy, the Netherlands, Austria and Poland⁽¹⁵³⁾. Intra-EU trade represented 21.4% of GDP in 2023, which is below the EU average. Motor vehicles are Germany's most important export goods (17.3% of total exports in 2023), followed by machinery (14.4%) and chemical products (9.0%). Recently, Germany's export-oriented industry has been particularly affected by a decline in global demand and increased competition for some of its key export products.

Regulatory restrictiveness remains high in several professions.

The overall regulatory framework provides favourable conditions for trade in services, but restrictions remain regarding the movement of people and the registration of businesses⁽¹⁵⁴⁾. Moreover, Germany's relatively good performance in the economy-wide Product Market Regulation indicator hides an uneven performance in various sectors and regulatory areas⁽¹⁵⁵⁾. According to the European Commission⁽¹⁵⁶⁾

and the OECD⁽¹⁵⁷⁾, regulatory barriers remain high in Germany for architects, civil engineers, accountants, tax advisers, patent and trademark agents, and lawyers – despite some recent reforms on company ownership and multidisciplinary partnerships in tax and legal professions. Exclusive rights to provide tax advice and legal services remain. Reducing restrictive regulation in services while safeguarding quality standards and consumer interests could help boost competition and productivity⁽¹⁵⁸⁾.

The conformity and transposition of single market directives could be improved.

Germany ranks 20th and below the EU average in transposing EU directives into national law. It also ranks low as regards overdue transpositions. Germany could also improve in terms of transposing directives correctly. In addition, the number of pending infringement cases is high and the average duration of infringement proceedings is also above the EU average. Problematic areas include direct taxation, road and rail transport, and services and professions⁽¹⁵⁹⁾. In 2024, Germany resolved 87.3% of the SOLVIT cases it handled as lead centre (above the EU average of 84.9%). Germany's SOLVIT centre was understaffed for most part of the reporting period, but the situation had improved by September 2024.

Public procurement

Germany has taken steps to further modernise and simplify its public procurement system.

Germany has a decentralised procurement system and most procurement is done at local and regional

⁽¹⁵²⁾European Investment Bank, [EIB investment survey 2024](#).

⁽¹⁵³⁾German Federal Statistical Office, 2024, [Foreign trade - German Federal Statistical Office](#).

⁽¹⁵⁴⁾OECD, [Services Trade Restrictiveness Index \(STRI\)](#), 2024.

⁽¹⁵⁵⁾OECD, 2024, Product Market Regulation indicator, [Germany PMR country note](#).

⁽¹⁵⁶⁾European Commission, 2021, [Communication on updating the reform recommendations for regulation in professional services](#), COM(2021)385, 9/7/2021.

⁽¹⁵⁷⁾OECD, 2024, Product Market Regulation indicator, [Germany PMR country note](#).

⁽¹⁵⁸⁾European Commission, 2021, Communication on updating the reform recommendations for regulation in professional services, COM(2021)385, [eur-lex.europa.eu](#).

⁽¹⁵⁹⁾European Commission, 2024, Single Market and Competitiveness Scoreboard, [Country data: Germany | The Single Market and Competitiveness Scoreboard](#).

levels. Indicators suggest overall a good performance. For example, the percentage of contracts awarded based on a single bid was 20% in 2024 (improving from 24% in 2023). The rate of direct awards was 7% in 2024, in line with the EU average (see Table A4.1). This is also corroborated by the OECD indicator on public procurement⁽¹⁶⁰⁾. In November 2024, the federal government launched a reform to simplify, further digitalise and accelerate public procurement procedures⁽¹⁶¹⁾. The reform package including a reduction in documentation requirements should reduce red tape by around EUR 1.3 billion annually. It also aims to further strengthen the strategic use of public procurement. In 2023, a national notification service for public contract awards was created⁽¹⁶²⁾, which centralises data on tenders from different platforms and makes Germany's procurement processes more transparent by publishing data on awarded contracts using a standard format.

Germany supports a strategic use of public procurement. Public procurement is estimated to be about 15% of German GDP and about 35% of total government expenditure⁽¹⁶³⁾. Policy tools and strategies aim to support strategic procurement at different levels. For example, Germany supports innovation in public procurement with the KOINNO competence centre⁽¹⁶⁴⁾ and services aimed at reducing the perceived risks of awarding innovative contracts in compliance with procurement law. Barriers are mainly a lack of knowledge and capacity at local procurer level. Better data gathering and monitoring could also encourage a wider uptake of sustainable, social and innovative procurement practices.

⁽¹⁶⁰⁾ OECD, 2024, [Product Market Regulation indicators](#).

⁽¹⁶¹⁾ Bundesregierung, 2024, [Transformation des Vergaberechts](#).

⁽¹⁶²⁾ Der Beauftragte der Bundesregierung für Informationstechnik, 2024, [cio.bund.de](#).
Beschaffungsamt des BMI, 2024, [bescha.bund.de](#).

⁽¹⁶³⁾ OECD, 2021, [Public procurement](#).

⁽¹⁶⁴⁾ BMWK, 2024, [Competence Center for Innovative Procurement - KOINNO](#).

Table A4.1: **Making Business Easier: indicators.**

Germany							
POLICY AREA	INDICATOR NAME	2020	2021	2022	2023	2024	EU-27 average
Investment climate							
Shortages	Material shortage, firms facing constraints, % ¹	13.4	55.9	77.2	37.5	13.1	10.0
	Labour shortage, firms facing constraints, % ¹	10.0	23.5	38.8	33.5	25.0	20.2
	Vacancy rate, vacant posts as a % of all available ones (vacant + occupied) ²	2.6	3.5	4.7	4.3	3.5	2.3
Infrastructure	Transport infrastructure as an obstacle to investment, % of firms reporting it as a major obstacle ³	15.6	17.5	19.3	21.4	24.4	13.4
	VHCN coverage, % ⁴	-	74.9	70.1	74.7	-	78.8
	FTTP coverage, % ⁴	-	15.4	19.3	29.8	-	64.0
	5G coverage, % ⁴	-	86.5	93.2	98.1	-	89.3
Reduction of regulatory and administrative barriers							
Regulatory environment	Impact of regulation on long-term investment, % firms reporting business regulation as a major obstacle ³	31.5	29.0	26.1	36.1	51.5	24.5
Late payments	Payment gap - corporates B2B, difference in days between offered and actual payment ⁵	20.5	11.7	12.3	14.1	14.6	15.6
	Payment gap - public sector, difference in days between offered and actual payment ⁵	24.1	10.6	12.6	14.8	15.6	15.1
	from public or private entities in the last 6 months	35.0	33.4	33.2	33.7	-	-
	Share of SMEs experiencing late payments, %* ⁶	-	-	-	-	36.5	47.9
	from private entities in the previous or current quarter	-	-	-	-	12.1	16.6
	from public entities in the previous or current quarter	-	-	-	-	12.1	16.6
Single Market							
Integration	EU trade integration, % (Average intra-EU imports + average intra EU exports)/GDP ²	18.6	20.5	22.5	21.1	20.6	41.6
	EEA Services Trade Restrictiveness Index ⁷	0.053	0.040	0.040	0.040	0.044	0.050
Compliance	Transposition deficit, % of all directives not transposed ⁸	0.6	0.4	1.0	1.0	1.0	0.8
	Conformity deficit, % of all directives transposed incorrectly ⁸	1.8	2.2	1.9	1.8	1.2	0.9
	SOLVIT, % resolution rate per country ⁸	87.8	88.6	84.9	95.0	87.3	84.9
	Number of pending infringement proceedings ⁸	48.0	47.0	40.0	39.0	32.0	24.4
Public procurement							
Competition and transparency in public procurement	Single bids, % of total contractors** ⁸	19	20	25	24	20	-
	Direct awards, %** ⁸	6	6	6	5	7	7.0

* Change in methodology in 2024: reporting late payments from public and private entities separately.

**The 2024 data on single bids is provisional and subject to revision. Due to missing data, the EU average of direct awards data is calculated without Romania.

Sources: (1) ECFIN BCS, (2) Eurostat, (3) EIB IS, (4) Digital Decade Country reports, (5) Intrum Payment Report, (6) SAFE survey, (7) OECD, (8) up to 2023: Single Market and Competitiveness Scoreboard, 2024: Public procurement data space (PPDS).

ANNEX 5: CAPITAL MARKETS, FINANCIAL STABILITY AND ACCESS TO FINANCE

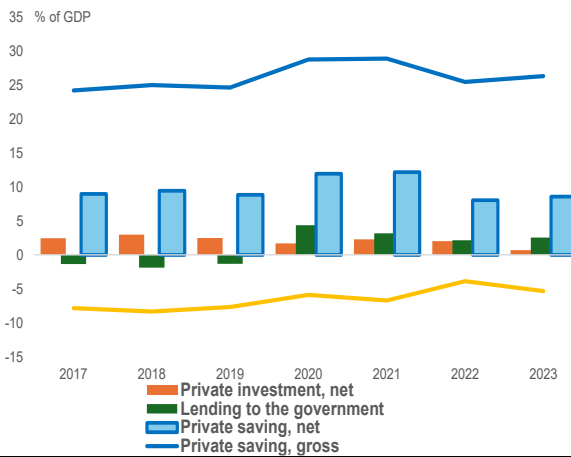
A significant share of Germany's relatively high net savings has consistently been invested abroad, as subdued private investment and moderate public deficits have resulted in structural net lending to the rest of the world. German businesses rely heavily on internal funding and bank financing. Small and medium-sized enterprises (SMEs), in particular, benefit from strong banking relationships, low debt-servicing costs, and tailored financial services. There is limited reliance on alternative forms of financing such as capital markets. German households' strong savings culture fosters risk-averse behaviour, favouring bank deposits over equities. This constrains the participation of retail investors in the equity market. Recent national policy efforts, including legislative measures like the draft Future Financing Act II, aim to address these gaps by both supporting market-based financing for start-ups and increasing the engagement of retail investors in capital markets.

Availability and use of domestic savings

The German economy invests a large part of its relatively high net savings abroad. In the past decade, the private savings ratio, net of fixed capital consumption, consistently fluctuated around its ten-year average of 9.5% of GDP, reaching a high of 12.2% in 2021 (see Graph A3.1). The net private investment ratio, which reflects the private sector's net contribution to capital accumulation, was significantly lower, in particular in 2023 and 2024. The government budget has been in deficit from 2020 until 2024, averaging 0.5% of GDP during the same period and 2.8% over the last 5 years. The public deficit was thus well below the substantial surpluses in net domestic savings and net investment. As a result, Germany has consistently demonstrated structural net lending to foreign countries, averaging 7% of GDP, with a peak of 8.8% in 2016. Therefore, a significant portion of

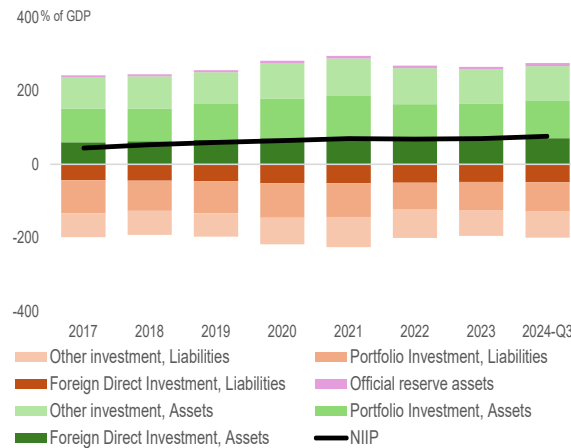
Germany's net savings—after accounting for the necessary investments to maintain its existing capital structure—has been used to finance projects abroad.

Graph A5.1: Net savings-investment balance in Germany



Source: AMECO

Graph A5.2: International investment position of Germany



Source: ECB

As a net creditor to the rest of the world, Germany has built up substantial foreign assets and maintains a positive net international investment position. As of Q3-2024, Germany's total external assets amounted to 275% of GDP, while its liabilities to foreign investors stood at 199% of GDP, resulting in a net international investment position (NIIP) of 76% of GDP (see Graph A3.2). Although the stock of official foreign reserve

assets (8% of GDP) plays only a minor role, the largest contribution to the positive NIIP comes from net portfolio investments, which reached 103% of GDP in Q3-2024. This underlines the high degree of Germany's integration into global capital markets. While Germany is a significant recipient of foreign capital, it remains primarily a net capital exporter, particularly through direct investments abroad.

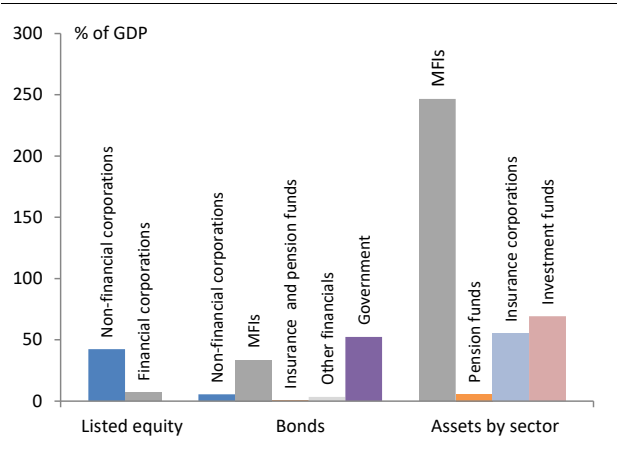
Structure of the capital markets and size of the financial sector

The German stock and bond markets are relatively small compared to the size of the German economy. While Deutsche Börse is the second-largest stock exchange group in the EU, equity markets in Germany remain modest in size. At the end of 2023, the market capitalisation of listed equities stood at just 49% of GDP, rather low compared to other EU countries with more developed capital markets (see Graph A3.3). Reflecting a broader European trend, the number of listed companies has declined in recent years, and several prominent German firms have opted to list on foreign stock exchanges. The volume of outstanding debt securities reached 95% of GDP, also moderate by European standards, with government bonds accounting for the bulk of issuances. However, these figures do not fully capture the particular structure of German capital markets, which offer companies a broad array of atypical and purely domestic financing instruments—many of which are not officially traded on secondary markets—such as promissory notes (Schuldscheine) and various forms of loans. This diversity enables firms to access tailored financing solutions that suit their specific needs.

The German financial sector continues to be predominantly bank-based, with banks remaining the largest component, followed by investment funds. As of 2023, the size of the banking sector stood at 246% of GDP, slightly below the EU average of 257%. German

banks play a pivotal role in financing the domestic economy. A key strength of the German banking sector lies in the long-standing and close relationships that banks maintain with their corporate clients through the so-called house-bank model. Most SMEs rely on a single credit institution throughout their lifecycle, which provides a full range of tailored financial services—from commercial to investment banking. Germany also hosts a robust asset management industry, with total assets reaching 69.2% of GDP in Q3-2024. The German investment fund sector has demonstrated resilience, successfully navigating the challenges of the COVID-19 crisis. With the exception of 2018, the fund industry has experienced steady growth. The insurance sector, with total assets amounting to 60% of GDP at end-2023, is both technically sophisticated and well-diversified, featuring a competitive landscape with domestic and international providers. German insurers operate under three distinct forms: (i) commercial insurance companies, (ii) non-profit mutual associations, and (iii) public-sector insurance entities. Despite some recent consolidation, the German insurance market remains the least concentrated in the EU. It is characterised by a large number of providers, few of which are publicly listed, and intense competition within the same geographical markets. Germany hosts two of the three world largest re-insurance companies.

Graph A5.3: **Capital markets and financial intermediaries in Germany**



Source: ECB, EIOPA, AMECO

Resilience of the banking sector

The German banking sector demonstrates high resilience to risks. Historically, Germany's aggregate capital adequacy ratio has been relatively higher compared to other European countries. German banks' overall capitalization further strengthened to 20.3% in 2023, slightly above the EU average of 20.1% (see Table A3.1). This improvement was due to the accumulation of high-quality loss-absorbing capital, with the CET1 ratio increasing from 15.9% in 2022 to 17.4% in Q3-2024, significantly above the EU average of 16.6%. Banks' profitability measures in terms of Return on Equity in Germany improved markedly to 6.8% in Q3-2024 but remained below the EU average of 10%.

According to the 2023 EU-wide stress tests, German banks would remain stable even in the event of a severe economic downturn.

Additionally, the Bundesbank conducted stress tests for roughly 1,200 less significant institutions (LSIs) in 2024 in Germany, representing about 91% of all credit institutions and approximately 40% of the aggregate total assets in Germany. In the worst-case scenario, the tested banks still maintained an average CET1 ratio of 14.5%, well above regulatory requirements. By December 2023, the average MREL level of German banks stood at 40.2% of Total Risk Exposure Amount (TREA), surpassing the binding target of 28.1%. To further bolster the banking sector's resilience, BaFin decided to maintain the countercyclical capital buffer rate at 0.75% for Q1-2025, effective from 1 February 2025, and the sectoral systemic risk buffer on loans secured by residential real estate at 2.0%.

Recently, banks' balance sheets have started to show signs of deterioration, albeit from a very low base, primarily due to economic challenges.

Credit quality remains robust, with an aggregate non-performing loan (NPL) ratio of 1.4% in Q3-2024, below the EU average of 1.9%. However, leading indicators, such as the recent uptick in bankruptcies to the highest level since 2011, suggest a deterioration in asset quality in the future. In fact, in 2024, the corporate NPL ratio already increased by 0.5 percentage points, reaching 3.4%, bringing it close to the EU average. Since late 2022, the NPL ratio for loans secured by commercial real estate has increased significantly, particularly among systemically important institutions (SIs), partly due to their high exposure to the US commercial real estate market. Over the past 18 months, the NPL ratio for these loans has nearly doubled from a previously low level, according to BaFin, with the aggregate NPL ratio for commercial real estate loan portfolios reaching 4.47% in Q3-2024. The commercial real estate sector continues to face significant challenges, with the credit quality of related loans deteriorating. While commercial real estate prices have recently stabilized,

transaction volumes remain low, and further price declines cannot be ruled out. As a result, risks associated with the commercial real estate sector are elevated. However, according to the German Financial Stability Committee ⁽¹⁶⁵⁾ these risks appear to be manageable for the financial system as a whole.

German banks maintain strong liquidity positions, although slightly below the EU average.

The liquidity and structural adequacy between assets and liabilities have improved, with the Loan-to-Deposit ratio at 96% in Q3-2024, down from 102% in 2014. The Liquidity Coverage Ratio stood at 147.6% for SIs and 187.5% for LSIs in Q3-2024, both below the EU average. Additionally, the Net Stable Funding Ratio for German banks in Q3-2024 was 126.2%, below EU's 138.1%. According to Deutsche Bank research⁽¹⁶⁶⁾, German households added almost EUR 100 bn to their deposits in 2024, with a net increase of EUR 97 bn, returning to pre-2021 deposit growth levels.

Resilience of the non-bank financial intermediaries

Germany's non-bank financial intermediaries (NBFIs) remain broadly solvent and resilient, but ongoing outflows from open-ended real estate funds and risks in the commercial property market reveal lingering sector vulnerabilities. According to the Bundesbank's 2024 Financial Stability Review, the NBFI sector continued to expand significantly over the last years. In Germany, NBFIs hold approximately 40% of total financial system assets, which represents an increase of 15 percentage points since 2009, slightly above

⁽¹⁶⁵⁾ German Financial Stability Committee [communication](#) of 19 December 2024,

⁽¹⁶⁶⁾ Deutsche Bank Research, [German Monitor Household Finance 29 November 2024](#), Heike Mai (author) «German households (re-)turn to interest-earning assets».

the increase in the European financial system. In this regard, Germany's asset management sector, which plays a central role in non-bank intermediation, remains highly solvent and does not currently pose risks to financial stability.

Commercial real estate market continues to pose significant risks. The German real estate price index slightly recovered in 2024 (up by 1.8% year-on-year). For the first time since mid-2022, prices for commercial properties recorded a positive trend. Nonetheless, liquidity risks in open-ended real estate funds remain a key financial stability concern. According to data from Barkow Consulting, open-ended retail real estate funds in Germany experienced sustained net outflows, with December 2024 marking the seventeenth consecutive month of withdrawals. Total net outflows reached EUR 5.9 bn in 2024, putting pressure on fund managers to liquidate assets and thus potentially amplifying declines in commercial property valuations. However, the structure of open-ended retail real estate funds in Germany includes mitigating features such as mandatory minimum holding periods and redemption notice requirements, which help to reduce short-term liquidity stress. In addition, Germany has a high share of single-investor specialised funds, which are typically less exposed to liquidity risks.

German insurers remain generally well capitalised and profitable, operating in a competitive market environment. They also report the highest average Solvency Capital Requirement (SCR) ratio in the EU (320% at year-end 2023), well above the regulatory minimum of 100%. However, German insurers' exposure to real estate remains significant, albeit spread across a diverse range of assets. Among other risks, this poses a major challenge in adequately valuing these holdings under changing market conditions. In addition, the high degree of illiquidity associated with real estate investments could further amplify vulnerabilities, especially in severe stress scenarios where insurers may be forced to

liquidate assets. Moreover, EIOPA has identified medium to high insurance protection gaps against climate risks in Germany, particularly for flood and coastal flood risks.

Sources of business funding and the role of banks

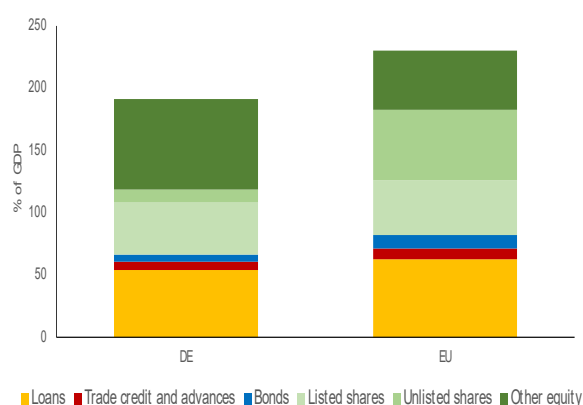
German firms rely less on external funding than the EU average, with most external funding sourced from banks. At the end of 2023, external financing was equivalent to 147.8% of Germany's GDP. In contrast, the EU average for non-financial corporations' (NFCs) external financing reached 188% of GDP. This suggests that German NFCs have strong financial profiles and solid solvency. Germany's NFCs also face the lowest debt-servicing costs in the EU ⁽¹⁶⁷⁾. Although external funding plays a limited role for German businesses overall, a larger share (39.1%) of external funding comes from banks than is the case in other EU Member States (EU average: 30.5%). This reflects the relatively easy access to bank credit for companies, including SMEs, fewer of which report access to finance as their primary problem compared with SMEs in most EU Member States ⁽¹⁶⁸⁾. In fact, Germany has one of the lowest shares of finance-constrained firms in the EU. The banking system currently appears to be adequately meeting funding needs. In addition, SMEs in Germany do not typically rely on capital markets for financing, even though the German capital markets offer a broad range of financing instruments, such as a popular type of promissory note (the *Schuldscheine*, new issuance of which totalled EUR 20.7 bn in 2024 ⁽¹⁶⁹⁾) and various types of loans.

⁽¹⁶⁷⁾Source: [2025 European Semester: Alert Mechanism Report](#).

⁽¹⁶⁸⁾Source: [2024 SAFE Access to Finance Monitor](#).

⁽¹⁶⁹⁾Source: LBBW Research, '[Der Schuldscheinmarkt zeigt sich resilient](#)', January 2025.

Graph A5.4: **Composition of NFC funding as a % of GDP**



(1) The sum of the liabilities only reflects the total for the NFC liabilities considered. Reference period 2023.

Source: Eurostat and FISMA E2 calculations

The banking sector plays a crucial role in financing businesses in Germany. The greater reliance on banks by German businesses can also be attributed to specific domestic cultural and historical factors. Traditionally, the banking sector has been central to financing the economy, fostering long-term customer relationships with NFCs. Germany's banking system, with 1 403 institutions, is particularly important for the *Mittelstand*, the backbone of the German economy. German banks maintain close, long-term relationships with NFCs, especially SMEs, through the 'house-bank' model, according to which businesses receive tailored financial services throughout their lifecycle from one single bank, contributing to smooth access.

The underperformance of growth in bank credit to NFCs in Germany is mostly due to economic stagnation rather than obstacles to credit access. New corporate lending slowed following the start of the ECB's tightening cycle in July 2022 and remained weak throughout 2024. Persistently weak private investment and high funding costs have been the primary drivers behind reduced loan demand. Since late 2022, German enterprises have cut back not only on borrowing from banks but also on other sources of funding, such as through debt securities, shares, and other equity instruments. Bank credit to

German NFCs grew only 0.5% year-on-year in November 2024. Overall, Germany's mild recession has significantly dampened credit demand.

The outlook for bank credit in Germany is moderately favourable. Companies are expected to continue relying on banks for both short- and long-term financing. Credit conditions should gradually improve later this year, driven by economic growth and anticipated ECB rate cuts. While the banking sector remains stable with low levels of non-performing loans, it faces challenges such as low profitability and modest capital buffers. Recent stress tests revealed vulnerabilities in some institutions, which could lead to tighter lending conditions if they worsen. Rising corporate insolvencies also increase the risk of loan defaults, prompting banks to reassess credit risks ⁽¹⁷⁰⁾. Even without defaults, lending standards are expected to tighten, as reflected in the latest ECB Bank Lending Survey, which shows a rise in rejected loan applications, especially for SMEs.

German companies maintain conservative investment strategies despite accessible bank financing. Most German SMEs do not appear to face significant constraints to financing their investments. According to the 2024 EIB Investment Survey, 76% of German firms considered their investment activities over the past three years to be adequate, slightly below the EU average of 80%. Most German firms are however focused on replacing existing capacity instead of investing in the development of new products and services. Business enterprise spending on R&D remains low, and the diffusion of technology is limited. In the early 2000s, Germany's corporate sector shifted from being a net debtor to a net saver. This trend of positive financing balances indicates that German companies have prioritised building equity over increasing innovative investments. In fact, the savings-

⁽¹⁷⁰⁾ BaFin: '[Risks in BaFin's Focus 2025](#)', January 2025.

investment gap in Germany has not changed fundamentally in recent years, despite increasing investment needs. In particular, alternative forms of financing, often used by innovative scale-ups, remain underdeveloped.

There is potential for German companies, particularly start-ups, to increase their use of market funding to meet investment needs. This is especially relevant considering that Germany has one of the highest needs of both current investments and planned investments to address climate change and reduce carbon emissions. The limited reliance of German SMEs on capital markets also points to a lack of funding opportunities for riskier or more innovative projects, which are typically difficult to finance internally. Furthermore, the German economy includes a significant share of capital-intensive sectors, which tend to have greater financing needs, particularly for R&D spending, investments in tangible assets, and other long-term projects.

Capital markets and the participation of retail investors

Germany faces declining interest in its stock market and a concerning trend of innovative firms listing their shares abroad.

Germany, the world's fourth-largest economy, accounts for 4.3% of the world's total GDP but accounts for only 2.4% of global stock-market capitalisation. Its largest stock exchange, Deutsche Börse, is the second-largest stock exchange group in the EU by market capitalisation (EUR 2.1 trillion). However, it trails significantly behind the pan-European financial market Euronext (EUR 6 trillion) ⁽¹⁷¹⁾. Deutsche Börse's market capitalisation relative to Germany's own GDP remains modest. The total number of listed companies on Deutsche Börse declined from 497 in December 2023 to 477 in December 2024, reflecting diminishing

attractiveness for the regulated market. Even more concerning, however, is the growing trend of cross-border IPOs and listings by German companies outside the EU in recent years. Notably, firms in highly innovative and R&D-intensive sectors increasingly opt to go public outside Germany, and mainly outside the EU. This shift is the cause of significant alarm, as it often leads to companies relocating high-value activities and investments to countries with larger investment volumes and specialised investor funds.

The aversion to risk and equity by German households poses an additional challenge for financing investment.

Only about 17% of all Germans hold equities ⁽¹⁷²⁾. The number of private individuals investing in shares or equity funds decreased over the last years to 12.1 million in 2024. This trend is mirrored in both the financing patterns of German NFCs and the savings behaviour of households (households disproportionately favour bank deposits rather than other forms of investment). The share of bank deposits in German households' financial assets is equivalent to 42% of GDP, above the EU average of 35% of GDP. According to a survey conducted by the German Association of Banks in January 2025 ⁽¹⁷³⁾, when asked about their preferred investments, 47% of respondents indicated they would invest in real estate, followed by 43% in overnight deposits, 41% in gold, and 40% each in mutual funds and equities. The survey also revealed a high and increasing preference for safe investments. Only 19% of respondents (down from 33% in the previous year) indicated they would be willing to take on greater investment risk in exchange for potentially higher returns. Finally, the lack of a funded, capital-based pension scheme supplementing the existing pay-as-you-go scheme negatively affects: (i) the sustainability and adequacy of pensions; (ii)

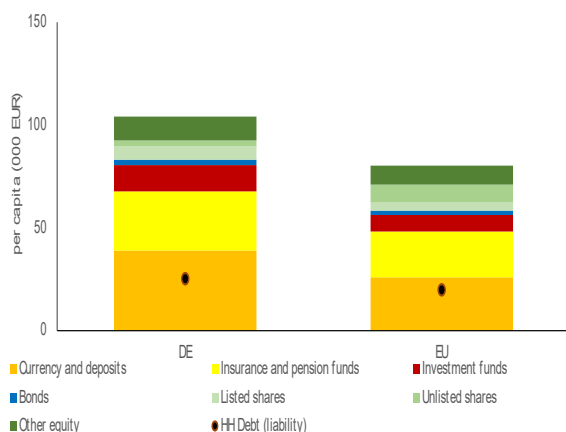
⁽¹⁷²⁾ Source: [Deutsches Aktieninstitut](#), 2024.

⁽¹⁷³⁾ <https://bankenverband.de/wirtschaft/praeferenzen-der-deutschen-bei-der-geldanlage-2024/2025>.

⁽¹⁷¹⁾ Source: [FESE Monthly Statistics, December 2024](#).

overall investment in equity in Germany; (iii) the access to finance of German companies; (iv) and growth and innovation in Germany.

Graph A5.5: **Composition of HH financial assets per capita and as a % of GDP**



Source: Eurostat.

Recent policy initiatives in Germany aim to increase both market-based financing for start-ups and retail participation in capital markets. In addition to ongoing efforts to improve the financial literacy of households, the government has introduced legislative measures to achieve these objectives. The Future Financing Act, adopted in 2023, aims to promote access to capital markets for start-ups and SMEs. The Second Future Financing Act, proposed in 2024, comprises a comprehensive package of measures to support future-oriented investments.

The role of domestic institutional investors

The German investment funds market has seen robust growth in recent years driven by the growing popularity of exchange-traded funds (ETFs) among younger investors. The German fund market is the largest in the euro area in terms of total fund ownership, with EUR 3.04 trillion in assets at the end of 2024, accounting for 16% of total assets held by

investment funds in the euro area ⁽¹⁷⁴⁾. It is also the second-largest market in the world in terms of assets under management ⁽¹⁷⁵⁾. Over the past decade, the German investment-fund industry has experienced robust growth, with assets increasing by approximately 8%, significantly outpacing the growth observed in other major European fund markets ⁽¹⁷⁶⁾. ETF savings plans have become particularly popular among younger investors: nearly half of all ETF savers in Germany are under 40 years old, compared with only one in four investors in actively managed funds ⁽¹⁷⁷⁾. Assets under management in Germany are allocated in line with investors' risk appetite and return expectations. According to a 2023 survey by the BVI-German Investment Funds Association, bonds were the largest asset class held by German investors, accounting for 42% of total German fund assets. Equities also played a substantial role, comprising 37% of the total value of German fund assets. Directly held real estate accounted for 13%, while smaller shares of assets were allocated to private-equity and venture-capital investments. German asset managers display a marked preference for cross-border investments compared with their EU peers. In 2023, they allocated approximately 20% of their equity holdings and 27% of their bond holdings to domestic investments, with the remainder allocated abroad ⁽¹⁷⁸⁾.

The investment portfolios of German insurers are predominantly composed of direct and indirect bond holdings. The German insurance sector, which is the second-largest insurance market in the EU, primarily invests in corporate bonds and covered bonds,

⁽¹⁷⁴⁾ Source: ECB: [Assets and liabilities of euro area investment funds \(other than money market funds\)](#).

⁽¹⁷⁵⁾ Source: EFAMA '[Asset Management in Europe](#)' report, 16th edition, December 2024).

⁽¹⁷⁶⁾ Source: BVI: '[Portfoliomanagement in Deutschland im Überblick](#)'.

⁽¹⁷⁷⁾ Source: Deutsches Aktieninstitut.

⁽¹⁷⁸⁾ See Exhibits 4.4 and 4.5 in [EFAMA Asset Management in Europe, facts and figures December 2024](#).

which together accounted for 30% of their asset allocation in mid-2024. These investments are made either indirectly through debt funds or directly, respectively at 14% and 16% of their asset allocation ⁽¹⁷⁹⁾. Equity investments also account for a substantial share of their portfolios, with direct investments in equity accounting for 21% of total insurance-fund assets. When combined with investments in equity funds, the share of equity holdings rises to 29.4%, which is above the EU average of 27% ⁽¹⁸⁰⁾. However, the allocation of assets to private-equity funds is negligible (0.8%).

Germany's pension-fund industry follows a conservative investment strategy. As of end-2024, 62% of total assets were in undertakings for collective investment in transferable securities (UCITS) and 30% in corporate and government debt. Equity investments remain low, totalling only EUR 3.6 billion in 2017—well behind other major EU markets. Pension fund involvement in start-ups and venture capital is also limited, with only 13% of commitments to such funds from 2007 to 2020, compared to 19% in the Baltics and over 20% in Nordic countries ⁽¹⁸¹⁾.

The depth of available venture and growth capital

Germany's underdeveloped venture-capital and private-equity market falls short in financing innovative firms and essential investments in digitalisation and climate action. The average value of annual private-equity and venture-capital investment relative to nominal GDP is still very modest in Germany. This investment declined slightly to 0.3% in

2023 from its peak of 0.6% in 2021 (EU average : 0.4% in 2023). Venture-capital investments in Germany are far below leading EU Member States, some of whom achieved investment amounts in venture capital equivalent to 0.8% of their GDP in 2023. This underdeveloped market for venture and growth capital holds firms back from securing adequate financing, limiting their potential to thrive and adapt in a challenging, transformative environment. Below-average follow-up investment in established SMEs underscores Germany's start-up sector's reliance on foreign investors ⁽¹⁸²⁾.

Financing the green transition

Public and private investments are vital for Germany's green transition and climate goals. Germany's Climate Change Act targets a 65% greenhouse-gas (GHG) reduction by 2030 and neutrality by 2045. Despite a 30.7% emissions drop since 2005, major public and private investment is still needed to meet these goals. Germany's recovery and resilience plan emphasises the green transition, allocating 49.5% of its funding to climate-related measures, well above the Recovery and Resilience Fund target of 37%. Despite substantial public spending and green transition efforts, mobilising private capital remains key to meeting ambitious targets.

⁽¹⁷⁹⁾EIOPA Statistics.

⁽¹⁸⁰⁾ Source: European Commission: [Overview of CMU indicators – 2024 update](#), indicator 12 'Equity holdings of insurers'.

⁽¹⁸¹⁾Source: [Closing the gaping hole in the capital market for EU start-ups – the role of pension funds – CEPS](#).

⁽¹⁸²⁾ Institut der deutschen Wirtschaft Köln '[Eine Agenda für mehr private Investitionen](#)', January 2025.

Financial literacy

Improving public financial literacy remains key to advancing Germany's capital markets.

The underdeveloped equity culture in the country highlights the need for additional initiatives by both the public and private sectors. Although levels of financial knowledge among adults in Germany are among the highest of all OECD countries (with an average score of 85/100, compared with the OECD average of 67/100) ⁽¹⁸³⁾, significant gaps remain in specific areas and among certain target groups. In response, the German Ministry of Finance and the Ministry of Education and Research launched a financial education initiative in March 2023, aiming to develop a national financial education strategy. In September 2024, the government received the OECD's proposal for this strategy.

Table A5.1: **Financial indicators**

	2017	2018	2019	2020	2021	2022	2023	2024-Q3	EU	
Banking sector	Total assets of MFIs (% of GDP)	231.5	226.6	235.1	259.3	249.5	265.5	246.5	240.9	248.4
	Common Equity Tier 1 ratio	15.9	15.7	15.5	16.0	15.7	15.9	17.0	17.4	16.6
	Total capital adequacy ratio	18.8	18.4	18.1	18.8	18.5	18.8	19.8	20.3	20.1
	Overall NPL ratio (% of all loans)	1.8	1.4	1.2	1.2	1.1	1.1	1.3	1.4	1.9
	NPL (% loans to NFC-Non financial corporations)	4.1	2.7	2.3	2.5	2.2	2.2	2.9	3.4	3.5
	NPL (% loans to HH-Households)	1.8	1.7	1.3	1.4	1.3	1.2	1.3	1.5	2.2
	NPL-Non performing loans coverage ratio	56.5	56.6	57.5	53.2	52.7	47.7	44.9	44.0	42.1
	Return on equity ¹	2.9	2.4	2.1	2.2	4.0	4.3	5.7	6.8	10.0
	Loans to NFCs (% of GDP)	25.6	26.4	27.1	28.9	28.4	29.3	27.9	27.3	30.0
	Loans to HHs (% of GDP)	48.6	48.9	49.6	53.2	52.5	51.1	48.6	47.5	44.5
	NFC credit annual % growth	4.3	5.3	5.1	3.9	5.2	10.9	1.0	0.2	0.8
HH credit annual % growth	3.2	3.9	4.4	4.7	5.1	4.3	0.6	0.5	0.7	
Non-banks sector	Stock market capitalisation (% of GDP)	58.1	47.6	54.2	56.8	62.7	47.2	49.3	52.0	69.3
	Initial public offerings (% of GDP)	0.19	0.20	0.02	0.14	0.58	0.00	0.06	-	0.05
	Market funding ratio	54.1	53.6	52.0	50.7	51.0	49.9	49.5	-	49.6
	Private equity (% of GDP)	0.36	0.35	0.44	0.43	0.54	0.39	0.31	-	0.41
	Venture capital (% of GDP)	0.04	0.04	0.06	0.05	0.11	0.08	0.06	-	0.05
	Financial literacy (composite)	-	-	-	-	-	-	48.5	-	45.5
	Bonds (as % of HH financial assets)	2.4	2.2	2.1	1.8	1.6	1.8	2.6	-	2.7
	Listed shares (as % of HH financial assets)	5.3	4.4	5.1	5.5	6.6	5.8	6.2	-	4.8
	Investment funds (as % of HH financial assets)	10.3	9.5	10.4	10.4	12.1	11.6	12.2	-	10.0
	Insurance/pension funds (as % of HH financial assets)	33.6	33.8	33.9	32.4	30.7	28.2	27.6	-	27.8
	Total assets of all insurers (% of GDP)	66.3	64.4	67.7	72.8	69.8	55.4	55.1	55.4	54.8
	Pension funds assets (% of GDP)	-	-	17.3	18.8	19.1	17.0	17.0	17.1	23.4
	1-3 4-10 11-17 18-24 25-27 Colours indicate performance ranking among 27 EU Member States.									

Colours indicate performance ranking among 27 EU Member States.

⁽¹⁸³⁾ Source: [OECD/INFE 2023 International Survey of Adult](#)

⁽¹⁾ Annualised data.

Credit growth and pension funds EU data refers to the EA average

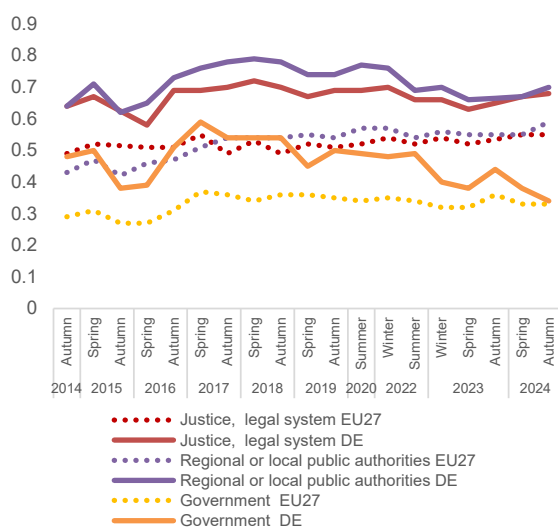
Source: AMECO, Eurostat, ECB, EBA, EIOPA

Germany's institutional framework plays a key role in influencing the country's competitiveness. Although the government is actively addressing issues of bureaucracy, fragmentation, and embracing innovation and digitalisation in public administration, progress has been uneven. Efforts to make government more agile, citizen-focused and efficient are underway. Germany continues to lag in terms of digitalisation of public services, particularly when measured against the Digital Decade targets. The justice system continues to operate efficiently.

and the use of public money (EU: 44%) ⁽¹⁸⁴⁾. Moreover, citizens think that more digital services, clearer information about procedures and services, and more channels for direct communication would improve their interactions with public administration. Germany is perceived to have a high quality of government, however there is significant regional disparity ⁽¹⁸⁵⁾.

Quality of legislation and regulatory simplification

Graph A6.1: Trust in justice, regional / local authorities and in government



(1) EU27 from 2019; EU28 before

Source: Standard Eurobarometer surveys

Germany's overall performance in developing and evaluating legislation is above the EU average. Performance in regulatory tools like ex-ante impact assessment, public consultation practices and reviews of existing regulations is broadly similar for primary laws and subordinate regulations. The implementation of these rules has been weakened in the past years, though ⁽¹⁸⁶⁾. There is scope to improve the requirements governing the methodology, systematic adoption and above all, the transparency, oversight and quality controls of public consultations for both primary and secondary legislation (Graph A6.2).

Public perceptions

Trust varies across Germany's public institutions. Although trust in the national government has declined, trust in regional and local authorities has increased to 70%, well above the EU average. Trust in the judicial system is also high (Graph A6.1). When asked about improvements that can increase trust in Germany's public administration, 57% of citizens pointed to less bureaucracy (EU: 52%) and 41% to more transparency about decisions

⁽¹⁸⁴⁾ [Understanding Europeans' views on reform needs - April 2023 - - Eurobarometer survey](#), Country Fact Sheet.

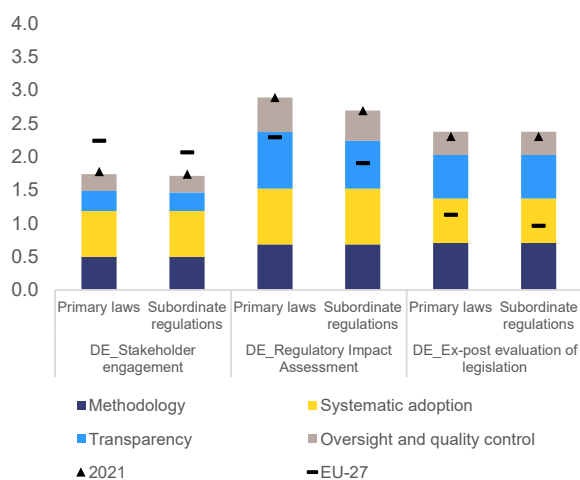
⁽¹⁸⁵⁾ [Inforegio - European Quality of Government Index](#)

⁽¹⁸⁶⁾ Nationaler Normenkontrollrat/Bundesministerium der Justiz, 2024, *Gute Gesetze. Digitale Verwaltung. Weniger Bürokratie. Momentum nutzen, Wirkung steigern* (Annual NKR report 2024, pp. 43), www.normenkontrollrat.bund.de.

Table A6.1: **Selected indicators on administrative burden reduction and simplification**

Ex ante impact assessment of legislation		Ex post evaluation of legislation	
When developing new legislation, regulators are required to ...	Identify and assess the impacts of the baseline or 'do nothing' option.	Is required to consider the consistency of regulations and address areas of duplication.	
	Identify and assess the impacts of alternative non-regulatory options.	Is required to contain an assessment of administrative burdens.	
	Quantify administrative burdens of new regulations.	Is required to contain an assessment of substantive compliance costs.	
	Quantify substantial costs of compliance of new regulations.	Compares the impact of the existing regulation to alternative options.	
	Assess macroeconomic costs of new regulations.	Periodic ex post evaluation of existing regulations is mandatory.	
	Assess the level of compliance.	Government uses stock-flow linkage rules when introducing new regulations (e.g., one-in one-out).	
	Identify and assess potential enforcement mechanisms.	A standing body has published an in-depth review of specific regulatory areas in the last 3 years.	
		In the last 5 years, public stocktakes have invited businesses and citizens to assess the effectiveness, efficiency, and burdens of legislation.	
<input checked="" type="radio"/> Yes / For all primary laws <input checked="" type="radio"/> For major primary laws <input checked="" type="radio"/> For some primary laws <input type="radio"/> No / Never			

(1) This table presents a subset of iREG indicators focusing on regulatory costs. The indicators refer to primary legislation. **Source:** OECD (2025), Regulatory Policy Outlook 2025 [<https://doi.org/10.1787/56b60e39-en>] and Better Regulation across the European Union 2025 (forthcoming).

Graph A6.2: **Indicators of Regulatory Policy and Governance (iREG)**

Source: OECD (2025), Regulatory Policy Outlook and Better Regulation across the European Union 2025 (forthcoming)

Germany has established mechanisms for simplifying regulation and identifying administrative burdens when developing and evaluating legislation. An example is the 'one-in, one-out' rule (Table A4.1 and Annex 4).

Germany's licensing system is aligned with most, but not all, best practices ⁽¹⁸⁷⁾. The 2023 OECD product market regulation indicators show that although the government keeps an up-to-date inventory of all permits and licences required/issued to businesses by public bodies, the inventory is not available online for consultation. Furthermore, there is no requirement for the government to regularly assess whether such licences and permits are still required or should be withdrawn (see also Annex 4).

Social dialogue

Social dialogue in Germany has a strong tradition. The cooperation between employers and employees, employers' associations and trade unions aims at resolving conflicts of interest through consensus politics. The social partnership takes place at a wide variety of levels, starting at the company level. The social

⁽¹⁸⁷⁾ OECD product market regulation (PMR) indicator.

Table A6.2: **Key Digital Decade targets monitored through the Digital Economy and Society Index**

		Germany			EU-27	Digital Decade target by 2030
		2022	2023	2024	2024	EU-27
Digitalisation of public services						
1	Digital public services for citizens Score (0 to 100)	76 2021	78 2022	76 2023	79 2023	100 2030
2	Digital public services for businesses Score (0 to 100)	80 2021	81 2022	79 2023	85 2023	100 2030
3	Access to e-health records Score (0 to 100)	na 2021	70 2022	87 2023	79 2023	100 2030

Source: State of the Digital Decade report 2024

partners work together constantly on a wide variety of regional levels, at the federal level, as well as the European level - in the form of joint positions, initiatives, actions or social dialogue.⁽¹⁸⁸⁾

Collective bargaining as a special form of social partnership is protected in the constitution. This includes the right to form employers' associations and trade unions, as well as the right to conduct collective bargaining and conclude collective agreements. Collective agreements are still the defining parameter of industrial relations in Germany. In the majority of companies, collective agreements apply directly or indirectly by reference to the collective agreement in the employment contract.

Digital public services

Germany has faced difficulties in moving public services online, with little progress made in recent years. In 2023, the availability of digital public services for businesses was rated at 78.6, below the EU average of 85.4. Similarly, digital public services for citizens

scored 75.8, compared to an EU average of 79.4. However, in terms of access to e-health records Germany scored 87, above the EU average of 79 (Table A6.2).

The take-up of digital public services in Germany is low. Only 63.9% of individuals use e-government services, compared to an EU average of 74.7%. Additionally, Germany has the second lowest proportion of eID users in the EU at 9.04%, well below the EU average of 41.1%. This can be attributed to its slow progress in digitalising public services⁽¹⁸⁹⁾. Germany has not yet set up and notified eID schemes for legal persons under the eIDAS Regulation⁽¹⁹⁰⁾. This means that German businesses cannot authenticate themselves to access public services provided by other Member States, including those enabled by the Once-Only Technical System⁽¹⁹¹⁾.

The German Online Access Act (Onlinezugangsgesetz) is a major ongoing step towards digitalising the administration. This reform effort is funded by the recovery and resilience plan. In addition, Germany is working under the EU Technical Support Instrument to harmonise the IT infrastructure of

⁽¹⁸⁸⁾ For an analysis of the involvement of Germany's social partners at national level in the European Semester and the Recovery and Resilience Facility, see Eurofound (2025), [National-level social governance of the European Semester and the Recovery and Resilience Facility](#).

⁽¹⁸⁹⁾ European Commission, [Digital Decade 2024: Country reports](#).

⁽¹⁹⁰⁾ European Commission, [eIDAS Dashboard](#).

⁽¹⁹¹⁾ European Commission, [The Once Only Principle System: A breakthrough for the EU's Digital Single Market](#).

Germany's 294 rural districts. This is expected to facilitate data exchange and improve collaboration within the public administration in the delivery of online services.

Germany is now closer to being ready for seamless, automated exchange of authentic documents and data across the EU. It has completed its first transactions using the Once-Only Technical System, part of the EU Single Digital Gateway, and is ready to roll out services for citizens and business ⁽¹⁹²⁾.

Some German authorities have started deploying AI in public services. For example, the AI Lab at the Federal Environment Agency (Umweltbundesamt) has been using data science methods and technologies to make it easier to review and perform a cross-scale analysis of complex environmental data.

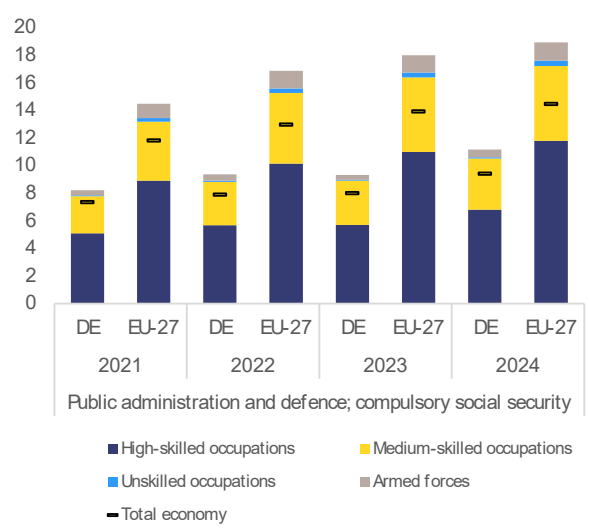
Civil service

The German civil service is facing a range of challenges. The share of civil servants with higher education qualifications is below the EU average (DE 46.5%, EU 54%)⁽¹⁹³⁾ and continues to drop since 2021. This translates in shortage of professionals and insufficient skills among staff to meet growing demands on public services. Demand for digital skills is putting additional pressure on an already strained workforce. At the same time, participation of civil servants in adult training lags behind (Graph A6.3). Reforms are also underway at federal and state levels. However, efforts to address these trends, as well as the overall aging of civil service have been hindered by fragmented human resource data and planning, as well as lack of a coordinated strategy on recruitment, mobility, training or performance assessment.

⁽¹⁹²⁾ European Commission, [Once-Only Technical System Acceleratorometer](#).

⁽¹⁹³⁾ Eurostat. Eurostat, 2025, [EU Labour Force Survey](#).

Graph A6.3: **Participation rate of 25-64 year olds in adult learning (%) by occupation**



Source: European Commission, based on the Labour Force Survey

Integrity

A lower percentage of companies than the EU average consider corruption to be a problem. In Germany, 47% of companies consider that corruption is widespread (EU average 64%), while only 20% consider that corruption is a problem when doing business (EU average 36%) ⁽¹⁹⁴⁾. Moreover, 40% of companies believe that people and businesses caught for bribing a senior official are appropriately punished (EU average 31%) ⁽¹⁹⁵⁾. Plans to strengthen the liability of legal persons and corporate sanctions for foreign bribery have not advanced over several years ⁽¹⁹⁶⁾. In Germany, 17% of companies (EU average 27%) think that corruption has prevented them from winning a public tender or a public procurement contract in practice in the last

⁽¹⁹⁴⁾ Flash Eurobarometer 543 on businesses' attitudes towards corruption in the EU (2024).

⁽¹⁹⁵⁾ Ibid.

⁽¹⁹⁶⁾ See the 2024 country-specific chapter for Germany of the Rule of Law Report, p. 14.

three years ⁽¹⁹⁷⁾. Proposals to modernise public procurement rules are still under preparation. The medical, pharmaceutical industries and construction were also identified as the most affected sectors by corruption-related crimes, while the business sector and public administration represented the preferred targets, with 74.3% of all corruption cases occurring in these sectors ⁽¹⁹⁸⁾. Overall, however, Germany provides an effective response in preventing and fighting corruption ⁽¹⁹⁹⁾.

Like most Member States, Germany has implemented a public register for lobbyists, but concerns remain regarding secondary activities of members of Parliament. Certain prohibitions are in place for remunerated lobby activities of members of Parliament. However, there is no requirement to disclose potential conflicts of interest, especially in respect of private companies ⁽²⁰⁰⁾. In addition, there have been no developments to increase transparency over financial and business interests of federal ministers and other high-level officials ⁽²⁰¹⁾.

408 days in 2022 and 422 days in 2021). The clearance rate also remains high (109% in 2023). The quality of the justice system is considered to be good overall, including in the area of digitalisation. There is significant use of digital technologies in courts, including for secure remote working, electronic case allocation and case management systems, distance communication technology and the use of AI applications in core activities. However, concerning the resources of the judiciary, certain challenges remain. As regards judicial independence, no systemic deficiencies have been reported. ⁽²⁰²⁾

Justice

The justice system is continuing to operate efficiently overall. The disposition time in civil and commercial cases at first instance increased slightly (from 241 days in 2022 to 249 days in 2023). In administrative cases, the disposition time remains higher, but it has continued the positive downward trend seen in recent years (391 days in 2023, compared to

⁽¹⁹⁷⁾Flash Eurobarometer 543 on businesses' attitudes towards corruption in the EU (2024).

⁽¹⁹⁸⁾ [BKA - Meldungen - Bundeslagebild Korruption 2023 veröffentlicht.](#)

⁽¹⁹⁹⁾ See the 2024 country-specific chapter for Germany of the Rule of Law Report, pp. 14-15.

⁽²⁰⁰⁾ Ibid., pp. 18-19.

⁽²⁰¹⁾ Ibid., p. 19.

⁽²⁰²⁾ For more detailed analysis of the performance of the justice system in Germany, see the upcoming 2025 EU Justice Scoreboard and the 2024 Rule of Law Report.

Germany's industry is undergoing a profound transformation, taking efforts to remain competitive in a low-carbon setting.

Germany is a key supplier of several net zero technologies, supported by a robust policy framework including research and innovation. German manufacturing depends heavily on imports of critical raw materials. Its automotive sector is undergoing a profound transformation. Energy-intensive industries have also been facing challenges. While the CO₂ emissions intensity of manufacturing has improved, a broader shift to clean energy has yet to take place. Germany has put in place policies to support the decarbonisation of industry, but more is needed. Despite positive trends, there is room for accelerating the circularity transition and improving pollution prevention too. This annex reviews the areas in need of urgent attention in Germany's clean industry transition and climate mitigation, looking at different dimensions.

Strategic autonomy and technology for the green transition

Net zero industry

Germany is a key supplier of wind turbine components, batteries and electrolyzers within the EU. The ongoing restructuring of the solar PV industry has hit German companies hard, resulting in Germany losing its leading role in the sector. Germany's manufacturing capacity amounts to between 7.8 and 11.2 GW/y (36-53% of the EU cumulative capacity), primarily concentrated in modules and cells ⁽²⁰³⁾. The country hosts the EU's only solar-grade polysilicon supplier. Germany is also a major supplier of wind

turbine components, particularly nacelles and blades. It also accounts for about 18% of battery cell manufacturing capacity in the EU. Its largest facility has an estimated capacity of at least 50 GWh/y. Lastly, Germany hosts the largest installed electrolyser manufacturing capacity among EU Members, with a manufacturing capacity between 3.3 and 3.5 GW/y (59-63% of the overall EU capacity) for electrolyzers.

Germany can build upon its technological expertise to expand carbon capture and storage manufacturing, as reflected in the recently adopted Carbon Contract for Difference schemes, the revised Carbon Dioxide Storage Act and an upcoming carbon management strategy. However, challenges such as high capital and operational costs remain, together with concerns about long-term regulatory stability and public acceptance.

Clean tech manufacturing capacity is supported by a broad policy framework. Its industrial strategy ⁽²⁰⁴⁾ plays a key role in diversifying value chains for net zero technologies and developing production capacities in Germany and the EU. It envisages the use of additional qualitative criteria covering CO₂ intensity and industry resilience in public procurement. The permitting of new production facilities for net zero technologies is relatively swift, taking 11 months on average.

Several instruments exist to encourage investment in net zero technologies. Key among them is the legal framework amending State aid rules (BKR-Bundesregelung), which has provided EUR 3 billion of subsidies up to 2025. For the wind turbine sector, a recent guarantee scheme by the European Investment Bank and Deutsche Bank is set to derisk investment.

⁽²⁰³⁾ European Commission: Directorate-General for Energy, 2025, *The net-zero manufacturing industry landscape across the Member States*, [Europa.eu](https://europea.eu).

⁽²⁰⁴⁾ BMWK, 2023, *Industriepolitik in der Zeitenwende*, [Publikationsportal](https://publikationsportal.bmwk.de).



Germany has a robust sectoral policy framework supporting research and development in net zero technology. For example, an overarching strategy on battery research – the *Dachkonzept Batterieforschung* – has measures to foster collaboration between research institutions and industry; scale up production processes; develop an ecosystem for innovation; and support young scientists ⁽²⁰⁵⁾ working on battery cell research. Furthermore, Germany has announced a Wind Industry Package containing measures to address (cyber) security, international level playing field, resilience and financing.” Building upon these examples, a further policy framework targeting additional technologies such as solar could be developed.

Transforming the car industry

The automotive industry – its largest industry sector – is facing strong competition and significant challenges in the transition to electric vehicles. The sector is undergoing a profound transformation, driven by the shift towards electric vehicles and away from internal combustion engines. It is facing intense competition from China, which has become the leading car-exporting country. According to a recent study for the industry association VDA ⁽²⁰⁶⁾, the transformation may result in a further loss of around 140 000 jobs by 2035, in professions such as metalworking or mechanical engineering. However, in other areas new jobs will be created, for example in electrical engineering or plastics processing.

⁽²⁰⁵⁾ European Commission, Joint Research Centre, Bielewski, M., Pfrang, A., Quintero Pulido, D., Bobba, S., Schade, B., Georgakaki, A., Letout, S., Mountraki, A. and Ince, E., *Clean Energy Technology Observatory: Battery Technology in the European Union - 2024 Status Report on Technology Development, Trends, Value Chains and Markets*, Publications Office of the European Union, Luxembourg, 2024, <https://data.europa.eu/doi/10.2760/4852968>, JRC139392.

⁽²⁰⁶⁾ Prognos, 2024, [Automobilindustrie im Wandel: Wie sich die Beschäftigung verändert](#)

Germany has the largest number of planned sustainable aviation fuels (SAF) production facilities among Member. Germany currently has only one operating plant producing sustainable aviation fuels (SAF) with used cooking oil as primary feedstock, processed in a co-processing unit⁽²⁰⁷⁾. However, it has the largest number of planned SAF production facilities among Member States. A significant proportion of these are still at an early stage of development, and include feasibility studies, pilot plants and research projects aimed at promoting the viability of more advanced technologies. The country is aiming to establish Power-to-Liquid (PtL) as the dominant technology for producing SAF domestically. However, significant investments are still required for the sector to grow.

Critical raw materials

Manufacturing depends heavily on imports of critical raw materials needed for the green and digital transitions. Germany's manufacturing is heavily reliant on critical raw materials such as lithium, cobalt and rare earths, which are essential for the production of high-tech products, including electric vehicles, wind turbines and electronics. This presents big challenges for sustainability and resilience, such as supply chain risks, environmental degradation, and social concerns. With 37.5% of material inputs in manufacturing production stemming from imports in 2023 (EU average: 22% ⁽²⁰⁸⁾), Germany is particularly vulnerable to supply chain disruptions.

Germany is implementing policies to strengthen supply chains and promote the uptake of circular solutions for critical raw materials. The government encourages the de-

⁽²⁰⁷⁾ European Union Aviation Safety Agency (EASA), 2024, *State of the EU SAF market in 2023*, [Link](#).

⁽²⁰⁸⁾ [Statistics | Eurostat](#)

risking and diversification of German industry, notably for strategic value chains, and has implemented various policy measures aimed at reducing reliance on imports and promoting the use of recycled materials. For example, a raw materials agency has been set up, tasked with coordinating supply chain management. On the supply of lithium specifically, a domestic mining project is underway. The recycling rate for e-waste, a key source of critical raw materials, is above the EU average, and stood at 85.5% in 2022 ⁽²⁰⁹⁾. The reuse and recycling rate for end-of-life vehicles is slightly below the EU average (86% vs. 89% in 2022) ⁽²¹⁰⁾. This points to the need to avoid the loss of critical raw materials, especially as the car industry shifts to battery-electric vehicles.

Climate mitigation

Industry decarbonisation

Manufacturing is relatively greenhouse gas emission-efficient, with a very high share of energy-related emissions (as opposed to emissions from industrial processes and product use). Nearly a quarter of its total greenhouse gas emissions come from manufacturing ⁽²¹¹⁾. Germany's manufacturing is about 20% more emissions efficient than the EU overall, with 220 g CO₂eq of emissions per euro of gross value added (GVA), ranking Germany sixth best in the EU (EU: 270 g/€).

⁽²⁰⁹⁾ [Statistics | Eurostat](#)

⁽²¹⁰⁾ [Statistics | Eurostat](#)

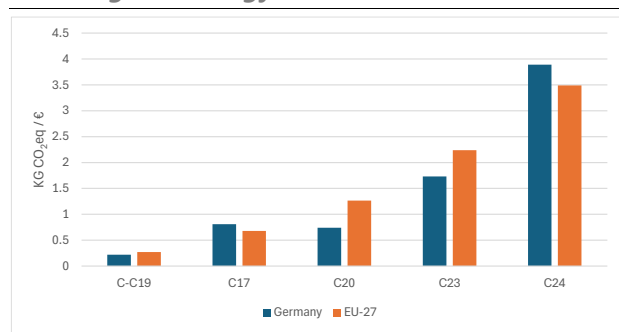
⁽²¹¹⁾ In 2023. Manufacturing includes all divisions of the "C" section of the NACE Rev. 2 statistical classification of economic activities. In the remainder of this section, unless indicated otherwise, data on manufacturing refer to the divisions of the NACE section C excluding division C19 (manufacture of coke and refined petroleum products), and the year 2022. The source of all data in this section is Eurostat; data following the UNFCCC Common Reporting Framework (CRF) are from the European Environment Agency (EEA), republished by Eurostat.

Between 2017 and 2022, the emission intensity of Germany's industry has declined less than in the EU overall: in Germany the decrease was by about 14%, against 20% in the EU overall. In 2023 in Germany's overall industrial greenhouse emissions, the share of energy-related emissions (as opposed to industrial process-related ones) was at 69%, the highest in the EU.

The greenhouse emissions intensity of manufacturing has improved, but a shift to clean energy has yet to take place. Between 2017 and 2022, the energy-related greenhouse gas emissions intensity of Germany's manufacturing industry declined by 8%, half as much as in the EU overall where it declined by 16%⁽²¹²⁾. In the same period, the share of electricity and renewables in final energy consumption in manufacturing was broadly stable at around 39%, while the energy intensity of manufacturing improved by 11%, to 0.8 GWh/€ in 2022. The emissions intensity of industrial processes and product use declined by 18%, less than in the EU overall where it declined by 23 %.

⁽²¹²⁾ For the GHG emissions intensity of GVA related to energy use and industrial processes and product use respectively, GHG emissions are from inventory data in line with the UNFCCC Common Reporting Format (CRF), notably referring to the source sectors CRF1.A.2 – fuel combustion in manufacturing industries and construction and CRF2 – industrial processes and product use. The CRF1.A.2 data broadly correspond to the NACE C and E sectors, excluding C-19. GVA data (in the denominator for both intensities) are aligned with this sectoral coverage. Therefore, they are not fully consistent with the data referred to in other part of this section.

Graph A7.1: GHG emission intensity of manufacturing and energy-intensive sectors, 2022



Source: Eurostat.

While relatively emissions-efficient, energy-intensive industries have been facing challenges. Energy-intensive industries (²¹³) accounted for 12% of Germany's total manufacturing gross value added (GVA) in 2022. Among them, the manufacture of basic metals (which accounted for about 2% of manufacturing production) recorded a particularly high emission intensity of production, with 3.9 kg CO₂eq/€ of GVA, significantly above the weighted EU average of 3.5 kg (²¹⁴). While having eased since 2023, electricity prices for industry remain high (²¹⁵). This, and global competition more broadly, put pressure on energy-intensive industries. In Germany, production in these sectors has declined by up to 20% since 2021 (²¹⁶).

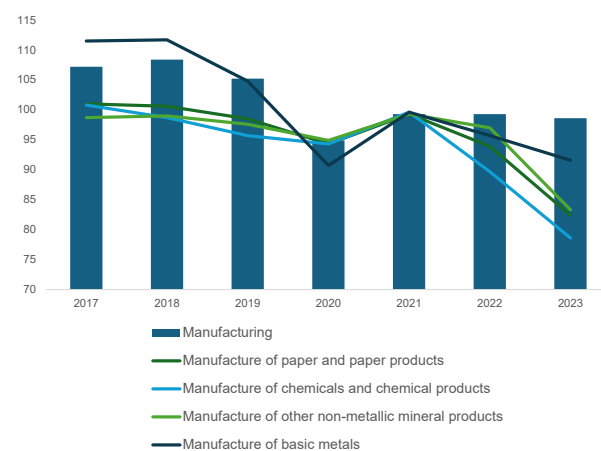
(²¹³)Notably, the manufacture of paper and paper products (NACE division C17), of chemicals and chemical products (C20), "other" non-metallic mineral products (C23; this division includes manufacturing activities related to a single substance of mineral origin, such as glass, ceramic products, tiles, and cement and plaster), and basic metals (C24). To date, these industries are energy-intensive – i.e. consuming much energy both on site and/or in the form of purchased electricity – and greenhouse gas emissions intensive, in various combinations.

(²¹⁴) This is in contrast with the GHG emissions intensity of the manufacture of non-metallic mineral products, which in Germany at 1.7 kg/€ is far below the weighted EU average of 2.5 kg. Likewise, the manufacture of chemicals in Germany also has a relatively low GHG emissions intensity in EU comparison, 0.7 kg/€.

(²¹⁵)Also vis-à-vis the US and China, see Prognos (2023), [Energiepreise für die Industrie im internationalen Vergleich](#). For a detailed analysis of energy prices, see Annex 8 on the affordable energy transition

(²¹⁶) Source: Eurostat.

Graph A7.2: Manufacturing industry production: total and selected sectors, index (2021 = 100), 2017-2023



Source: Eurostat

Germany has put in place policies to support the decarbonisation of industry but much more is needed. To address these challenges, German policymakers have implemented a number of support measures, including funding for research and development (for example, the FONA research for sustainability initiative); subsidies for clean technologies (e.g. through carbon contracts for difference and tax incentives for low-carbon investments); support for the expansion of electrolyser capacity in line with the national hydrogen strategy; the promotion of energy efficiency; and the development of lead markets for climate-friendly products. However, because of the magnitude of the challenge, further efforts are still needed to support investment in the decarbonisation of manufacturing, particularly in energy-intensive sectors.

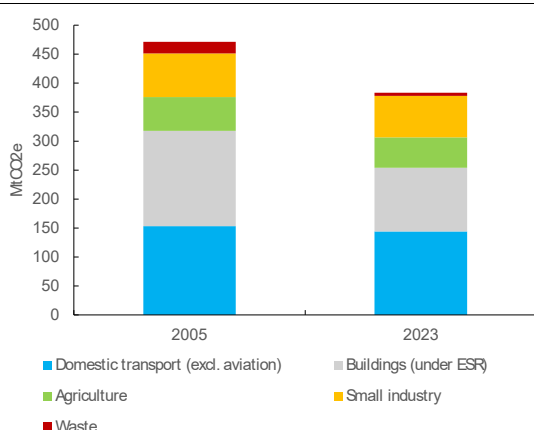
Reduction of emissions in the effort sharing sectors

To attain its 2030 target for the effort sharing sectors, Germany needs to swiftly specify and implement further climate mitigation policies(²¹⁷). GHG emissions from

(²¹⁷)The national greenhouse gas emission reduction target is set out in Regulation (EU) 2023/857 (the Effort Sharing Regulation). It applies jointly to buildings (heating and

Germany's effort sharing sectors in 2023 are expected to have been 20.9% below those of 2005, significantly short of its effort sharing target of a 50% reduction. By 2030, current policies are projected to reduce them by 39.8 % relative to 2005 levels; additional policies under Germany's final updated national energy and climate plan are projected to achieve a reduction of a further percentage point. This results in a sizeable shortfall against Germany's effort sharing target of a 50% reduction, of 9.2 percentage points ⁽²¹⁸⁾. Swift and steady adoption and implementation of further climate mitigation measures will be critical. While Germany could use domestic flexibilities available under the Effort Sharing Regulation, this would not be sufficient to close the gap to target.

Graph A7.3: **Greenhouse gas emissions in effort sharing sectors, 2005 and 2023**



Source: European Environment Agency

Significant effort is needed to curb greenhouse gas emissions from road transport and buildings. Germany's emissions in the effort sharing road transport sector decreased by 1.41% in 2023 compared to 2022,

cooling); road transport, agriculture; waste; and small industry (known as the effort sharing sectors).

⁽²¹⁸⁾ The emissions from effort sharing sectors for 2023 are based on approximated inventory data. The final data will be established in 2027 after a comprehensive review. Projections on the impact of current policies ("with existing measures", WEM) and additional policies ("with additional measures", WAM) as per Germany's final updated national energy and climate plan.

which is a slower rate of reduction than needed to meet the 2030 target. Sales of electric cars in Germany decreased in 2024, with only around 380 600 newly registered e-vehicles, almost 27.5% less than in 2023. Electric vehicles accounted for 13.5% of all new registrations ⁽²¹⁹⁾, not sufficient to meet the country's climate targets.

The transport sector is still heavily reliant on fossil fuels, with a high share of diesel vehicles on its roads. Since 2016, the government has disbursed around EUR 10 billion to support the purchase of about 2.1 million electric vehicles, including up to 560 000 electric vehicles under the recovery and resilience plan. The funding programme decisively contributed to promoting electric mobility, but it was phased out by end-2023.

Challenges also remain regarding the charging infrastructure and grid integration. In early 2024, about 123 500 public charging points were in operation, but more will be needed in the future ⁽²²⁰⁾. Moreover, the industry's reliance on imported battery cells and other critical components raises concerns regarding competitiveness and strategic dependencies.

In the buildings sector, effort sharing emissions decreased by 7 % in 2023 compared to 2022. However, the building stock has a large share of old, inefficient buildings, that require significant investments to renovate. The renovation rate, with about 1% of buildings renovated each year, is not sufficient to meet Germany's climate targets.

⁽²¹⁹⁾ BMWK, 2023, *Umweltbonus endet mit Ablauf des 17. Dezember 2023*, [bmwk.de](https://www.bmwk.de).

⁽²²⁰⁾ Nationale Leitstelle Ladeinfrastruktur, 2024, *Studie Ladeinfrastruktur-2025-2030 Neuauflage-2024.pdf*.

Circular economy transition

Despite positive trends, the circularity transition could be accelerated. Standing at 14% in 2023, Germany's circular material use is above the EU average but far behind that of EU leaders. Resource productivity, too, was above the EU average in 2023, with EUR 3.04 per kg of material consumed. Germany's resource productivity has been constantly improving over the past decade. This helps minimise negative environmental impacts and reduce dependence on volatile raw material markets. Germany adopted its first comprehensive national circular economy strategy⁽²²¹⁾ in December 2024. Its goal is to reduce raw material consumption by examining production and consumption over the entire life cycle of a product and identifying opportunities for conserving resources through resource efficiency and circularity in all phases. Germany's resource efficiency programme ProgRess III⁽²²²⁾ already includes 118 measures aiming to increase circularity. The measures follow the value chain from raw material extraction, product design and production to consumption, waste prevention and waste recovery. The overarching goal of ProgRess is to make the extraction and use of natural resources more sustainable and meet the country's responsibility to future generations.

Germany is a top performer in waste management but produces far more waste than the EU average. With 606 kg of waste per capita produced in 2022, Germany is far above the EU average of 513 kg. Still, with a recycling rate of 69%, Germany ranked first in the EU for municipal waste recycling. It is on track to meet the 2025 recycling and the 2035 landfilling targets. In 2021, at 48%, its recycling

rate for plastic packaging was above the EU average. In 2022, 87% of construction and demolition waste was recycled, excluding backfilling, far above the EU average of 78%. At the same time, at 14.5 tonnes per person, Germany's material footprint is on a par with the EU-27 average.

Current investment in the circularity transition is insufficient. Germany is estimated⁽²²³⁾ to need additional investments of at least EUR 6.2 billion per year for the circular economy transition, including for waste management. To close the circular economy investment gap to attain policy targets that are not yet budgeted, EUR 1.5 billion is needed for recent initiatives on the circular economy such as eco-design for sustainable products; packaging waste; labelling and digital tools; critical raw materials recycling and measures proposed under the amended the Waste Framework Directive. An additional EUR 4.3 billion is needed to unlock Germany's circular economy potential⁽²²⁴⁾.

Zero pollution industry

Germany has made considerable progress in reducing air pollution, which is now decoupled from GDP growth. The 2020-2029 emission reduction commitments under the national air pollution control programme have been met, and the country is on track to meet its commitments for 2030 onwards as well. In 2023, the limits for nitrogen dioxide (NO₂) set by the Ambient Air Quality Directive⁽²²⁵⁾ were breached in only two air quality zones, down from 26 in 2016. Between 2010 and 2022, nitrogen oxide (NO_x) emissions decreased by

⁽²²¹⁾ Nationale Kreislaufwirtschaftsstrategie Deutschland, [Link](#).

⁽²²²⁾ ProgRess III, 2nd update, [Link](#).

⁽²²³⁾ Estimates from 2024. Source: Waste management and circular economy expenditure tracking in the EU funds, EIB projects and in the national expenditure (Eurostat). Datasets: environmental protection expenditure accounts (env_epi) and circular economy private investments (cei_cieo12).

⁽²²⁴⁾ European Commission, DG Environment, *Environmental investment needs & gaps assessment programme*, 2025 update. Expressed in 2022 prices.

⁽²²⁵⁾ Ambient Air Quality Directive (EU) 2008/50, [Link](#).

35 %. The main reason for the failure to meet NO_x limit values is diesel vehicle traffic. With EUR 24 in damage to health and the environment per thousand EUR of GVA, Germany is ranked seventeenth among EU Members on the emissions intensity of industrial activity. However, within the EU, the damage to health and environment due to the main industrial air pollutants is the highest in Germany in absolute terms. Most emissions to air come from the energy sector; emissions of NO_x, sulfur dioxide and heavy metals come mainly from the minerals industry.

Water pollution from industry is decreasing, but the accumulation of toxic substances puts chemical pressure on surface water bodies. Between 2010 and 2022, industrial releases of pollutants to water decreased by 38% for heavy metals (Cd, Hg, Pb and nickel), by 27% for nitrogen, by 28% for organic carbon and by 38% for phosphorus. Germany has the second highest absolute amount of emissions of heavy metals into water in the EU, but occupies only 18th position for emissions intensity (below the EU average). Key emitters of heavy metals and nitrogen into water are the chemical industry and the energy sector. Pulp and paper manufacturing is the largest emitter of organic carbon. Two ubiquitous and persistent bio-accumulative and toxic substances (brominated ethers and mercury) cause all surface waterbodies in Germany to fail to achieve good chemical status.

The costs of pollution remain far higher than the investment in pollution prevention and control. For 2021, about 32 000 deaths per year were attributed to fine particulate matter (PM_{2.5}) pollution; 9 500 deaths to nitrogen dioxide, and 3 300 to ozone (O₃) ⁽²²⁶⁾. The costs from all pollutants are estimated at

EUR 95 billion ⁽²²⁷⁾. In contrast, to meet its objectives for pollution prevention and control and address the health and economic costs of pollution, Germany needs to spend an additional EUR 9.4 billion per year (0.24% of GDP), mostly for measures on clean air ⁽²²⁸⁾.

⁽²²⁶⁾ Latest available annual estimates by the European Environment Agency, [Link](#). In terms of years of life lost, this implies 333 000 years for PM_{2.5}, 98 900 for NO₂, and 36 000 for O₃.

⁽²²⁷⁾ For 2021, value of statistical life method. Source: EEA, 2024, The costs to health and the environment from industrial air pollution in Europe – 2024 update, [Link](#).

⁽²²⁸⁾ European Commission, DG Environment, *Environmental investment needs & gaps assessment programme*, 2025 update. Expressed in 2022 prices.

Table A7.1: Key clean industry and climate mitigation indicators: Germany

Strategic autonomy and technology for the green transition				Germany				EU-27					
Net zero industry													
Operational manufacturing capacity 2023													
- Solar PV (c: cell, w: wafer, m: module), MW				1600-2500 (c), 250 (w), 900-8500 (m)				- Electrolyzer, MW		3300-3500			
- Wind (b: blade, t: turbine, r: nacelle), MW				450-500 (b), 11400-17750 (r), 3800-4200				- battery, MWh		55000-60000			
Automotive industry transformation				2017	2018	2019	2020	2021	2022	2023	2018	2021	
Motorisation rate (passenger cars per 1000 inhabitants), %				561	567	574	580	583	578	588	↗	539	561
New zero-emission vehicles, electricity motor, %				0.73	1.05	1.75	6.65	13.58	17.75	18.43	↗	1.03	8.96
Critical raw materials				2017	2018	2019	2020	2021	2022	2023		2018	2021
Material import dependency, %					40.0	41.4	39.7	40.0	38.8	37.5	↘	24.2	22.6
Climate mitigation				Germany				Trend		EU-27			
Industry decarbonisation				2017	2018	2019	2020	2021	2022	2023		2017	2022
GHG emissions intensity of manufacturing production, kg/€				0.26	0.25	0.24	0.25	0.24	0.22	0.21	↘	0.34	0.27
Share of energy-related emissions in industrial GHG emissions				32.6	33.6	33.5	32.8	31.8	31.4	31.0	↘	44.8	42.5
Energy-related GHG emissions intensity of manufacturing and construction, kg/€				150.6	143.0	142.5	148.7	146.7	138.5	-	↘	158.4	132.9
Share of electricity and renewables in final energy consumption in manufacturing, %				39.7	40.0	40.3	39.1	39.4	39.8	39.4	↗	43.3	44.2
Energy intensity of manufacturing, GWh/€				0.94	0.91	0.89	0.95	0.89	0.83	0.78	↘	1.29	1.09
Share of energy-intensive industries in manufacturing production									11.9			7.3	
GHG emissions intensity of production in sector [...], kg/€													
- paper and paper products (NACE C17)				0.75	0.69	0.68	0.71	0.72	0.81	-	-	0.73	0.68
- chemicals and chemical products (NACE C20)				0.71	0.70	0.68	0.68	0.70	0.74	-	-	1.25	1.26
- other non-metallic mineral products (NACE C23)				1.77	1.71	1.75	1.92	1.76	1.73	-	-	2.53	2.24
- basic metals (NACE C24)				3.05	2.86	2.87	2.87	3.82	3.89	-	-	2.79	3.49
Reduction of effort sharing emissions					2018	2019	2020	2021	2022	2023		2018	2023
GHG emission reductions relative to base year, %								-16.7	-18.5	-20.9			
- domestic road transport					6.4	5.7	-5.5	-6.6	-4.6	-5.9	↘	1.4	5.2
- buildings					-24.9	-21.1	-20.9	-22.7	-28.1	-33.1	↘	21.4	32.9
				2005				2021	2022	2023	Target	WEM	WAM
Effort sharing: GHG emissions, Mt; target, gap, %				484.7				403.8	395.0	383.4	-50.0	-10.2	-9.2
Sustainable industry				Germany				Trend		EU-27			
Circular economy transition					2018	2019	2020	2021	2022	2023		2018	2021
Material footprint, tonnes per person					162	160	153	154	159	14.5	↘	14.7	15.0
Circular material use rate, %					12.0	12.4	12.8	12.2	12.5	13.9	↗	11.6	11.1
Resource productivity, €/kg					2.7	2.9	2.9	3.0	3.4	3.8	↗	2.1	2.3
Zero pollution industry													
Years of life lost due to PM2.5, per 100,000 inhabitants					604	429	348	393	535	-	↗	702	571
Air pollution damage cost intensity, per thousand € of GVA								24.0					27.5
Water pollution intensity, kg weighted by human factors per bn € GVA									0.3				0.9

Source: Net zero industry: European Commission: [The net-zero manufacturing industry landscape across Member States: final report](#), 2025. Automotive industry transformation: Eurostat. Critical raw materials: Eurostat. Climate mitigation: See footnotes in the "climate mitigation" section; reduction of effort sharing emissions: [EEA greenhouse gases data viewer](#); European Commission, [Climate Action Progress Report](#), 2024. Sustainable industry: Years of life lost due to PM2.5: Eurostat and EEA, [Harm to human health from air pollution in Europe: burden of disease status](#), 2024. Air pollution damage: EEA, [EU large industry air pollution damage costs intensity](#), 2024. Emissions covered: As, benzene, Cd, Cr, Hg, NH3, Ni, NMVOC, NOX, Pb, dioxins, PM10, PAH, SOX. Water pollution intensity: EEA, [EU large industry water pollution intensity](#), 2024. Releases into water covered from cadmium, lead, mercury, nickel. Other indicators: Eurostat.

This annex outlines the progress made and the ongoing challenges faced in enhancing energy competitiveness and affordability, while advancing the transition to net zero. It examines the measures and targets proposed in the final (draft) updates to the national energy and climate plans (NECPs) for 2030.

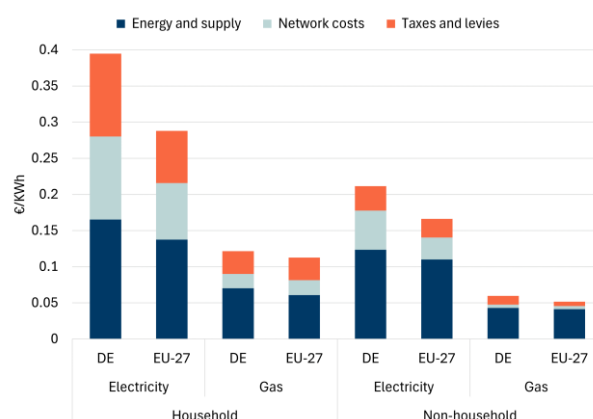
Germany has made significant progress in its clean energy transition, with a complete exit from nuclear in 2023 and with its phasing-down of coal (with a complete phase-out planned for 2038). Further electrification of its energy system is required to achieve 80% in renewables electricity by 2030 (up from 57.5% achieved in 2024)⁽²²⁹⁾. Germany has accelerated renewables deployment considerably, but consumers (households and industry) are still facing one of the highest electricity prices in the EU. Germany must continue expanding its grid and using its energy system more efficiently by increasing flexibility.

Energy prices and costs

In 2024, German retail electricity prices for households were the highest in the EU despite a slight decline compared to 2023. Households gas retail prices have experienced a modest increase year on year and were slightly above the EU average in 2024.

Non-household consumers also experienced significantly higher electricity prices than the EU average in 2024, with almost a 30% price premium and the third highest price in the EU, like for households. By contrast, gas retail prices were more aligned with the EU average in 2024.

Graph A8.1: Retail energy price components for household and non-household consumers, 2024



(i) For household consumers, consumption band is DC for electricity and D2 for gas. Taxes and levies are shown including VAT.

(ii) For non-household consumers, consumption band is ID for electricity and I4 for gas. Taxes and levies are shown excluding VAT and recoverable charges, as these are typically recovered by businesses.

Source: Eurostat

Wholesale electricity prices in the German-Luxembourgish bidding zone were 78.4 EUR/MWh in 2024⁽²³⁰⁾, below the EU average of 84.7 EUR/MWh, largely attributed to a significant share of renewables in Germany's electricity mix (57.5% in 2024). But within the broader Central Western European (CWE) region, Germany experienced price spikes during spring and summer, and this occurred amid rising natural gas costs. The situation worsened in autumn and winter, as the region was hit by the "Dunkelflaute". Germany's solar production fell by 11.7% in December 2024, and its wind energy output plummeted by 21.6% from October to December 2024, compared to 2023. This decrease in renewable generation created a demand-supply gap, which was worsened by limited non-fossil flexibility. While this gap was partially covered by increased electricity imports⁽²³¹⁾ from neighbouring countries in the

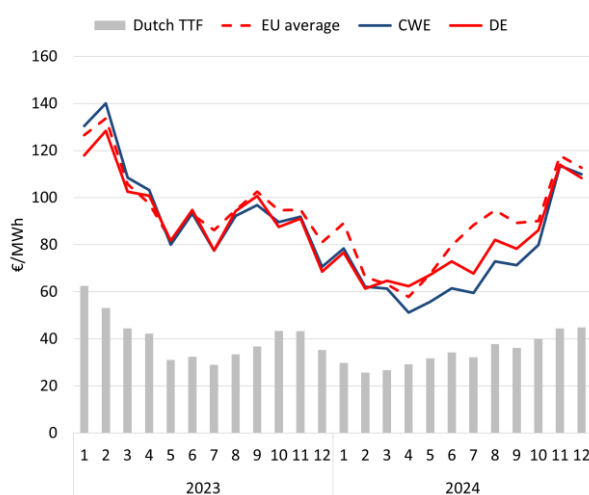
⁽²³⁰⁾ Fraunhofer (ENTSO-E data).

⁽²³¹⁾ From October to December 2024, Germany's electricity trade balanced moved from net exports of 2.1 TWh to net imports of 4.4 TWh.

⁽²²⁹⁾ Yearly electricity data, Ember.

CWE region, the remaining shortfall was largely addressed by ramping up natural gas and coal-fired generation units, with increases in November 2024 of 11% and 1.8%, respectively, compared to the same period in 2023. As a result, prices surged, particularly during peak demand hours in the evening, with an average of 176 EUR/MWh in November and December 2024⁽²³²⁾, a 60% increase over the same period in 2023⁽²³³⁾.

Graph A8.2: **Monthly average day-ahead wholesale electricity prices and European benchmark natural gas prices (Dutch TTF)**



(i) the Title Transfer Facility (TTF) is a virtual trading point for natural gas in the Netherlands. It serves as the primary benchmark for European natural gas prices.

(ii) CWE gives average prices in the central-western European market (Belgium, France, Germany, Luxembourg, the Netherlands and Austria).

Source: S&P Platts and ENTSO-E

Flexibility and electricity grids

Germany is increasing its cross-border trade capacity and belongs to the Core⁽²³⁴⁾ and

⁽²³²⁾ Fraunhofer (ENTSO-E data): Gas prices at peak demand hours from 17:00 to 18:00 on average in November and December 2024 compared to November and December 2023.

⁽²³³⁾ Yearly electricity data, Ember (consumption and generation data throughout the paragraph).

⁽²³⁴⁾ Core is the capacity calculation region (CCR) which covers Belgium, Czechia, Germany, France, Croatia, Hungary, the Netherlands, Austria, Poland, Romania, Slovenia, Slovakia (and, once connected, Ireland).

Hansa⁽²³⁵⁾ capacity calculation regions (CCRs)⁽²³⁶⁾. The Hansa CCR generally has high capacity, but the Core CCR has reduced trade capacities. Germany's current cross-border trade capacity fulfilment is below the 70% minimum. EU Member States should ensure that a minimum of 70% of technical cross-border capacity is available for trading. To address this, Germany is implementing an action plan until the end of 2025 to strengthen its internal electricity grid.

In 2024, the electricity interconnection level was 10.6%, slightly declining as renewables outpace interconnector expansion. Germany aims to meet a 15% interconnection target by 2030, with ongoing transmission and distribution grid expansion. In 2024, 128 expansion projects covering 16 800 km⁽²³⁷⁾ were planned, including several projects of common interest (PCIs). Of these, 15% were operational, 28% under construction and 49% in the permitting process. Legislative changes like amendments to the Energy Industry Act and the Network Expansion Acceleration Act have, along with the EU Emergency Regulation, expedited permitting and allowed the construction of 1 700 km of new lines in 2024 (vs 1 000 km in 2023). Grid reinforcement and digitalisation are crucial for electrifying buildings and transport.

Germany is developing a 9 000 km hydrogen core network, consisting of 40% new and 60% repurposed pipelines and involving EUR 18.9 billion in planned investments. The network will connect industrial centres, ports and energy sites, enhancing links with EU neighbours. It aims to be operational by 2032, with some pipelines ready as early as this year.

⁽²³⁵⁾ The Hansa CCR includes Denmark, Germany, the Netherlands, Poland and Sweden.

⁽²³⁶⁾ A CCR is a group of countries that calculate cross-border electricity trade flows together.

⁽²³⁷⁾ [Netzausbau - Prognose zum Stromnetzausbau](#).

Germany's transmission grid is challenged by a geographical mismatch, with high wind generation in the north but major demand centres in the south and west. In 2023, Germany had to pay 60% of the EU's congestion management expenses (about EUR 2.5 billion) and had to curtail 10.5 TWh of renewable energy. Negative electricity prices further highlight the need for system flexibility and shifts in consumption patterns.

In 2023, Germany launched its electricity storage strategy to support the market-driven expansion of electricity storage. This strategy addresses issues like licensing, grid fees, and connection acceleration. The final updated NECP highlights a need to increase storage capacity. Germany currently has non-fossil flexibility: 17.7 GWh of operational electricity storage, 13.4 GWh of battery storage and 10 GWh of pumped storage hydropower. Two new pumped storage plants are planned as PCIs: one on the German-Austrian border and the other in southern Thuringia.

The regulatory framework is a barrier to demand-side flexibility and storage because of disincentives in the grid fee structure. These disincentives include discounts for large consumers with steady demand (i.e. industry). Germany has launched a working group to address this and created a roadmap for the ramping-up of dynamic tariffs. Demand response and storage can play a part in the provision of ancillary services and congestion management. Aggregators can enter Germany's day-ahead and intraday markets.

Smart meters are crucial for demand flexibility, but Germany's roll-out has been delayed by legal and bureaucratic hurdles. Germany plans to address this by implementing a statutory timetable with binding targets. This will enable consumers to use smart metering systems more easily already in 2025.

The household retail energy market is market-based and features dynamic-price contracts. In 2023, 99% of households had

market-based fixed-price contracts. Households are increasingly becoming prosumers. 11.9% of households generate electricity via photovoltaic systems⁽²³⁸⁾ but only 1% use smart meters. 942 registered energy cooperatives were functioning as citizen or renewable energy communities in 2023. The average minimum fee to become a member was EUR 545⁽²³⁹⁾.

In 2023, electricity accounted for 21.7% of final energy consumption (FEC) (below the EU average of 22.9%) and this share has remained largely stagnant in the last decade⁽²⁴⁰⁾, partly due to an unfavourable electricity-to-gas price ratio that disincentivizes electrification and cost-effective decarbonization. Electricity accounts for 20.5% and 33.1% of households' and industry's FEC respectively (see also Annex 7). The transport sector's FEC remains negligible at 2.9%. Further progress in electrification across sectors is required to cost-effectively decarbonise the economy and bring the benefits of affordable renewable generation to consumers. In 2024's second semester, Germany had the highest household electricity prices in the EU, with electricity costing 3.2 times more per unit than gas. For energy-intensive industries, retail electricity prices were among the highest in the EU (€0.21/kWh), with an unfavourable electricity-to-gas price ratio of 3.5 (EU average: 3.3). These price-differentials between gas and electricity discourage electrification.⁽²⁴¹⁾

⁽²³⁸⁾ ACER Market Monitoring report 2023.

⁽²³⁹⁾ Energy communities repository: Barriers and action drivers for the development of different activities by renewable and citizen energy communities.

⁽²⁴⁰⁾ The CAGR (compound annual growth rate) was 0.1% between 2013 and 2023. The minimum/maximum shares were 21.3% and 22.3%, respectively. Source: Final energy balances, Eurostat.

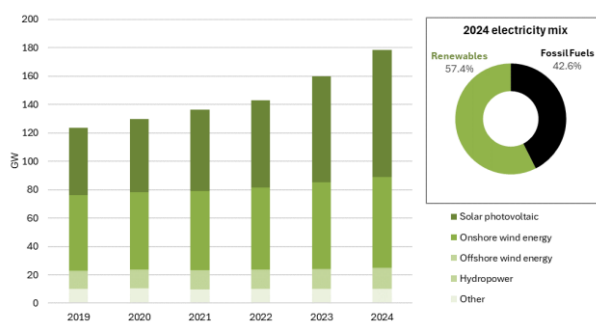
⁽²⁴¹⁾ Analysis based on Eurostat data for the second semester of 2024. For household consumers, consumption band is DC for electricity and D2 for gas, which refer to medium-sized consumers and provide an insight into affordability. For non-household consumers, consumption band is ID for electricity and I4 for gas, referring to large-sized consumers, providing an insight into international

Renewables and long-term contracts

Germany's legal framework has enabled it to significantly accelerate renewable energy installations in the past two years, achieving record levels of permitting for wind and grid projects. Challenges nevertheless remain, such as the need to fully digitalise the permitting process.

In 2024, renewable energy sources (RES) accounted for 57.5% of the electricity mix (vs the EU's overall RES share of 47%) – an increase on 53% in 2023⁽²⁴²⁾. Germany had about 190 GW of renewables⁽²⁴³⁾ installed in 2024, including nearly 100 GW of solar (+16.2 GW in 2024), 63.5 GW of onshore wind (+2.5 GW) and 9.2 GW of offshore wind (+0.7 GW). Germany published a schedule for significant auction volumes for onshore and offshore wind and solar PV on the Union Renewable Development Platform⁽²⁴⁴⁾.

Graph A8.3: Germany's installed renewable capacity (left) and electricity generation mix (right)



"Other" includes renewable municipal waste, solid biofuels, liquid biofuels, and biogas.

Source: IRENA, Ember

competitiveness (price used for the calculation excludes VAT and other recoverable taxes/levies/fees as non-household consumers are usually able to recover VAT and some other taxes).

⁽²⁴²⁾ Yearly electricity data, Ember.

⁽²⁴³⁾ [Bundesnetzagentur](#) (publication date: 8 January 2025).

⁽²⁴⁴⁾ [Member States overview | Union Renewable Development Platform](#).

317 power purchase agreements (PPAs) (totalling 15 800 MW) were signed in 2024, making Germany the biggest PPA market in Europe (together with the Netherlands, Spain and the United Kingdom)⁽²⁴⁵⁾. In 2024, Germany was the first Member State to launch funding via carbon contracts for difference for SMEs and larger industrial corporations in order to fund and drive forward the decarbonisation of industry⁽²⁴⁶⁾.

Energy efficiency

Germany improved energy intensity in 2023 and reduced energy consumption. Primary energy consumption (PEC) dropped by 8.5% to 238.4 Mtoe and final energy consumption (FEC) decreased by 5.0% to 187 Mtoe. FEC decreased in all sectors compared with 2022: by 8.3% in residential, by 5.6% in industry, by 3.4% in services and by 2.4% in transport. The recast Energy Efficiency Directive⁽²⁴⁷⁾ requires Germany to reach a PEC of 194.2 Mtoe and a FEC of 155.5 Mtoe by 2030. To meet these targets, Germany is implementing measures like a low-fare public transport ticket, an updated building efficiency law and carbon neutral data centres.

Germany has taken steps to build infrastructure for high-efficiency cogeneration or efficient district heating and cooling from waste heat and renewables, including in the industrial sector. To address heating and cooling, key measures include the Law on Heat Planning and heat network decarbonisation, along with an updated building efficiency law. Germany has not yet submitted its full heating and cooling assessment as required by Article 25(1)

⁽²⁴⁵⁾ [European PPA Market Outlook 2024, Pexapark](#).

⁽²⁴⁶⁾ BMWK, 2024, Carbon contracts for difference announced, [bmwk.de](#).

⁽²⁴⁷⁾ Energy Efficiency Directive (EU) 2023/1791, [eur-lex](#).

of the recast Energy Efficiency Directive⁽²⁴⁸⁾, but it plans to do so by the end of 2025.

Germany would benefit from an increase in efforts in the residential sector to meet its 2030 reduction target for energy consumption in buildings. Residential FEC went up by 3.6% from 2018 to 2022, but 2023 data indicate that it is now back to 2018 levels. However, Germany's national long-term renovation strategy aims to reduce PEC in buildings by 39% between 2018 and 2030.

Germany has one of the lowest rates of heat pumps per household. There was a 59% increase in heat pump sales in 2023, but sales dropped back sharply in 2024. Electricity was 3.4 times more expensive than gas in 2023, but slightly fell back to being 3.3 times more expensive in the first half of 2024. This price difference means that heat pumps save energy but do not offer significant financial savings. However, Germany's updated Building Energy Act (Gebäudeenergiegesetz), which requires new buildings to use heating systems that are at least 65% powered by renewables from January 2024 onward, is expected to increase the uptake of heat pumps.

Germany has a national financing framework for energy efficiency that mainly consists of grants and mixed schemes. It continued implementing several key financial measures in 2024 (e.g. the Federal Subsidy for Efficient Buildings and the Federal Funding for Efficient Heating Networks). This framework supports various sectors, including SMEs. As part of its recovery and resilience plan (RRP), Germany aims to fully renovate at least 40 000 housing units and added 335 000 individual renovation measures in 2024, focusing on building energy renovation with a budget of EUR 6.2 billion. Germany should maintain funding stability for renovation programmes and address the shortage of skilled workers.

⁽²⁴⁸⁾ Energy Efficiency Directive (EU) 2023/1791, [eur-lex](#).

Security of supply and diversification

Germany has successfully diversified away from Russian gas. Since the end of 2022, pipeline gas (from Belgium, the Netherlands and Norway) and LNG (mainly from the US) by commissioning floating storage regasification units (FSRUs) helped to replace the Russian gas dependence. The State-owned company Deutsche Energy Terminal operates four FSRUs in Brunsbüttel, Wilhelmshaven (two locations) and Stade (with a total capacity of up to 22 bcm per year). Two other FSRUs are privately run in Mukran (with a total capacity of up to 13.5 bcm per year). Two more FSRUs are set to become operational in 2025 in Stade and Wilhelmshaven.

Despite progress in renewables, the overall energy mix in 2023 remained heavily reliant on fossil fuels. Oil accounted for 37% of gross inland consumption, natural gas for 25% and coal for 17%⁽²⁴⁹⁾. Renewables (and biofuels) accounted for 19%⁽²⁵⁰⁾. This reliance underscores the importance of Germany's ongoing efforts in its energy transition to diversify its energy sources and strengthen energy security. In 2023, 21.6% of gross final energy consumption in Germany came from renewable sources, up by 0.75 percentage point compared to 2022⁽²⁵¹⁾.

Fossil fuel subsidies

In 2023, environmentally harmful⁽²⁵²⁾ fossil fuel subsidies without a planned phase-out before 2030 represented 0.20% of Germany's GDP⁽²⁵³⁾

⁽²⁴⁹⁾ Electricity and heat are excluded to avoid double-counting focusing on primary energy sources.

⁽²⁵⁰⁾ Gross inland consumption ([Eurostat](#)).

⁽²⁵¹⁾ Gross final energy consumption ([Statistics | Eurostat](#)).

⁽²⁵²⁾ Direct fossil fuel subsidies that incentivise maintaining or increasing in the availability of fossil fuels and/or use of fossil fuels.

⁽²⁵³⁾ Numerator is based on volumes exchanged with the German authorities. For all Member States, it includes

in 2023, below the EU weighted average of 0.49%. Tax measures accounted for 90% of this volume, while income/price support and direct grants represented 9.5% and 0.5%, respectively. Additionally, Germany's Effective Carbon Rate averaged EUR 96.85 per tonne of CO₂ above the EU weighted mean of EUR 84.80 ⁽²⁵⁴⁾⁽²⁵⁵⁾.

public R&D expenditures for fossil fuels as reported by the IEA (Energy Technology RD&D Budgets) and excludes, for methodological consistency, excise tax exemption on kerosene consumed in intra-EU27 air traffic.

⁽²⁵⁴⁾ OECD, 2024, *Pricing Greenhouse Gas Emissions 2024*

⁽²⁵⁵⁾ The Effective Carbon Rate is the sum of carbon taxes, ETS permit prices and fuel excise taxes, representing the aggregate effective carbon rate paid on emissions.

Table A8.1: Key Energy Indicators

	Germany				EU			
	2021	2022	2023	2024	2021	2022	2023	2024
Household consumer - Electricity retail price (EUR/KWh)	0.3214	0.3317	0.4075	0.3948	0.2314	0.2649	0.2877	0.2879
Energy & supply [%]	25.0%	39.3%	48.9%	41.9%	36.6%	54.3%	55.6%	47.8%
Network costs	24.1%	24.2%	23.0%	29.1%	26.7%	25.3%	24.8%	27.2%
Taxes and levies including VAT	50.9%	36.5%	28.1%	29.1%	36.7%	20.3%	19.6%	25.0%
VAT	16.0%	15.9%	16.0%	16.0%	14.5%	13.4%	13.8%	14.6%
Household consumer - Gas retail price	0.0666	0.0857	0.1195	0.1216	0.0684	0.0948	0.1121	0.1128
Energy & supply	44.4%	55.8%	63.2%	57.8%	43.7%	61.0%	64.5%	53.9%
Network costs	23.4%	17.6%	16.6%	16.3%	22.5%	17.3%	17.1%	18.3%
Taxes and levies including VAT	32.1%	26.6%	20.3%	25.9%	33.8%	21.7%	18.4%	27.8%
VAT	15.9%	12.8%	6.5%	12.3%	15.5%	11.6%	10.2%	13.6%
Non-household consumer - Electricity retail price	0.1672	0.2039	0.2136	0.2115	0.1242	0.1895	0.1971	0.1661
Energy & supply	25.2%	52.0%	54.6%	49.1%	43.0%	66.5%	63.0%	55.8%
Network costs	15.6%	13.1%	16.2%	21.6%	15.8%	10.7%	11.9%	15.5%
Taxes and levies excluding VAT	51.4%	22.5%	15.8%	15.9%	30.4%	9.9%	11.2%	15.4%
Non-household consumer - Gas retail price	0.0336	0.0637	0.0730	0.0596	0.0328	0.0722	0.0672	0.0517
Energy & supply	56.8%	70.7%	72.5%	62.9%	66.2%	77.3%	77.3%	68.7%
Network costs	7.8%	4.5%	5.2%	6.6%	7.7%	3.8%	5.3%	7.1%
Taxes and levies excluding VAT	23.2%	13.2%	16.8%	20.0%	12.5%	6.1%	7.3%	11.6%
Wholesale electricity price (EUR/MWh)	96.6	234.5	95.5	78.6	111.0	233.2	99.1	84.7
Dutch TTF (EUR/MWh)	n/a	n/a	n/a	n/a	46.9	123.1	40.5	34.4
	2017	2018	2019	2020	2021	2022	2023	2024
Gross Electricity Production (GWh)	653,723	640,468	606,917	575,462	592,799	578,949	511,881	-
Combustible Fuels	404,286	385,445	334,214	302,330	332,188	333,345	273,470	-
Nuclear	76,324	76,005	75,071	64,382	69,130	34,709	7,216	-
Hydro	26,155	23,863	25,671	25,275	24,972	23,576	25,337	-
Wind	105,693	109,951	125,894	132,102	114,169	124,816	140,538	-
Solar	39,401	43,459	44,383	49,496	50,472	61,022	63,576	-
Geothermal	163	178	197	231	244	206	195	-
Other Sources	1,701	1,567	1,487	1,646	1,624	1,275	1,549	-
Gross Electricity Production [%]								
Combustible Fuels	61.8%	60.2%	55.1%	52.5%	56.0%	57.6%	53.4%	-
Nuclear	11.7%	11.9%	12.4%	11.2%	11.7%	6.0%	1.4%	-
Hydro	4.0%	3.7%	4.2%	4.4%	4.2%	4.1%	4.9%	-
Wind	16.2%	17.2%	20.7%	23.0%	19.3%	21.6%	27.5%	-
Solar	6.0%	6.8%	7.3%	8.6%	8.5%	10.5%	12.4%	-
Geothermal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-
Other Sources	0.3%	0.2%	0.2%	0.3%	0.3%	0.2%	0.3%	-
Net Imports of Electricity (GWh)	-52,459	-48,736	-32,667	-19,029	-18,575	-27,256	9,225	-
As a % of electricity available for final consumption	-9.9%	-9.3%	-6.4%	-3.9%	-3.6%	-5.6%	2.0%	-
Electricity Interconnection [%]	8.9%	10.5%	10.9%	11.4%	11.0%	11.5%	11.2%	10.6%
Share of renewable energy consumption - by sector [%]								
Electricity	34.6%	37.6%	40.6%	44.2%	44.0%	48.0%	52.3%	-
Heating and cooling	13.4%	14.2%	14.5%	14.5%	15.5%	17.4%	17.1%	-
Transport	7.0%	7.9%	7.6%	10.0%	8.1%	10.1%	11.9%	-
Overall	15.5%	16.7%	17.3%	19.1%	19.3%	20.8%	21.6%	-
	2020	2021	2022	2023	2020	2021	2022	2023
Import Dependency [%]	63.7%	63.4%	68.6%	66.4%	57.5%	55.5%	62.5%	58.3%
of Solid fossil fuels	44.1%	47.8%	50.4%	49.2%	35.8%	37.2%	45.9%	40.8%
of Oil and petroleum products	96.5%	95.6%	96.9%	93.7%	96.8%	91.7%	97.8%	94.5%
of Natural Gas	89.1%	90.7%	105.9%	93.7%	83.6%	83.6%	97.6%	90.0%
Dependency from Russian Fossil Fuels [%]								
of Natural Gas	65.2%	65.4%	29.6%	0.0%	41.0%	40.9%	20.7%	9.3%
of Crude Oil	34.0%	34.1%	25.4%	0.3%	25.7%	25.2%	18.4%	3.0%
of Hard Coal	48.1%	52.6%	30.5%	1.9%	49.1%	47.4%	21.5%	1.0%
	2017	2018	2019	2020	2021	2022	2023	
Gas Consumption (in bcm)	95.0	94.7	95.6	92.9	99.0	87.2	80.1	
Gas Consumption year-on-year change [%]	8.1%	-0.3%	0.9%	-2.8%	6.5%	-11.9%	-8.1%	
Gas Imports - by type (in bcm)	118.7	88.3	94.8	80.4	84.8	87.7	71.6	
Gas imports - pipeline	118.7	88.3	94.8	80.4	84.8	87.7	65.1	
Gas imports - LNG	0.0	0.0	0.0	0.0	0.0	0.0	6.5	
Gas Imports - by main source supplier [%]								
Norway	9.4%	2.8%	2.8%	20.5%	19.1%	31.6%	41.4%	
Netherlands	0.0%	0.0%	0.0%	12.7%	0.0%	0.0%	24.7%	
Belgium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.8%	
Russia	52.3%	48.8%	48.8%	65.2%	65.4%	29.6%	0.0%	

Source: Eurostat, ENTSO-E, S&P Platts

Action on climate change adaptation and preparedness in Germany is critical as the country faces mounting economic impacts from extreme weather events. The severe floods in July 2021 and heatwaves in 2022 had severe impacts on people, the economy and ecosystems. These events highlight the urgent need to implement and sufficiently finance national and sub-national measures to tackle climate-related threats. Despite efforts to improve water quality, only a marginal improvement has been observed, with a significant share of surface and groundwater bodies failing to meet good chemical status due to pollutants such as nitrates. The concerning state of nature and biodiversity loss poses a threat to ecosystem services, which are essential for maintaining economic stability in sectors such as agriculture and fisheries, requiring additional action. To meet the 2030 target, additional efforts are needed in the land use, land-use change and forestry sector.

Climate adaptation and preparedness

Germany is exposed to extreme precipitation, large-scale floods, heatwaves and droughts. Climate risks have a direct effect on Germany's economy and society, as the severe flood events in Germany demonstrated in July 2021. These floods caused over 180 fatalities and economic losses of up to around EUR 33 billion ⁽²⁵⁶⁾. Between 1980 and 2023, Germany recorded 104 544 fatalities and EUR 180.4 billion in economic losses caused by weather and climate-related extreme events. Only 30% of the economic damages over this period were insured ⁽²⁵⁷⁾. The gap in insurance coverage is particularly wide for river and coastal floods.

⁽²⁵⁶⁾Bundesministerium des Innern und für Heimat, 2022, Abschlussbericht Hochwasserkatastrophe-Final, [Link](#).

⁽²⁵⁷⁾EEA, 2024, Economic losses from weather- and climate-related extremes in Europe, [Link](#).

Climate-change related risks in Germany are caused by a mix of negative impacts from heat, droughts and natural disturbances. The impacts in Germany differed by region. Notably, less water availability and lower ground water levels have affected agricultural yields and forests, further exacerbated by bark beetles and by an increasing number of wildfires in north-eastern Germany. Between 2006 and 2023, 663 hectares burned in forest fires each year on average. This is also reflected in the increased impact of droughts on ecosystems. For example, in 2022, 18% of land in Germany was affected by drought. Rising temperatures also alter ecosystems both on land and in the oceans, leading to shifts in biodiversity and species migrating from southern to northern regions ⁽²⁵⁸⁾.

The economic and societal impacts of higher temperatures and extreme weather events due to climate change are significant. Heatwaves have a significant impact on Germany. In 2022, heatwaves led to approximately 8 200 heat-related fatalities ⁽²⁵⁹⁾. By mid-century, Germany forecasts a high risk from climate change affecting agriculture, forests, fisheries, coastal protection, water management and human health ⁽²⁶⁰⁾. Existing measures can mitigate but not fully eliminate this risk. Almost all sectors are reliant on natural resources and ecosystems. Sectors such as agriculture, fisheries and forestry are particularly affected. In recent decades, dry and hot periods have already caused significant disruptions in power supply and yield losses in agriculture. The number of hot days above 30°C is rising substantially ⁽²⁶¹⁾, despite wide fluctuations between years, disproportionately

⁽²⁵⁸⁾DAS, 2024, *Deutsche Anpassungsstrategie an den Klimawandel*, p. 19 ff., [Link](#).

⁽²⁵⁹⁾Nature Medicine, 2023, *Heat-related mortality in Europe during the summer of 2022*, [Link](#).

⁽²⁶⁰⁾DAS, 2024, *Deutsche Anpassungsstrategie an den Klimawandel*, Figure 2, [Link](#).

⁽²⁶¹⁾Umweltbundesamt, 2024, *Environmental Indicators: Hot days*, [Link](#).



affecting vulnerable groups. The impacts of climate change are expected to fundamentally affect public health, infrastructure and the economy in Germany, at both local and country-wide levels ⁽²⁶²⁾.

National policy measures on climate adaptation and preparedness have strengthened in recent years, but additional measures at municipal level are also required. Germany has made significant progress in climate adaptation and has been proactive in addressing climate-related threats. The federal government has improved its risk and impact assessments. It revised the national adaptation strategy in 2024, which includes an adaptation action plan outlining over 180 specific measures and around 90 instruments. The plan was developed with input from a comprehensive climate impact and risk analysis. The strategy identifies 33 measurable goals to take precautions against extreme weather events such as heat, drought, heavy rain and flooding. One of the goals identified is to increase the reach of national early warning systems ⁽²⁶³⁾, as the 2021 floods revealed technical gaps.

Climate adaptation action is implemented at sub-national level. Municipalities and *Länder* have been closely involved in the analysis and development of the strategy. They are obliged to incorporate climate adaptation in their urban planning and to identify adaptation measures at sub-national level. Some municipalities have already taken some measures, especially heat-related measures such as drinking fountains or fresh air corridors and de-paving urban areas. However, the strategy relies heavily on active participation from the *Länder* and municipalities to achieve widespread implementation. Key challenges remain to close funding gaps and to ensure

comprehensive local planning of adaptation concepts, particularly in smaller municipalities.

Water resilience

Water quality in Germany has only improved marginally, and concerns remain for surface water bodies. Germany's third river basin management plan (2022-2027) under the Water Framework Directive shows that the ecological status and potential of surface water bodies has only slightly improved since the second plan, with only 9.3% classified as having good or better ecological status/potential. In addition, none of Germany's surface water bodies have a good chemical status, mainly due to substances emitted during fossil fuel combustion and industrial use. Even with future measures, Germany only expects 3% of its water bodies to achieve good chemical status by 2027 and 4% by 2045. The quantitative status of groundwater bodies has slightly deteriorated since the second plan, with 95.2% reported to have a good quantitative status. The chemical status of groundwater bodies has improved slightly, with 67.3% classified as having a good chemical status. Diffuse agricultural pollution is the most significant form of pressure on both surface and groundwater bodies with nitrates being the worst pollutant, causing failure to achieve good chemical status in groundwater.

At country level, Germany does not face water stress, although there are regional and seasonal differences. The Water Exploitation Index Plus (WEI+) was 3.6 % in 2022, which is far below the 20% generally taken to be an indication of water scarcity. Nevertheless, Germany has experienced climate-change induced water loss from soils and vegetation and record-low levels of groundwater bodies throughout different regions. Although water abstraction is not identified as a significant form of pressure,

⁽²⁶²⁾Metis Institut für Strategie und Vorausschau, 2025, *National Interdisciplinary Climate Risk Assessment*, [Link](#).

⁽²⁶³⁾ DAS, 2024, *Deutsche Anpassungsstrategie an den Klimawandel*, p. 75 ff., [Link](#).

several studies indicate emerging water scarcity issues ⁽²⁶⁴⁾. This should not be underestimated - with almost half of the water used by the manufacturing sector, scarcity issues could have an impact on Germany as an industry and business location. A national water strategy was adopted in 2023 ⁽²⁶⁵⁾ with targets for 2050, including restoring forests and green spaces, and guidelines to regulate water distribution in the event of regional shortages.

Germany is almost 100% compliant with the requirements of the Urban Wastewater Treatment Directive. Almost all German households are connected to the public sewage system. A major challenge for the future will be to eliminate micropollutants in waste water, which have so far not been taken into account. The annual water investment needs reach an estimated EUR 19.4 billion (in 2022 prices) in Germany (see Graph A9.2). This comprises investment needs both for the water industry and for water protection and management. The current level of financing is around EUR 15.6 billion, leaving a gap of about EUR 3.7 billion per year (0.1% of gross domestic product), with over half related to waste water (EUR 2.7 billion per year). Of the total financing, the EU multiannual budget provides a very small share (0.4%, mostly under cohesion policy), with a similarly small share of European Investment Bank financing (0.9%). About 98.8% of financing for water comes from national sources.

Biodiversity and ecosystems

Despite Germany's strong commitment to protecting the environment and biodiversity, the state of its nature and ecosystems remains a concern and reduces the country's climate and economic resilience. Germany has two main types of

ecosystems: agroecosystems, which cover 50.3% of the country, and forest ecosystems, covering 29.9% ⁽²⁶⁶⁾. High livestock density, land-use intensification and climate change significantly affect these ecosystems. With 38.5% of its land currently designated as protected areas (Natura 2000 and other nationally designated protected areas), Germany is significantly above the EU average of 26.1% for protected areas. Although not all of these areas are meeting the criteria for the EU biodiversity strategy target to protect 30% of land at EU level by 2030, they nevertheless make a significant contribution towards this target. With 45.4% of marine waters protected, Germany also exceeds the EU-27 average of 12.1%.

The overall conservation status of habitats and species improved slightly during the last reporting period (2013-2018), but the share of habitats and species in bad conservation status increased. In Germany, 29.7% of habitats are in a good conservation status, above the EU average of 14.7%. However, the proportion of habitats in a bad conservation status (37.4%), is also above the EU average of 35.8%. 25.7 % of protected species were assessed as having good conservation status, compared to 24.6 % reported under the previous reporting period. Nevertheless, the EU average is 27.5% and the proportion of species in a bad conservation status is 33.1%, well above the EU average of 20.6%. This situation has implications for Germany's climate resilience, as the loss of biodiversity impairs ecosystems' ability to provide services that help mitigate the effects of climate change, such as regulating water cycles, maintaining soil health and sequestering carbon.

Nature degradation creates significant risks to the economy and to competitiveness for Germany. Although overall Germany has a level of dependency on ecosystem services

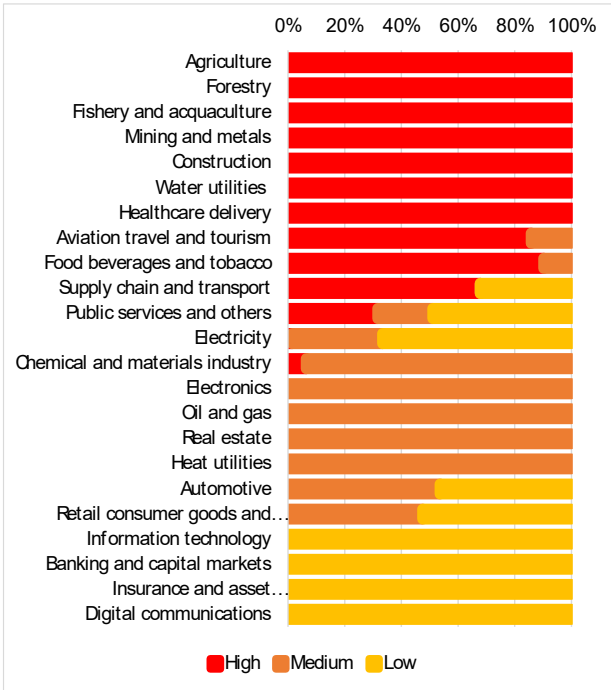
⁽²⁶⁴⁾ Heinrich-Böll-Stiftung, 2025, *Wasseratlas*, [Link](#).

⁽²⁶⁵⁾ BMUV, Wasserstrategie, [Link](#).

⁽²⁶⁶⁾ Statistisches Bundesamt, 2023, [Link](#).

below the EU average, several sectors such as agriculture, fisheries, construction and water utilities (see Graph A9.1) are particularly dependent on ecosystem services as 100% of the gross value added generated by these sectors is directly dependent on ecosystem services. This means that failure to maintain the capacity of ecosystems to deliver services could entail significant costs or even stop production in these sectors. Protecting and restoring key ecosystems would help maintain the long-term competitiveness of these sectors.

Graph A9.1: **Direct dependency(1) on ecosystem services(2) of the gross value added generated by economic sector in 2022**



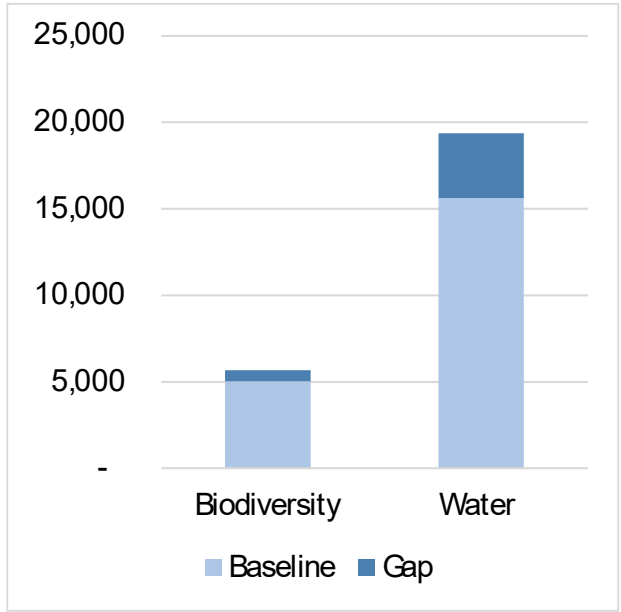
(1) Dependency based on the sector's own operations, excluding value chain operations within countries and across international value chains. A high dependency indicates a high potential exposure to nature-related shocks or deteriorating trends, which means that the disruption of an ecosystem service could cause production failure and severe financial loss.

(2) Ecosystem services are the contributions of ecosystems to the benefits that are used in economic and other human activity, including provisioning services (e.g. biomass provisioning or water supply), regulating and maintenance services (e.g. soil quality regulation or pollination), and cultural services (e.g. recreational activities).

Source: Hirschbuehl et al., 2025, *The EU economy's dependency on nature*, [Link](#).

Germany requires EUR 5.67 billion of investment per year to effectively protect and restore its natural capital, mitigate the impacts of climate change and preserve the country's rich biodiversity (see Graph A9.2). The current level of financing for biodiversity and ecosystem conservation in Germany is around EUR 5 billion, leaving a gap of EUR 638 million.

Graph A9.2: **Investment needs and gaps in EUR million, in 2022 constant prices**



Source: European Commission, DG Environment, Environmental investment needs & gaps assessment programme, 2025 update.

Sustainable agriculture and land use

Germany's carbon removals fall short of the level of ambition needed to meet its 2030 target for land use, land-use change and forestry (LULUCF). Germany's LULUCF sector has generated strong emissions since 2018, a worrying trend. To meet its 2030 LULUCF target, additional carbon removals of -3.8 million tonnes of CO₂ equivalent (CO₂eq) are needed with respect to the 2016-2018 level ⁽²⁶⁷⁾. The latest available projections indicate a gap of 7.5 million tonnes of CO₂eq to the 2030

⁽²⁶⁷⁾ In line with Regulation (EU) 2023/839.

target ⁽²⁶⁸⁾. Therefore, additional measures need to be applied to reach the 2030 target. The rewetting of peatlands and expansion of carbon farming practices such as agroforestry have the potential to reverse the trend of falling net carbon removals. Adaptation and restoration measures in forests would need to be strengthened after forests became a net emitter in the 2017-2022 period, according to the latest Federal Forest Inventory ⁽²⁶⁹⁾.

German agriculture is a source of greenhouse gas emissions and has a significant impact on air, water and soils, although a positive trend can be observed.

In 2022, agriculture generated a total of 53 million tonnes of CO₂eq, a slight decrease since 2018, accounting for around 8% of the country's total emissions. This includes 35 million tonnes of CO₂eq from livestock (also decreasing since 2018). The size of utilised agricultural area (UAA) in Germany has decreased slightly over the last decade from 16 699 thousand hectares in 2013 to 16 585 in 2023. This is partly due to the difficult economic situation faced by many agricultural holdings. A further reduction in greenhouse gas emissions is needed to reach the national target for 2030 laid down in the German Climate Protection Law ⁽²⁷⁰⁾.

An analysis of Germany's river basin management plan identified nutrients from agriculture as a major form of pressure for groundwater/surface water affecting the good status. This is one of the main factors for not meeting the Water Framework Directive's objectives. According to data from the Nitrates Directive, almost 27% of groundwater monitoring stations in Germany recorded average nitrate concentrations above 50 mg/l

⁽²⁶⁸⁾ Climate Action Progress Report 2024, COM/2024/498.

⁽²⁶⁹⁾ Bundesministerium für Ernährung und Landwirtschaft, 2024, *Vierte Bundeswaldinventur 2022*, [Link](#).

⁽²⁷⁰⁾ Bundes-Klimaschutzgesetz, [Link](#).

between 2016 and 2019, exceeding the healthy threshold for human consumption. However, the gross nitrogen balance on agricultural land in Germany is improving, with 38.8 kg of nitrogen per hectare per year in 2021, almost 18 kg less than in the previous year. Although the livestock density index was 0.98 in 2020, which is above the EU average of 0.75 (on a downward trend), ammonia emissions have been on a downward trend during the last decade from 537 000 tonnes in 2012 to 411 000 tonnes in 2022. In 2021, pesticides were detected in 27% of surface water bodies, close to the EU average of 29%.

Germany is transitioning to a sustainable food system by implementing policies to reduce the environmental impact of agriculture.

In 2022, 5.4% of its agricultural land had landscape features such as woods and non-productive grasslands, slightly below the EU average of 5.6%. Organic farming, which reduces the use of synthetic fertilisers and pesticides, made up almost 9.8% of Germany's agricultural land in 2022, a more than 70% increase since 2012, but still below the EU average. Still, Germany has the ambitious objective to reach 30% of UAA under organic farming by 2030. Germany's common agricultural policy (CAP) strategic plan allocates approximately 30% ⁽²⁷¹⁾ of its budget to measures that tackle environmental and climate-related challenges. As agricultural emissions mainly stem from soil and manure management, Germany integrated several measures in its CAP strategic plan to protect soil organic matter and carbon content. This contributes to climate change mitigation and should improve water quality and biodiversity. Over 40% of UAA in Germany is set to receive CAP support for biodiversity conservation, such as measures to maintain landscape features or set aside non-productive areas on arable land. In addition, around 30% of UAA is to be put under commitments for improvement of the soil quality, for example by including

⁽²⁷¹⁾ *At a glance: Germany's CAP strategic plan*; p. 7, [Link](#).

leguminous crops in crop rotation, and to improve the quality of water bodies by reducing the use of fertilisers and pesticides. This includes CAP support for organic farming. The CAP strategic plan also supports investment in, for example, the restoration of habitats, sustainable management of water resources, and flood and coastal protection. The bioeconomy, encompassing the production and processing of biological products, contributed EUR 135 billion of added value to the country's gross domestic product in 2021 ⁽²⁷²⁾. Agriculture generated EUR 23.9 billion, while the food industry generated EUR 44.4 billion.

⁽²⁷²⁾European Commission, 2023, *EU Bioeconomy Monitoring System dashboards*, [Link](#).

Table A9.1: Key indicators on progress on climate adaptation, preparedness and environment

Climate adaptation and preparedness:								EU-27	
	Germany							2018	2021
	2018	2019	2020	2021	2022	2023		2018	2021
Drought impact on ecosystems [area impacted by drought as % of total]	19.95	17.72	15.48	0.1	18.17	0.23		6.77	2.76
Forest-fire burnt area ⁽¹⁾ [ha, annual average 2006-2023]	663	663	663	663	663	663			
Economic losses from extreme events [EUR million at constant 2022 prices]	10 145	8 247	1 607	38 744	11 014	2 163		24 142	62 981
Insurance protection gap ⁽²⁾ [composite score between 0 and 4]	-	-	-	-	1.38	1.38			
Heat-related mortality ⁽³⁾ [number of deaths per 100 000 inhabitants in 2013-2022]	67	67	67	67	67				
Sub-national climate adaptation action [% of population covered by the EU Covenant of Mayors for Climate & Energy]	24	24	24	24	24	24		41	44

Water resilience:								EU-27	
	Germany							2018	2021
	2018	2019	2020	2021	2022	2023		2018	2021
Water Exploitation Index Plus, WEI+ ⁽⁴⁾ [total water consumption as % of renewable freshwater resources]	4.2	4.0	3.2	3.0	3.6	-		4.5	4.5
Water consumption [million m ³]	5 476	5 342	4 511	4 892	4 738	-			
Ecological/quantitative status of water bodies ⁽⁵⁾ [% of water bodies failing to achieve good status]									
Surface water bodies	-	-	-	89%	-	-		-	59%
Groundwater bodies	-	-	-	5%	-	-		-	93%

Biodiversity and ecosystems:								EU-27	
	Germany							2018	2021
	2018	2019	2020	2021	2022	2023		2018	2021
Conservation status of habitats ⁽⁶⁾ [% of habitats having a good conservation status]	29.7	-	-	-	-	-		14.7	-
Common farmland bird index 2000=100	-	-	-	-	-	-		72.2	74.4
Protected areas [% of protected land areas]	-	-	-	37	39	-		-	26

Sustainable agriculture and land use:								EU-27	
	Germany							2018	2021
	2018	2019	2020	2021	2022	2023		2018	2021
Bioeconomy's added value ⁽⁷⁾ [EUR million]	112 545	122 719	120 749	132 071				634 378	716 124
Landscape features [% of agricultural land covered with landscape features]	-	-	-	-	5	-			
Food waste [kg per capita]	-	-	131	131	129	-			
Area under organic farming [% of total UAA]	7.3	7.8	9.6	9.7	9.8			7.99	-
Nitrogen balance [kg of nitrogen per ha of UAA]	77.9	53.4	56.2	38.8	-	-			
Nitrates in groundwater ⁽⁸⁾ [mgNO ₃ /l]	27.1	26.4	25.0	24.2	-	-			
Net greenhouse gas removals from LULUCF ⁽⁹⁾ [kt CO ₂ -eq]	760	- 2 462	5 798	2 622	4 382	-		- 256 077	- 240 984

(1) The data show the average for the timespan 2006-2023 based on EFFIS - European Forest Fire Information System.

(2) Scale: 0 (no protection gap) – 4 (very high gap). EIOPA, 2024, Dashboard on insurance protection gap for natural catastrophes.

(3) van Daalen, K. R. et al., 2024, The 2024 Europe report of the Lancet Countdown on health and climate change: unprecedented warming demands unprecedented action, The Lancet Public Health.

(4) This indicator measures total water consumption as a percentage of the renewable freshwater resources available for a given territory and period. Values above 20% are generally considered to be a sign of water scarcity, while values equal or greater than 40% indicate situations of severe water scarcity.

(5) European Commission, 2024, 7th Implementation Report from the Commission to the Council and the European Parliament on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC) (Third River Basin Management Plans and Second Flood Risk Management Plans).

(6) For this indicator, the EU average includes figures for the UK under the previous configuration, EU-28.

(7) European Commission, 2023, EU Bioeconomy Monitoring System dashboards.

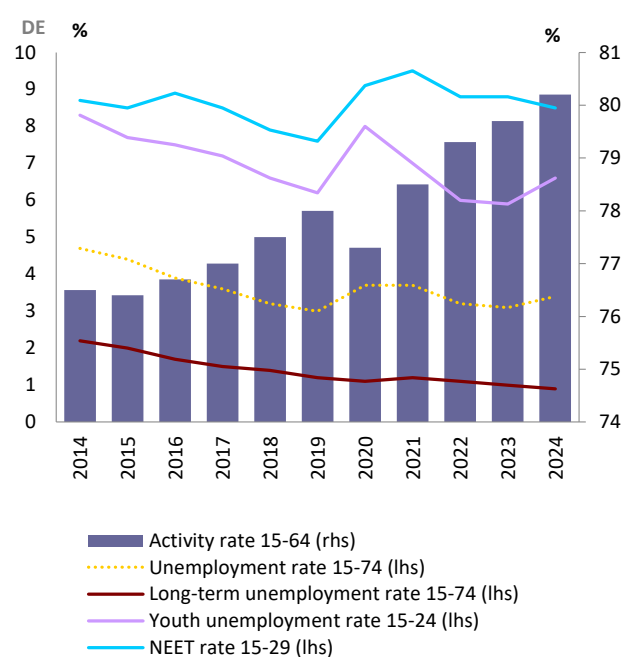
(8) Nitrates can persist in groundwater for a long time and accumulate at a high level through inputs from anthropogenic sources (mainly agriculture). The EU drinking water standard sets a limit of 50 mg NO₃/L to avoid threats to human health.

(9) Net removals are expressed in negative figures, net emissions in positive figures. Reported data are from the 2024 greenhouse gas inventory submission. 2030 value of net greenhouse gas removals as in Regulation (EU) 2023/839 – Annex IIa.

Source: Eurostat, EEA.

Weakening labour demand flattened employment growth and increased unemployment as the German economy continued contracting. The deterioration of the labour market is expected to be contained as economic growth resumes and ageing continues to weigh on labour supply. At the same time, structural transformation may lead to an increased need for changing jobs. Better tapping the unused labour market potential of some groups, including of second earners, a substantial number of whom are women, people with a migrant background and people with low-level qualifications is key to reducing the negative impact of severe labour and skills shortages to growth, competitiveness and innovation and meet the skilled labour demand linked to the green and digital transition.

Graph A10.1: Key labour market indicators (2024)



Source: Eurostat, LFS [lfsi_emp_a, une_rt_a, edat_lfse_20, une_ltu_a]

The labour market remains resilient, despite a challenging economic context, with high levels of tightness and declining hours worked per capita. Even as the economy stagnated, 81.3% of the of the population (age group 20-64) was employed in 2024, showing good progress being made towards achieving

the 83% national target set for 2030. The unemployment rate increased by 0.3 percentage points (pps) on an annual basis, but remained well below the EU average (3.4% vs EU: 5.9% in 2024). Furthermore, both youth unemployment and the share of young people aged 15-29 not in employment, education or training (NEET) remained well below the respective EU averages (6.6% vs EU: 14.9% and 8.5% vs EU: 11% in 2024). The resilience of the labour market reflects that even if employment in manufacturing industries has declined, it continued to increase in public services, education and health.

Persistent labour shortages pose challenges for competitiveness, investment and innovation, weighing on prosperity and social systems. After having increased between 2011 and 2022, the number of open job positions decreased by 29% since 2022. Around one third of companies reported being affected by labour shortages in Q4 2024 compared to 39% in 2023 ⁽²⁷³⁾. At the same time, the job vacancy rate still remains relatively high (3.2% in Q4-2024) and above the EU average (2.3%), although it has declined to below its pre-pandemic level. In particular, shortages are reported in construction, information and communication activities and professional, scientific and technical activities. According to CEDEFOP-EURES data, the occupations most requested in the country (January to September 2024) were ICT professionals, office professionals, and researchers and engineers. Moreover, the share of employers expecting labour shortages to limit their production was at or above the EU average across sectors in the Q4-2024. Specifically, it was above the EU average in industry (19.9%) and the services sector (38.2%).

⁽²⁷³⁾ KfW, 2024, KfW-ifo Skilled Labour Barometer, www.kfw.dewww.kfw.de.

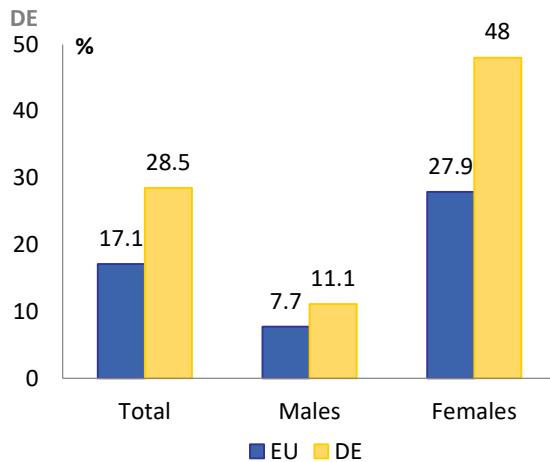


Population ageing will further reduce labour supply and points to the need for further measures to tackle labour shortages, including through attracting skilled third-country nationals. According to the Ageing Report 2024 ⁽²⁷⁴⁾, the age group 20-64 years is projected to shrink by approximately 2.3 million between 2024 and 2030 (approximately 5.7 million until 2070). The low number of children per parents, which has remained stable since the mid-1970s, and the rapid ageing of society have been somewhat counterbalanced by immigration so far. The Skilled Immigration Act, from 2023, intends to attract more skilled workers from third countries. From the third-country nationals who entered Germany in 2023, 72 400 persons received residence titles for employment purposes (a decrease of 0.9% over a year), of which 56.3% were considered skilled professionals with recognised qualifications. 58 775 third-country nationals received a visa on educational grounds (-2.7% compared to 2022) ⁽²⁷⁵⁾.

In light of persistent shortages, creating stronger incentives to increase the number of hours worked, including for second earners, remains crucial. Germany has one of the highest female employment rates in the EU (77.6% in 2024 vs 70.8%). However, due to a large share of women working part-time, it has one of the highest gender gaps in part-time employment (37.6 pps in 2024 vs EU 20.2 pps). The gender working time gap is about 7.5 hours, having declined from 10 hours in 2010. The interplay between the tax and benefits system creates disincentives for second and low-wage earners – a considerable number of whom are women - to work more hours. Although the tax wedge (the taxation of earnings from labour) on labour for low-income workers in Germany is now 1.4 pps below its 2018 level, it increased from 43.5% in

2023 to 43.9% in 2024, and it remains considerably above the average for OECD countries (31.0%). For second earners, the benefits of lower taxes through joint taxation at the cost of increased second earners' marginal tax rates is a strong disincentive for second earners to increase the hours worked (see also Annex 13 on taxation). To tap into the labour market potential of second earners, the government introduced the 'midi-jobs' ⁽²⁷⁶⁾, with progressivity in increasing social contributions for low incomes. However, this reform did not create substantial incentives among this group to work more hours. Research showed that the redistribution effects of the midi-jobs may even strengthen the part-time work trap for second earners ⁽²⁷⁷⁾. A reform of tax-classes which could possibly improve work incentives, was put forward by the governmental coalition in the 2024 Growth Initiative.

Graph A10.2: **Part-time employment by sex (ages 20-64, 2023)**



Source: Eurostat, LFS [lfsa_eppga]

⁽²⁷⁴⁾European Commission, Ageing Report 2024.

⁽²⁷⁵⁾Federal Ministry of Interior and Federal Office for Migration and Refugees, 2023, Migration Report of the Federal Government, bamf.de.

⁽²⁷⁶⁾ The transitional area, known as midi-job, begins with a regular monthly salary above the marginal income threshold and ends at EUR 2 000 per month. Over the course of the adjustment of the minimum wage and thus the marginal income threshold, a midi-job was starting at EUR 538.01 from 1 January 2024 and at EUR 556.01 from 1 January 2025.

⁽²⁷⁷⁾DIW, Wochenbericht 2023, Midijob-Reform, www.diw.de.

Better provision of quality childcare and all-day schools could also strengthen the incentives for women to work more hours.

The share of women working part-time due to care responsibilities was among the highest in the EU at 24.6% (vs EU: 21.2%). This is at least partly driven by insufficient childcare provision, with the share of under 3-year-olds in formal childcare remaining relatively stable for years, at around 30% with substantial regional differences and below the Barcelona targets ⁽²⁷⁸⁾. In 2023, 95.3% of children between 3 and compulsory school age attended early childhood education and care (ECEC), close to the EU average (94.6%) but below the EU-level target of 96%. Despite further expanding ECEC, Germany faces significant unmet demand for childcare, which negatively affects the possibilities for women with caring responsibilities to increase their labour market outcomes.

Germany has a substantial untapped labour market potential including people with a migrant background and lower-level qualifications.

Despite the low unemployment rate, there is still a substantial number of unused labour. In 2024, an average of around 4 million employable and around 1.5 million non-employable people in Germany received the social assistance 'citizen's income' (*Bürgergeld*), rising for the second year in a row and reaching the highest level since 2018 ⁽²⁷⁹⁾. A substantial part of this group are third-country citizens, including Ukrainian citizens, with lower skill levels including German language being an obstacle to their integration into the labour market. The share of employed Ukrainian citizens was around 32% in February 2025 ⁽²⁸⁰⁾. In general, people born outside of the EU had a low employment rate, especially women (68.3%

and 58.4%, respectively, in 2024). Adults with lower-level qualifications also have a much lower employment rate than those with mid- or high-level qualifications (66.5% vs 82.1% and 87.9%, respectively, in 2024). Women with lower-level qualifications have a particularly low employment rate (58.6% vs 73.9% for men, in 2024). For people born outside the EU and with lower-level qualifications, the situation is much more difficult for women, who had a very low employment rate of 47.5%, than for men (72.8%) in 2024. However, this was also the case for non-EU born women with high-level qualifications (63.4% vs 80.8% for men in 2024). To increase incentives to take up a job, the federal government was planning a reform of the citizens benefits system by introducing stricter sanctions. An action plan for the labour market integration of refugees ("Job-Turbo") was launched in fall 2023, focusing on transitions to jobs. Although the disability employment gap has decreased from 24 pps in 2022 to 22.6 pps in 2023, it still stands around the EU average of 21.5 pps.

Labour market restructuring, declining economic activity in some sectors as well as the green transition requires the rapid reactivation of the work force in case of layoffs. According to the OECD ⁽²⁸¹⁾, around 21.1% of the labour force in Germany works in green-driven jobs. However, of the existing green-driven jobs, only 14% are genuinely 'green new or emerging occupations', while 4.7% of employment is still found in energy-intensive industries in 2023. Structural transformations have negatively impacted several important economic sectors such as automotive industries, energy-intensive chemical productions, construction, and retail, resulting in job losses (including of well-paid jobs) and reduced levels of hiring ⁽²⁸²⁾. In 2024 the use of cyclical short-time work continued

⁽²⁷⁸⁾ Education and Training Monitor 2024.

⁽²⁷⁹⁾ [Grundsicherung - Statistik der Bundesagentur für Arbeit](#)

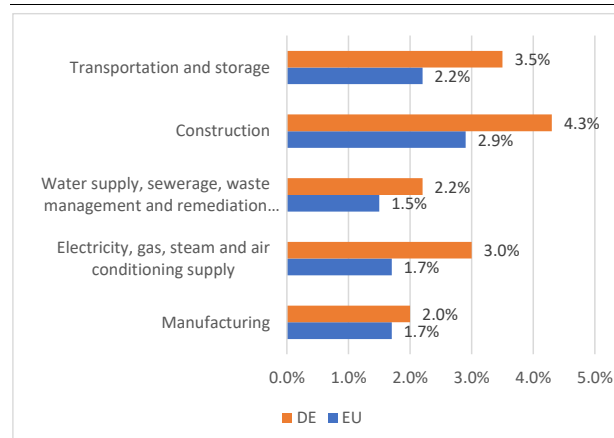
⁽²⁸⁰⁾ [Arbeitsmarkt kompakt - Auswirkungen der Fluchtmigration aus der Ukraine auf den Arbeitsmarkt und die Grundsicherung für Arbeitsuchende](#)

⁽²⁸¹⁾ OECD, 2024, *Employment outlook 2024 - Country Notes: Germany*, oecd.org.

⁽²⁸²⁾ IW Köln, 2024, *Handwerk: Jede zweite Stelle bleibt unbesetzt*, www.iwkoeln.de.

to increase mainly in the manufacturing sector⁽²⁸³⁾. Meanwhile, labour shortages were still affecting sectors key for the green transition, such as construction, water supply, sewerage, waste management and energy, showing shifting needs and the potential for the green sector (see graph A8.3). The ongoing structural changes in the economy call for a forward-looking policy to upskill and reskill workers facing job transitions. Reallocation of employees from emission-intensive to green-driven jobs requires significantly more investment in retraining programmes for people with lower levels of skills than for high-skilled people, underlining the importance of keeping upskilling and reskilling opportunities well-targeted, especially in the rapidly transforming sectors⁽²⁸⁴⁾. Germany addresses the green transition through many measures. The social assistance citizen's benefit (*Bürgergeld*) provides, for example, an additional continuing education and training benefit and other benefits to incentivise upskilling. Transfer companies offer assistance with job searches and skill training during mass layoffs while compensating workers for income losses through public funds and employer contributions.

Graph A10.3: Labour shortages in key sectors for the green transition in Germany and the EU (Q4-2024)



Source: Eurostat, LFS [jvs_q_nace2]

The shortage of skilled labour especially in the highly innovative and competitive ICT and AI sectors needs to be addressed to help in the digital transition. Businesses in the digital sector experience difficulties in finding workers with the right skillset. Compared to its aim of reaching 80% of adults (16-74 years old) possessing at least basic digital skills, the country only improved marginally between 2021 and 2023, from 48.9% to 52.2% and is still below the EU average of 55.6%. In particular, young people and people born outside the EU have relatively low levels of basic digital skills. A very large share of companies, one of the highest in the EU, also had issues finding ICT workers in 2024 (72.4% vs EU 57.5%⁽²⁸⁵⁾). Meanwhile, there is also a low share of students enrolled in ICT studies (see Annex 10). Any further progress made in improving productivity could therefore be limited by the underused potential of the digital transition to transform work. Together with reducing bureaucratic burdens for skilled third-country citizens enabling their employment in the IT sector, the government took measures to step-up investment in education, especially in mathematics, informatics, natural sciences and technology subjects, increasing adult-learning

⁽²⁸³⁾ IAB, 2024, *IAB-Forschungsbericht*, No. 5/2024, www.iwkoeln.de.

⁽²⁸⁴⁾ OECD, 2024, *Employment outlook 2024 - Country Notes: Germany*, oecd.org.

⁽²⁸⁵⁾ Eurostat, DESI [isoc_ske_itrcrs] share of companies of more than 10 workers looking to recruit ICT workers experiencing difficulties in filling those positions.

support and improving work condition incentives in the IT sector.

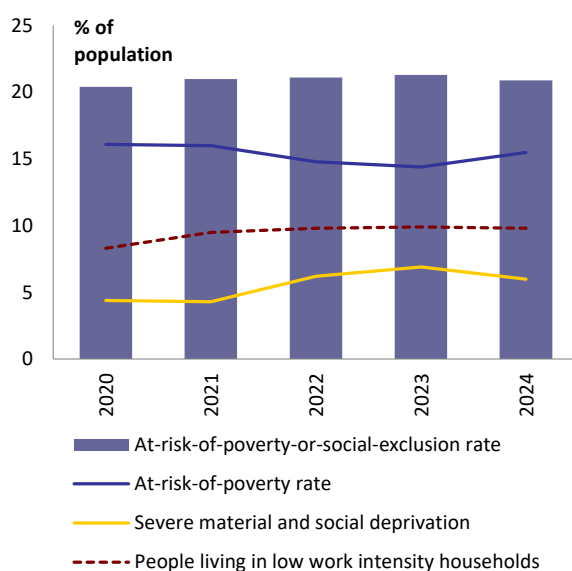
Real wages have just returned to the pre-pandemic level, while the minimum wage has shown sizeable increases. After having lagged inflation as the energy price shock hit, real wage growth returned from 2023, and real wages reached their pre-pandemic level by end 2024. The statutory minimum wage increased by just over 30% between January 2022 and January 2025, corresponding to an increase of more than 12% in real terms. This, along with the widespread use of one-off payments, including the the government's inflation bonus scheme (Inflationsausgleichsprämie) which had a ceiling of EUR 3 000 per employee, contributed to above-average increases of lower wages, and a reduction of the share of low-wage earners.

Germany's recovery and resilience plan (RRP) and the European Social Fund Plus (ESF+) provide comprehensive support to increase employability. The German RRP addresses, among other things, the digital transformation, especially that of education, and digital skills by establishing an education platform and educational centres of excellence focusing on creating the necessary infrastructure for digital content and retraining and further training. Investment in digital infrastructure supports digital transformation, higher growth and better jobs. The ESF+ measures complement the German RRP in these areas. The German ESF+ programmes contribute to a green, digital and resilient transformation of the economy while: i) supporting sustainable and quality employment (EUR 1.9 billion); ii) increasing competences and skills (EUR 2.2 billion); and iii) promoting social inclusion (EUR 2.2 billion) in line with the European Pillar of Social Rights and its action plan. Active labour market and inclusion measures are strongly focused on disadvantaged groups.



Germany has a strong social protection system but faces considerable challenges related to poverty, wealth inequality and housing that have been worsening over the past five years. The country is facing risks of poverty or social exclusion, a challenging housing market as well as high levels of wealth inequality. Among the contributing factors are the gradual recovery in real wages, the high tax burden on labour especially compared to other tax sources, the rising cost of living especially for housing and energy, and migration-related challenges. There have been noteworthy reforms to improve social conditions. Other reforms, for example the law that establishes the compliance with collective agreements in federal public procurement are planned or are still in the early planning stages. Furthermore, Germany is implementing the European Child Guarantee through its National Action Plan “New Opportunities for Children in Germany” (NAP).

Graph A11.1: **At-risk-of poverty or social exclusion rate for Germany and its components**



Source: Eurostat, EU-SILC [ilc_peps01n, ilc_li02, ilc_mdsc11, ilc_lvhl11n], break in series for 2020

Despite the positive impact of social benefits on poverty reduction, persistent social exclusion risks point to significant

challenges for the German social protection system. In 2024, the share of people at risk of poverty or social exclusion (AROPE) was at 21.1%, down slightly from 21.3% in 2023, close to the EU average (21%). The share of people with an income under the at-risk-of-poverty (AROP) threshold decreased in 2023, notably coinciding with the introduction of the ‘citizens’ benefit (*Bürgergeld*), before rising to 15.5% in 2024. The *Bürgergeld* reform aimed at simplifying and streamlining the welfare system, providing a more comprehensive and inclusive support network for those in need. The share of people who are severely materially or socially deprived (i.e. without access to the minimum necessary or desirable items to lead an adequate life) was at 6.2% in 2024, down from 6.9% in 2023. The indicator shot up from 4.4% in 2020 to above 6% in 2022, driven by the soaring cost of living, especially energy and transport, which are linked to the economic and inflationary effects of the Russian war of aggression against Ukraine. The rapidly increasing housing overburden costs since 2020 also created considerable material poverty risks.

The number of people living in (quasi-)jobless households is particularly high, partly linked to the decreasing average number of hours worked. While Germany set a 2030 poverty reduction target of reducing the number of people under 65 living in (quasi-)jobless households by 1.2 million compared to its 2020 level, their numbers actually grew by 1.158 million in 2024, to a total of 6.161 million ⁽²⁸⁶⁾. In relative terms, in 2024, 9.8% of the population under 65 was therefore living in a household with very low work intensity. This figure is significantly above the EU average (7.9%) and has been on the rise since 2020 when it was 8.3%. The percentage of women

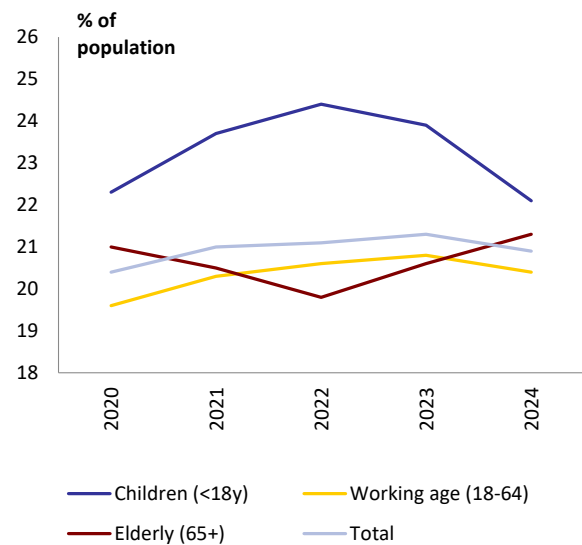
⁽²⁸⁶⁾ Although not set in the AROPE indicator used for the EU 2030 target, Germany’s target in terms of decreasing very low work intensity households is expected to have an equivalent impact on the AROPE rate.

working part-time due to care responsibilities was at 29.9% in 2024, higher than the EU average (26.4%), compared with 8.5% for men (EU: 6.4%). Germany also has one of the highest shares of non-EU-born adults living in very low work intensity households (19.5% vs 13.6% for the EU). Countering the rise in very low work intensity households requires boosting employment-oriented measures but also decreasing the existing fiscal disincentives for low-earners and secondary wage earners to work more hours (see Annex 13).

The risk of poverty among children decreased slightly. After peaking at 24.4% in 2022, the AROPE rate for children fell back to 23.9% in 2023 (EU average: 24.8%) and 22.9% in 2024 (EU: 24.2%), slightly below its level in 2020. However, the number of children at risk of poverty or social exclusion grew by 78 000 since 2020, to 3.222 million in 2024. This is also the case for the number of children living in very low work intensity households, which grew by 152 000 since 2020 to 1.475 million in 2024. In order to mitigate the impact of poverty on children, Germany is implementing the European Child Guarantee (ECG) as part of its 2023 action plan. Measures taken in line with the ECG could, among other things, counteract Germany's severe lack of childcare availability (306 000 to 430 000 places missing for under 3-year-olds) ⁽²⁸⁷⁾ and improve the inclusivity of the education system, as the educational outcomes of pupils are strongly linked to the income level of their parents (see Annex 10). The German recovery and resilience plan is dedicating EUR 500 million to creating additional childcare places by building new childcare facilities and refurbishing old ones.

⁽²⁸⁷⁾IW (2024), 306.000 Betreuungsplätze für unter Dreijährige fehlen. IW Report 40/2024. Bertelsmann, 2023, Mehr Plätze und bessere Qualität in Kitas bis 2030, [bertelsmann.de](https://www.bertelsmann.de)

Graph A11.2: Risk of poverty or social exclusion in different age groups



Source: Eurostat, EU-SILC [ilc_peps01n], break in series for 2020

Poverty risks are mitigated by social benefits, but many workers are not sufficiently protected despite the recent increase in the minimum wage. The impact of social benefits (excluding pensions) on reducing poverty is above average in the EU (35.7% vs EU 34.4%) but decreased sharply from 2023 when it was 41.7%. The considerable increases in the minimum wage since 2022 do not fully shield all workers from poverty, as 6.5% of them were at risk of poverty in 2024 (EU: 8.2%), rising to 14.2% for workers with a low level of education (EU: 17.4%) and 14.8% for single parents with dependent children (EU: 18.9%). Collective bargaining coverage stands at 49%, overall continuing a decline by 25 percentage points (pps) since 1998.

Some specific groups, migrants especially, but also persons with disabilities and the elderly, face greater social challenges. In 2024, people over 18 years old born outside of the EU had an AROPE rate of 39.6% (EU: 38.2%), compared to 17% for people born in Germany, producing a gap above the EU average (22.6 pps vs 20.2 pps for the EU). In that same year, there were around 10.5 million non-EU-born people residing in Germany. A considerable proportion of those are fleeing wars and hardship and follow a difficult path to

integration, including an estimated one million Ukrainians fleeing the Russian war of aggression since 2022, and around 800 000 Syrians who have been granted refugee status since 2015. Other specific populations at risk include individuals above the age of 65, for whom the risk of poverty or social exclusion was 21.2% in 2024, and higher among women (23.1% vs 18.7% for men). Nearly 700 000 pensioners are dependent on social assistance due to low pension rights ⁽²⁸⁸⁾. 39.5% of persons with severe disabilities were at risk of poverty or social exclusion in 2023, higher than the EU average (35.6%) and on the rise since 2021 (31%). This is a gap of 18.3 pps compared to persons without disabilities.

Social fairness is impacted by wealth inequality, where there is potential for fiscal revenues. Income inequality as measured by the S80/S20 ratio ⁽²⁸⁹⁾ was 4.49, slightly below the EU average (4.66). In terms of wealth inequality, Germany had one of the highest Gini coefficients in the euro area at 0.77 in Q2-2024 (euro area: 0.68), although due in a large part to a lower-than-average level of home ownership. 52.4% of Germans rent rather than own their homes, one of the highest levels in the EU (where the average is 31%). When homes are passed down as inheritance, this can deepen the wealth gap between renters and the inheritance owners as generations go by. At the same time, the wealthiest top 10% accounted for 60.9% of the country's net wealth, and the top 5% for 47.9%, some of the highest – albeit stabilising – levels in the euro area ⁽²⁹⁰⁾. The high level of wealth concentration is also linked to a higher overall saving rate, and thus to the savings overhang,

reflected in the current account surplus ⁽²⁹¹⁾. Germany is one of the Member States that relies the most on labour taxation in its tax mix while the revenue share from property taxation is below the EU average. The tax mix could be improved by alleviating pressure on labour and increasing taxation on wealth (see Annex 13), which would contribute to a better targeting and more growth-friendly sourcing of efforts to fight poverty risks.

The fight against the rising energy poverty is not targeted enough towards those most in need. The share of the population unable to keep their homes adequately warm in 2023 stood at 8.2%, lower than the EU average of 10.6%, but reflecting a significant increase from 2021 (+4.9 pps). Structural issues such as leaks, damp or rot affected 16% of the population, above the EU average of 15.5% and a 4 pps increase since 2020. Energy poverty policies include benefits under the minimum social security schemes, such as support for energy costs and a housing cost subsidy for low-income individuals. The country has implemented energy price brakes for gas and electricity, capping prices in 2023 for a substantial portion of household consumption. However, despite these interventions, structural measures specifically targeting vulnerable households remain limited. Energy poverty issues are addressed in Germany's national energy and climate plan through various energy efficiency, renewable energy and social welfare programmes. Yet there is a lack of measures explicitly focused on reducing energy poverty, with policies often targeting broader social security and housing benefits rather than being tailored to energy-poor households.

Housing costs overburden has increased significantly over time. In 2024, 12% of the population was living in households with housing costs above 40% of their total income, significantly above the EU average of 8.2%.

⁽²⁸⁸⁾ [Destatis](#), April 2024.

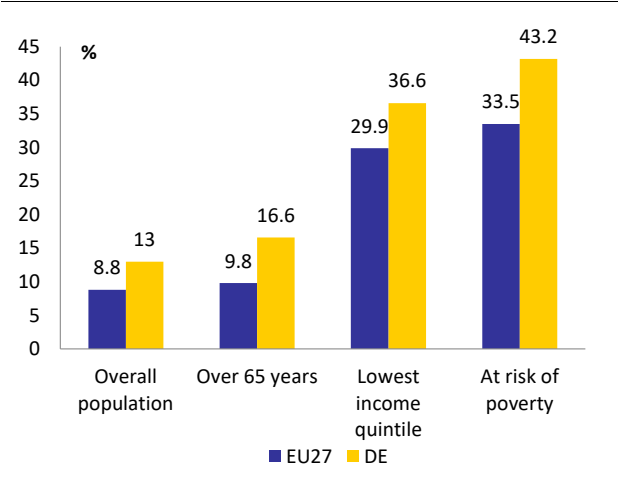
⁽²⁸⁹⁾ The ratio of total equivalised disposable income received by the 20% of the country's population with the highest income to that received by the 20% with the lowest income.

⁽²⁹⁰⁾ ECB Distributional Wealth Accounts and HFCS survey.

⁽²⁹¹⁾ European Commission (2024), In-Depth Review for Germany, 2024.

Some groups, such as older people and the lowest income quintile, were particularly affected at 15.3% (EU: 8.9%) and 33.3% (EU: 27.8%) respectively. Even among medium-income individuals the percentage was significantly higher than the EU average (7.2% vs 3.3%). Housing-induced poverty was a major poverty and social exclusion risk in Germany in 2024, as 37.5% of people who were at risk of poverty were also experiencing housing cost overburden (EU: 31.1%). Additionally, 5.0% of individuals faced arrears on utility bills, a 1.3 pp. increase compared to 2021, although still below the EU average of 6.9%. The Housing Benefit Plus Act, which entered into force in 2023, increased the number of households receiving housing benefits by 80% from the previous year, to around 1.2 million people, while also increasing the benefits available, from an average of EUR 191 per household in 2022 to EUR 297 in 2023.

Graph A11.3: **Housing cost overburden in different population groups (2023)**



Source: Eurostat, LFS [ilc_lvho07a, ilc_lvho07b]

The limited supply of affordable housing and the decline in social housing stock are major challenges for poverty and social risks. By early 2023, the estimated housing shortage had increased to 800 000 units⁽²⁹²⁾. The government target (as set out in 2021) of 400 000 newly built houses per year has been

⁽²⁹²⁾ Eduard Pestel Institut, 2024, Bauen und Wohnen 2024 in Deutschland, www.mieterbund.de.

getting further out of reach every year. 294 400 new units were built in 2023, of which only 23 000 were publicly funded (against a target of 100 000 to be publicly funded). The pressure on affordable housing was also increased by the steadily decreasing stock of subsidised social housing over the last twenty years, from approximately 2.5 million units in 2000 to around 1.1 million in 2023. The federal government increased support for building social housing from EUR 1 billion in 2020 to over EUR 3 billion in 2024. However, further measures could be useful. A strategic increase in the publicly funded housing stock could put downwards pressure on rents in the private housing sector. The government also announced its aim to eliminate homelessness entirely by 2030, while it is estimated at the beginning of 2024 that there were around 31 700 people sleeping rough, 439 500 people housed in the emergency housing assistance system, and 60 400 people staying involuntarily with relatives, friends or acquaintances due to the lack of their own home⁽²⁹³⁾. The national action plan against homelessness, 'Together for a home,' was approved in April 2024⁽²⁹⁴⁾.

House prices have increased over the last decade despite a recent correction in the context of high interest rates. Since 2015, house prices have increased by around 50% in nominal terms. After several years of house price growth, prices decreased by 8.5% in 2023 and by a further 1.6% in 2024. As a result, the estimated overvaluation gap, which stood at 20% in 2022, has decreased to around 7% in 2023 and is expected to have closed in 2024. While the number of housing completions has been relatively stable, the number of building permits decreased by more than 31% in 2023 and by 16.8% in 2024, implying a lower supply of new housing looking ahead, which could put upward pressure on house prices. In terms of financial stability, in February 2024 the

⁽²⁹³⁾ BMWSB, Wohnungslosenbericht 2024.

⁽²⁹⁴⁾ BMWSB, [Nationaler Aktionsplan gegen Wohnungslosigkeit](#) 2024.

European Systemic Risk Board (ESRB) concluded that the residential property market was subject to medium risks and the macroprudential policy mix was only partially appropriate and partially sufficient to mitigate the situation ⁽²⁹⁵⁾.

Overall, housing affordability has deteriorated over the last decade despite a recent improvement. From 2012 to 2022, house prices had increased by 80%, outpacing household income by 32%. The standardised house price-to-income ratio ⁽²⁹⁶⁾ increased steadily until 2021 before easing in the context of the house price correction. Housing supply was slow to respond, with German dwelling completions per capita remaining along the lowest in the EU during the 2010s. While the aggregate number of dwellings had increased roughly with population since 2012, this masks large regional discrepancies, with supply bottlenecks affecting large urban centres in particular. As a consequence, in 2022 the government tried to increase new home completions annually from less than 300 000 to its target of 400 000. During 2022-2023 house prices indeed declined strongly amid pressures from increased interest rates and falling real wages, leading to a significant improvement in price-to-income and rent-to-income ratios. Price pressures in large urban centres remains strong nonetheless. The housing market downturn significantly weighed on construction and building permits. New dwelling completions are forecast to decline to less than 200 000 during 2024-2026, which is likely to exacerbate the strong housing affordability bottlenecks in the seven large cities. Taking into account the cost of mortgage funding, the borrowing capacity of households worsened

over the last ten years as well, since the average household now needs a higher share of its annual income for mortgage payments. Having a rather large rental market, the ratio of new rents to incomes ⁽²⁹⁷⁾ increased over the last decade, especially in the city centres.

⁽²⁹⁵⁾ ESRB (2024), Follow-up Report on Vulnerabilities in the Residential Real Estate Sectors of the EEA Countries.

⁽²⁹⁶⁾ The price-to-income ratio compares changes in the house price index to that of households' gross disposable income per capita. A persistent rise of this ratio can result in houses becoming increasingly unaffordable, creating a mismatch between the supply of housing and the demand for it.

⁽²⁹⁷⁾ The rent-to-income ratio compares changes in the house rent index to that of households' gross disposable income per capita.

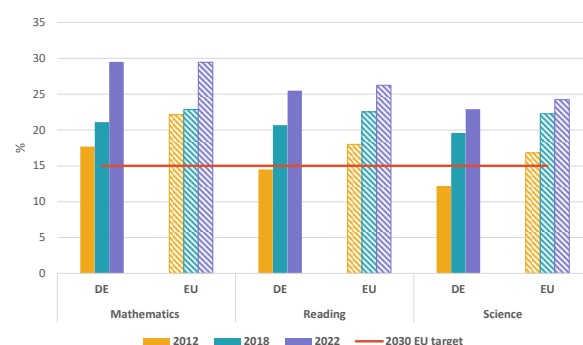
Germany has made progress in adult education, however shortages of skilled labour, weaknesses in education and low education outcomes are major threats to productivity and competitiveness. The education and training systems are under pressure from factors such as the ageing population, which has severely reduced the supply of skilled labour, and the new skills needed for the digital and green transitions. The performance of the education system is declining, putting human capital formation at risk. Highly innovative and competitive ICT and AI sectors are particularly affected by shortages of skilled labour, while the digital skills of the population are low, particularly among young people. Upskilling and reskilling efforts, notably for people with low levels of education and for the unemployed, are still needed.

Limited participation of disadvantaged children in early childhood education and care (ECEC) impacts foundational learning and increases inequalities. For children between three and the mandatory school age, participation in ECEC was 95.3% in 2023, 0.5 percentage point (p.p.) below the participation rate in 2015. For children under three, the participation in formal childcare fell since 2021 6.3 pps to 25.1% in 2024 ⁽²⁹⁸⁾. Participation in quality ECEC should allow children to make up for early disadvantage due to family background and language deficiencies ⁽²⁹⁹⁾. However, children from richer households participated more than twice as often than their poorer peers (13.8% AROPE compared to 32.4% non-AROE) ⁽³⁰⁰⁾. The right to a place in ECEC from the age of one was set in 2013 and the number of places has been substantially expanded, but significant unmet demand persists. For under-3-year-olds, there

is a severe lack of childcare availability (306 000 to 430 000 places missing) ⁽³⁰¹⁾. In addition to initiatives in the *Länder*, the Federal Government supports the improvement of quality in ECEC ⁽³⁰²⁾ as well as language development for children ⁽³⁰³⁾.

Lack of staff in ECEC continues to limit quality improvements. ECEC staff shortages continue to impede both the expansion of places and the improvement of quality. The National Report on Education 2024 estimates that additional 51 000 to 88 500 ECEC staff are needed, while other estimates identify potentially larger gaps ⁽³⁰⁴⁾. To address the shortage of skilled workers in childcare and all-day care in elementary schools, the Federal ministry for family affairs has developed jointly with the *Laender*, municipalities, social partners and experts a strategy to secure skilled labour in educational professions. The federally funded quality initiative included improved initial and continued training and better working conditions.

Graph A12.1: Underachievement rates by field, PISA 2012, 2018 and 2022 (%)



Source: OECD (2023).

The performance of the education system is declining. In the 2022 OECD PISA test, 29.5% of 15-year-olds underperformed in

⁽²⁹⁸⁾IILC_CAINDFORMAL; EU SILC are survey-based data and can show a stronger year-to-year variation compared to register-based data. The monitoring report cites 35.5% for 2022 based on registry data that are persistently higher compared to survey data.

⁽²⁹⁹⁾Autor:innengruppe Bildungsberichterstattung (ABBE), Bildung in Deutschland 2024.

⁽³⁰⁰⁾AROE: At risk of poverty or social exclusion.

⁽³⁰¹⁾IW, 2024, 306.000 Betreuungsplätze für unter Dreijährige fehlen. IW Report 40/2024. Bertelsmann, 2023, Mehr Plätze und bessere Qualität in Kitas bis 2030, [bertelsmann.de](https://www.bertelsmann.de).

⁽³⁰²⁾KiTa-Qualitätsgesetz und KiTa-Qualitäts- und -Teilhabeverbesserungsgesetz (KiQuTG).

⁽³⁰³⁾[Sprach-Kitas: Weil Sprache der Schlüssel zur Welt ist](https://www.sprach-kitas.de).

⁽³⁰⁴⁾Bertelsmann Stiftung, 2023, Fachkräfte-Radar für KiTa und Grundschule 2023, [bertelsmann.de](https://www.bertelsmann.de).

mathematics, 25.5% in reading and 22.9% in sciences. Underachievement has significantly increased over the last decade (+11.8, 11.0 and 10.7 pps in maths, reading and sciences, respectively), particularly among students from disadvantaged and migrant backgrounds, widening the socio-economic gap.

Schools face a serious shortage of teachers, especially in STEM disciplines like mathematics. There will be an annual shortage estimated about 23 500 to 40 000 teachers in the coming years ⁽³⁰⁵⁾. There is a fall in the number of teacher-training graduates, indicating a lack of appeal for the profession, despite relatively high wages. The share of lateral entrants among teachers more than doubled between 2015 and 2022, from 4% to 10%. To fill existing gaps, it is important to attract more teacher candidates, including through lateral entry. Continued training becomes more important to update teachers' skills. The most experienced teachers are not always employed in the most complex environments, potentially aggravating differences in education outcomes between schools.

Young people with disadvantaged and migrant backgrounds are disproportionately affected by low education outcomes. Underachievement among disadvantaged students saw a 9.9 pps rise between 2018 and 2022. In 2022, about half (46.6%) of students from disadvantaged backgrounds did not reach a minimum proficiency level in mathematics (vs 32.6% in 2012), compared to 8.4% of underperformance of students from non-disadvantaged backgrounds ⁽³⁰⁶⁾. Worryingly, about two thirds (64.0%) of students born abroad underachieve in mathematics, compared to 21.9% of non-immigrant students. Rates improve for the second generation at 34.5% ⁽³⁰⁷⁾. This is even more important as in

2022, 25.8% of students had a migrant background. Early school leaving in Germany remains since 2021 around 12.5% with a small drop to 12.4% in 2024. This is 3.1 pps above the EU average and still far from the 2030 9% European level target. It is considerably higher among young men and those with migrant backgrounds.

Compensating for socio-economic disadvantages is particularly difficult in countries with early tracking, such as Germany. Helping all pupils achieve their full potential would also require more resources, including the availability of teaching and support staff. To promote a more balanced resource allocation, the new 'Startchancen' programme, with EUR 20 billion allocated for the next ten years, encourages better matching of financing of individual schools with their actual challenges. It is co-financed at federal and regional level.

The share of top-performers in basic skills remains high but the declining trend threatens a strong position in STEM and research. 8.6% of German students reach the highest PISA levels in mathematics and 8.2% and 9.7% in reading and science, above the EU average in all three fields. However, their share has halved in mathematics since 2012 (-8.9 pps) and contracted by a fifth (-2.5 pps) in science. Combined with the increase of low performers, this will pose a challenge to the historically strong German position in STEM fields and research, the foundation of the German industrial mix.

Tertiary educational attainment continues to increase. In Germany, 30% of jobs require tertiary education, 48% of jobs require upper secondary education and 21% of jobs require lower secondary education or lower. The share of young tertiary graduates aged 25-34 increased by 12.1 pps between 2014 to 2024. At 40.5%, Germany is nevertheless still 3.7 pps behind the EU average (44.2%) and significantly below the 45% EU level target for 2030. At the same time, according to the European Centre

⁽³⁰⁵⁾ABBE, 2022. And [Prognose und Maßnahmen - Lehrermangel verschärft sich weiter \(deutsches-schulportal.de\)](#). See also: Anders, 2022.

⁽³⁰⁶⁾PISA 2022, Table I.B1.5.25.

⁽³⁰⁷⁾PISA 2022, Table I.B1.7.37.

for the Development of Vocational Training (CEDEFOP), 28% of people in Germany had a higher level of qualification than required for their job.

STEM skills remain strong despite signs of weakening. 35.8% of all students (International Standard Classification of Education (ISCED) level 5-8) are enrolled in STEM subjects, the highest share in the EU. However, one in two students did not finish their STEM studies in 2022, compared to one in six in 2012 ⁽³⁰⁸⁾. An increasing share of foreign students keeps student numbers in STEM high. STEM graduates as share of the population have increased, and in 2022 the country had by far the highest share of STEM graduates of all graduates in the EU (35.9% ⁽³⁰⁹⁾ vs EU average of 26.6%). Despite overall high participation rates, the gender gap in STEM studies remains an issue. Only 27.8% of STEM graduates are women, 5.6 pps below the EU average.

The well-functioning vocational education and training (VET) system continues to adapt to the green transition but faces rising concerns over underachievement and limited apprenticeship opportunities. In 2023, 57.7% of students in medium-level of education were enrolled in a VET programme, slightly above the EU average (54.2%), and participation in work-based learning was significantly higher than the EU average (94.5% vs 65.3% in 2024). However, concerns are growing over the basic skills of apprentices, reflecting a broader decline in educational performance, while many young people still lack apprenticeship opportunities. To address these issues, the Federal Government introduced an apprenticeship guarantee in 2024, particularly targeting people with a disadvantaged background. In addition, the Federal Employment Agency launched a national online portal for continuous VET,

serving as a one-stop shop for people seeking vocational training. In response to the green transition, Germany has modernised its VET system by integrating new cross-occupational training standards. Climate neutrality continues to drive VET reforms in a comprehensive approach.

Persistent skills and labour shortages are hindering competitiveness and the green transition. In the third quarter of 2024, labour shortages remained widespread (3.0% vs EU 2.3%), reflecting strong skills shortages given the low level of skills mismatches ⁽³¹⁰⁾ (11.4% vs EU 19.2% in 2024). Although the economic slowdown has led to a slight easing, 32% of SMEs continue to report that skills shortfalls are hampering their operations, with particularly high levels in the services sector (39.1%) ⁽³¹¹⁾. They are, however, relatively limited in the manufacturing sector (9.7%), which is more affected by economic headwinds. Labour shortages are also hindering the green transition. In 2023 they exceeded EU averages in many sectors key to the green transition, including construction (4.6% vs EU 3.1%), transportation (3.1% vs 2.2%), water supply, sewerage and waste management (2.3% vs 1.6%), energy supply (2.5% vs 1.7%) and manufacturing (2% vs 1.8%). Meanwhile, the share of employees working in environmental goods and services sectors remains among the lowest in the EU (2% vs EU average of 3.3% in 2022), while the share of employees in energy-intensive industries is one of the highest (4.7% in 2023). This highlights both the strong growth potential of Germany's green sector and the pressing need to develop a workforce with the appropriate skillset (see also Annex 8).

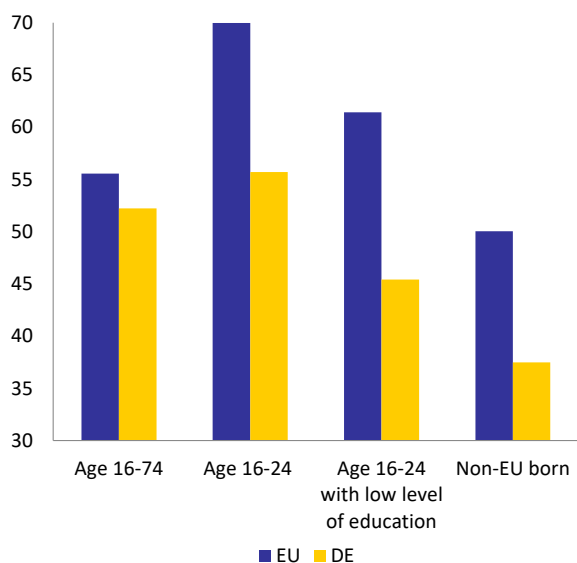
⁽³⁰⁸⁾DESTATIS, Eurostat.

⁽³⁰⁹⁾Eurostat [educ_uae_grado2] customised data.

⁽³¹⁰⁾The macroeconomic skills mismatch indicator measures the dispersion of employment rates across skill groups (proxied by qualification levels, with ISCED 0-2 low; 3-4 medium and 5-7 high).

⁽³¹¹⁾[KfW-ifo Skilled Labour Barometer, December 2024](#). More than 70% in law firms, tax accounting and auditing; more than 50% in road and rail transport services; and 50% in architecture and engineering firms.

Graph A12.2: **Population with at least basic digital skills, by age, country of birth and educational attainment**



Source: Eurostat, LFS [isoc_sk_dskl_i21]

The overall digital skills level of the population is low and not enough students are enrolled in ICT to reply to the needs.

The share of adults (16-74) with at least basic digital skills increased from 48.9% in 2021 to 52.2% in 2023. However, this is still below the EU average of 55.6%. In the context of the Digital Decade, Germany aims to reach 80% by 2030, implying that significant further efforts are needed. This is particularly important among the youth (aged 16-24), who experienced a decrease from 57.7% in 2021 to 55.7% in 2023 and continue to be well below the EU average of 70%, and among non-EU born (37.5% vs EU average of 50%). This lack of basic digital skills among adults hinders competitiveness while many companies have difficulties recruiting ICT specialists (72.4% vs EU average of 57.5%). On the other hand, only 7% of German students are enrolled in ICT, 3 pps below the EU average ⁽³¹²⁾. The share of women among enrolled ICT students (21.7%) is just above the EU average (20.2%), but overall low. The slow pace of digital transformation in Germany further hampers the competitiveness

⁽³¹²⁾EE and FI 10.7%, HU 8.3%, LU 9.8%.

of the economy. Progress on digital infrastructure, digital skills and digital public administration is an important prerequisite to reducing the administrative burden on firms and boosting the use of digital technologies to stimulate productivity growth.

The adult learning system is generally well-positioned to address upskilling and reskilling needs, although challenges remain for disadvantaged groups.

Adult learning participation registered one of the highest increases between 2016 and 2022 (excluding guided on-the-job training: +7.3 pps, vs +2.1 pps at EU level), reaching 53.7%, well above the EU average of 39.5%. The country is on track to reach its national target of 65%. Access, information and guidance for disadvantaged groups continue nevertheless to pose challenges ⁽³¹³⁾. People with low levels of education participate significantly less in training (30%) than their peers with medium or high levels of education (49.9% and 71.5%, respectively), while participation among the unemployed (31.7%) remains markedly lower than among the employed (58.4%). The German *Länder* have a well-established framework for adult learning, with 14 out of 16 offering paid educational leave and eight providing training vouchers, partly funded by the European Social Fund Plus (ESF+). At federal level, the Upgrading Training Assistance Act (AFBG) provides support for people preparing for advanced vocational qualifications. The National Skills Strategy strengthens continuous education and training, while the National Decade for Literacy and Basic Education (2016-2026) was designed to raise reading and writing skills as well as the level of basic education of adults in Germany. The Act to Strengthen the Promotion of Vocational Training and Skills (Skills Act) adopted in 2023 improves the promotion of

⁽³¹³⁾Bilger, F. & Koubek, E. (2024). Continuing education behaviour in Germany in 2022: Results of the Adult Education Survey - AES Trend Report ([Weiterbildungsverhalten in Deutschland 2022. Ergebnisse des Adult Education Survey – AES-Trendbericht](#)).

continuing vocational education and training of employed workers and introduces a skills development benefit. The Federal Employment Agency (Germany's public employment service - PES) provides support measures to unemployed people pursuing VET and training, including accommodation, travelling and childcare expenses. These measures have been recently expanded by the Skills Development Opportunities Act (*Qualifizierungschancengesetz*) and the Work of Tomorrow Act (*Arbeits-von-morgen-Gesetz*). The citizen's allowance (*Bürgergeld*) continues to be paid through the PES and persons entitled to unemployed benefits receive a top-up (*Bürgergeldbonus*) during VET periods. To increase the labour market participation and access to training of carers, and especially women, it is also crucial to continue expanding childcare availability.

Germany is exploring introducing individual learning accounts to further develop its adult education system. As part of a pilot project, which incorporates some key policy elements of individual learning accounts (ILAs) and involves the social partners, Germany is considering providing personal entitlements to people with low incomes who need upskilling and reskilling. The framework would ensure that these entitlements are (i) transferable across professional status, (ii) employer-independent, and (iii) accumulable over a three-year period. Developing ILAs would require expanding the adult learning entitlements to continuous VET provided by the PES to a broader group of persons. At the moment, these are limited to early school leavers seeking to obtain a school diploma. In addition, further enhancing the digital infrastructure through a single national registry for upskilling and reskilling courses could improve quality assurance and facilitate access for users to their individual accounts. (On skills related support of the ESF+ and the RRF, see: Annex 8).



Table A13.1: Social Scoreboard for Germany

Social Scoreboard for Germany						
Equal opportunities and access to the labour market		Adult participation in learning (during the last 12 months, excl. guided on the job training, % of the population aged 25-64, 2022)				53,7
		Early leavers from education and training (% of the population aged 18-24, 2024)				12,4
		Share of individuals who have basic or above basic overall digital skills (% of the population aged 16-74, 2023)				52,2
		Young people not in employment, education or training (% of the population aged 15-29, 2024)				8,5
		Gender employment gap (percentage points, population aged 20-64, 2024)				7,3
		Income quintile ratio (\$80/\$20, 2024)				4,49
Dynamic labour markets and fair working conditions		Employment rate (% of the population aged 20-64, 2024)				81,3
		Unemployment rate (% of the active population aged 15-74, 2024)				3,4
		Long term unemployment (% of the active population aged 15-74, 2024)				0,9
		Gross disposable household income (GDHI) per capita growth (index, 2008=100, 2023)				112,9
Social protection and inclusion		At risk of poverty or social exclusion (AROPE) rate (% of the total population, 2024)				21,1
		At risk of poverty or social exclusion (AROPE) rate for children (% of the population aged 0-17, 2024)				22,9
		Impact of social transfers (other than pensions) on poverty reduction (% reduction of AROP, 2024)				35,7
		Disability employment gap (percentage points, population aged 20-64, 2024)				22,0
		Housing cost overburden (% of the total population, 2024)				12,0
		Children aged less than 3 years in formal childcare (% of the under 3-years-old population, 2024)				25,1
		Self-reported unmet need for medical care (% of the population aged 16+, 2024)				0,8
Critical situation	To watch	Weak but improving	Good but to monitor	On average	Better than average	Best performers

(1) Update of 5 May 2025. Members States are categorised based on the Social Scoreboard according to a methodology agreed with the EMCO and SPC Committees. Please consult the Annex of the Joint Employment Report 2025 for details on the methodology (<https://employment-social-affairs.ec.europa.eu/joint-employment-report-2025-0>).

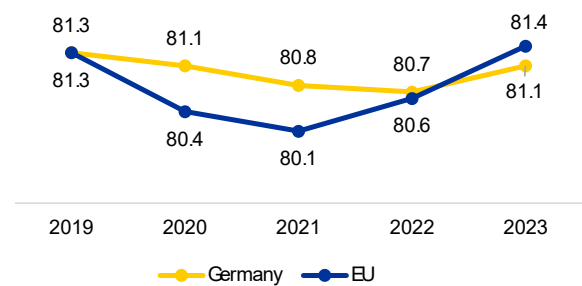
Source: Eurostat

ANNEX 14: HEALTH AND HEALTH SYSTEMS

Germany's health system faces challenges that must be addressed to improve public health, social equity, and to boost economic competitiveness. Germany's health system remains primarily hospital-centred, with an increasing emphasis on prevention. With a high level of health spending compared to the EU average, the country is planning a major hospital reform to: (i) reduce inpatient cases; (ii) enhance coordination and integration across care settings; and (iii) ensure cost effectiveness and quality. This reform also aims to tackle challenges related to the sustainability of the health workforce arising from demographic changes.

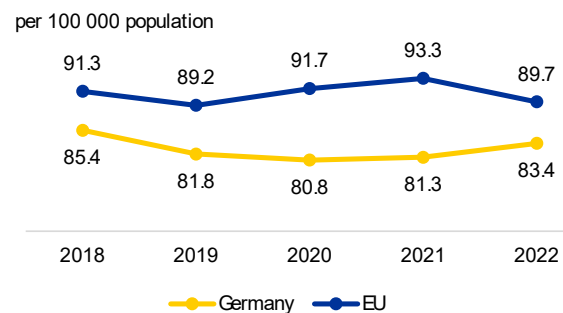
Life expectancy at birth in Germany has nearly returned to pre-COVID-19 levels and remains just below the EU average. This contrasts with the pre-pandemic period, when life expectancy in Germany was above the EU average. Germany performs relatively well in preventing deaths from treatable conditions, indicating an effective healthcare system. Diseases of the circulatory system (cardiovascular diseases) are the leading cause of death - with rates slightly above the EU average, followed by cancer, with large disparities between regions. Germany has launched the National Action Plan "IN FORM", an initiative to promote healthy diets and physical activity. Germany participates in several joint actions funded by EU4Health, aimed at preventing cancer and other non-communicable diseases, while also developing networks for better care, including European Reference Network for rare diseases.

Graph A14.1: Life expectancy at birth, years



Source: Eurostat (demo_mlexpec)

Graph A14.2: Treatable mortality



Age-standardised death rate (mortality that could be avoided through optimal quality healthcare)

Source: Eurostat (hlth_cd_apr)

Germany's health system is strongly hospital-centred. In 2022, health spending per person was the highest in the EU, with the majority covered by public funds. Out-of-pocket payments stood at 10.7% of total health expenditures, below the EU average of 14.3%. Germany's high number of hospital beds (635 per 100,000 people in 2022, well above the EU average) reflects its hospital-focused care model. To lower inpatient cases, promote outpatient care, and ensure cost-effectiveness and quality, a new law has been passed to restructure the hospital sector. As part of the reform, a new hospital reimbursement system aims to remove incentives for unnecessary medical procedures by partially replacing the current payment model with flat fees and newly defined service groups. A transformation fund of up to EUR 50 billion is planned to support hospital restructuring from 2026 to 2035. The goal is to centralize complex procedures in well-equipped hospitals and better integrate inpatient care with outpatient and community

Table A14.1: Key health indicators

	2019	2020	2021	2022	2023	EU average* (latest year)
Cancer mortality per 100 000 population	243.8	240.3	235.7	237.3	n.a.	234.7 (2022)
Mortality due to circulatory diseases per 100 000 population	349.9	348.3	345.1	361.5	n.a.	336.4 (2022)
Current expenditure on health, purchasing power standards, per capita	4 550	4 811	5 145	5 317	n.a.	3 684.6 (2022)
Public share of health expenditure, % of current health expenditure	84.0	85.3	85.5	86.7	85.9	81.3 (2022)
Spending on prevention, % of current health expenditure	3.5	3.5	6.6	7.9	n.a.	5.5 (2022)
Available hospital beds per 100 000 population**	661	652	645	635	n.a.	444 (2022)
Doctors per 1 000 population*	4.4	4.5	4.5	4.5	n.a.	4.2 (2022)*
Nurses per 1 000 population*	11.8	12.0	12.0	12.0	n.a.	7.6 (2022)*
Mortality at working age (20-64 years), % of total mortality	14.0	13.5	13.7	13.0	13.0	14.3 (2023)
Number of patents (pharma / biotech / medical technology)	1789	1574	1286	899	1210	29 (2023)***
Total consumption of antibacterials for systemic use, daily defined dose per 1 000 inhabitants****	:	:	:	:	13.3	20.0 (2023)

*The EU average is weighted for all indicators except for doctors and nurses per 1 000 population, for which the EU simple average is used based on 2022 (or latest 2021) data except for Luxembourg (2017). Doctors' density data refer to practising doctors in all countries except Greece, Portugal (licensed to practise) and Slovakia (professionally active). Density of nurses: data refer to practising nurses (EU recognised qualification) in most countries except France and Slovakia (professionally active) and Greece (hospital only). **Available hospital beds' covers somatic care, not psychiatric care. ***The EU median is used for patents.

Source: Eurostat database; European Patent Office; ****European Centre for Disease Prevention and Control (ECDC) for 2023.

nursing services, expanding outpatient options for patients.

Germany prioritises disease prevention. In 2022, Germany allocated 7.9% of its healthcare budget to prevention in 2022, surpassing the EU average of 5.5%. Despite this, preventable mortality increased by 3% between 2012 and 2022, but remaining below the EU average. Germans consume fewer fruits and vegetables than the EU average. However, vaping is more prevalent, particularly among young adults, with 4.8% using e-products, exceeding the EU average of 2.7% ⁽³¹⁴⁾.

Germany's healthcare workforce is aging, with a growing reliance on migrant workers to fill labor gaps. Germany has a high number of doctors and nurses, but its medical workforce is aging rapidly, with 36% of doctors between 55-64 years old (highest in the EU) and fewer than 20% under 35. Germany has a relatively low number of new medical graduates, with only 12 per 100,000 population, and has seen a modest increase in medical and nursing student admissions compared to other countries.

Germany's healthcare workforce is becoming increasingly reliant on foreign doctors, with 40% of all foreign doctors coming from EU countries and 60% from non-EU countries. The country is also experiencing a growing outflow of doctors, primarily to Switzerland. Despite having a high number of nurses per capita, Germany faces shortages in certain areas, such as hospital and long-term care facilities. Temporary staff has become costly, with expenses reaching nearly EUR 2.9 bn in 2022, double than in 2015. Increasing number of hospital staff (around 33,000, almost double than in 2010) work without formal employment contracts, primarily among non-doctors.

Germany's health system has significant potential to drive innovation and growth in the EU's medical sector. Germany is one of the EU largest investors in health R&D, with high levels of public spending in this area. The country leads the EU in medical innovation, with the highest number of European patents (1,210) granted in 2023 in the areas of pharmaceuticals, biotechnology, and medical devices ⁽³¹⁵⁾. Germany's pharmaceutical sector is robust, with a record EUR 14.4 bn invested in R&D, driven by large multinational companies

⁽³¹⁴⁾OECD/European Commission (2024), [Health at a Glance: Europe 2024 - State of Health in the EU Cycle](#), Chapter 4.

⁽³¹⁵⁾European Patent Office, [Data to download | epo.org](#).

headquartered in the country. The European Federation of Pharmaceutical Industries and Associations ranks Germany as the first for R&D investment in the pharmaceutical sector based on the country of activity, with a budget of EUR 9.4 bn ⁽³¹⁶⁾. R&D activities are also funded through the German recovery and resilience plan. This includes a special programme to accelerate research and development on vaccines against SARS-CoV-2.

Despite recent relevant progress, Germany is lagging behind in the digitalisation of its health system. Germany has seen a slight increase in online healthcare usage, with 5.3% of people accessing their health records online and 11% using online health services, but these numbers remain below the EU average (see Annex 6). Germany still lags behind in digital health adoption. Sizeable investments planned under the recovery and resilience plan focus on IT-related investment in hospitals and public health services. Complementary investments are also planned under the cohesion policy aiming to support e-health services and applications and to boost the digital transformation of the healthcare sector. Additionally, two landmark Digital Acts were passed in 2024, aiming to enhance healthcare through electronic patient records, e-prescriptions, and improved health data analysis for research and development. (see Annex 3).

⁽³¹⁶⁾See [EFPIA](#).

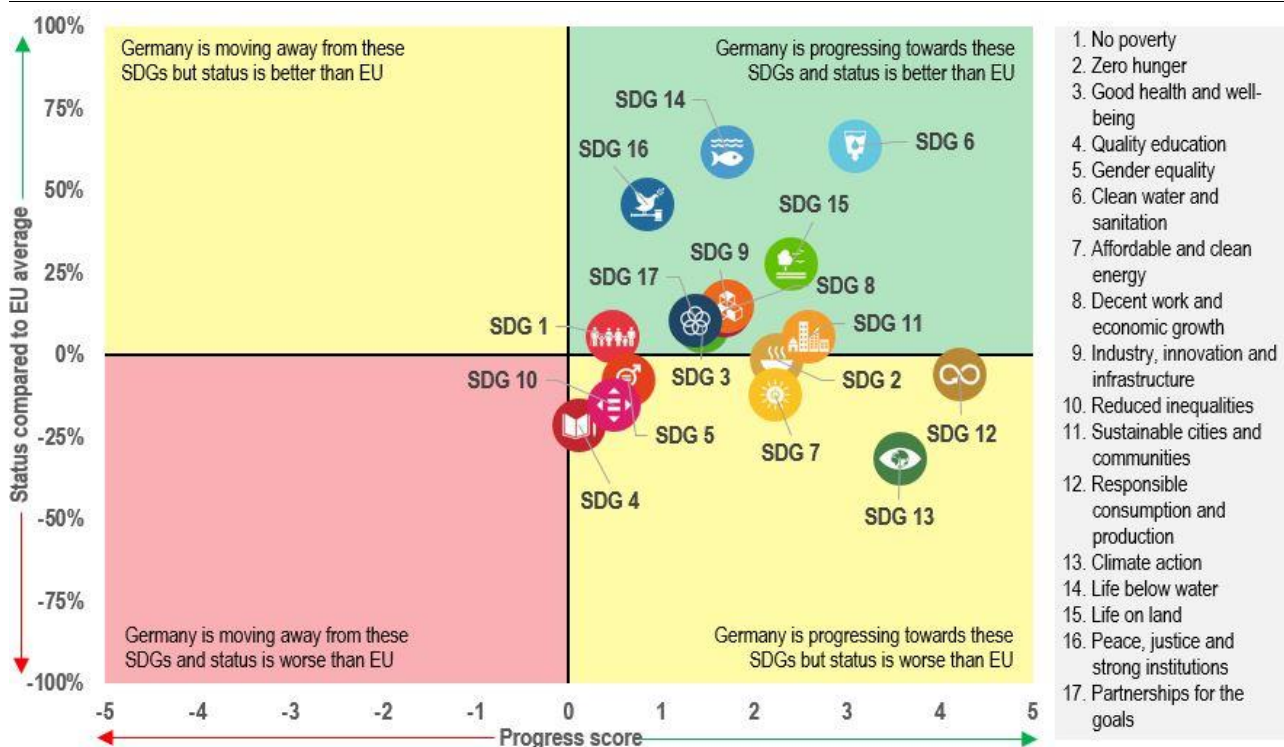


This Annex assesses Germany's progress on the Sustainable Development Goals (SDGs) along the dimensions of competitiveness, sustainability, social fairness and macroeconomic stability. The 17 SDGs and their related indicators provide a policy framework under the UN's 2030 Agenda for Sustainable Development. The aim is to end all forms of poverty, fight inequalities and tackle climate change and the environmental crisis, while ensuring that no one is left behind. The EU and its Member States are committed to this historic global framework agreement and to playing an active role in maximising progress on the SDGs. The graph below is based on the EU SDG indicator set developed to monitor progress on the SDGs in the EU.

Germany performs well and is further

improving on SDGs on *competitiveness* (SDGs 8 and 9) but needs to catch up with the EU average on quality education (SDG 4). Germany performs above the EU average on SDG 8 (Decent work and economic growth) and on SDG 9 (Industry, innovation and infrastructure). With 3.11% of GDP allocated to R&D in 2023, Germany has some of the highest R&D spending in the EU. The share of R&D personnel in the active population rose from 1.71% in 2018 to 1.91% in 2023 (EU: 1.56% in 2023). However, Germany is performing below the EU average on SDG 4 (Quality education), which is hampering growth and competitiveness. The share of low-achieving 15-year-olds in mathematics increased strongly from 21.1% in 2018 to 29.5% in 2022. A rising number of young people leave education early (10.3% in 2019, vs 12.4% in

Graph A15.1: Progress towards the SDGs in Germany



For detailed datasets on the various SDGs, see the annual Eurostat report '[Sustainable development in the European Union](#)'; for details on extensive country-specific data on the short-term progress of Member States: [Key findings – Sustainable development indicators – Eurostat \(europa.eu\)](#). A high status does not mean that a country is close to reaching a specific SDG, but signals that it is doing better than the EU on average. The progress score is an absolute measure based on the indicator trends over the past five years. The calculation does not take into account any target values, as most EU policy targets are only valid for the aggregate EU level. Depending on data availability for each goal, not all 17 SDGs are shown for each country.

Source: Eurostat, latest update of 28 April 2025. Data refer mainly to the period 2018–2023 or 2019–2024. Data on SDGs may vary across the report and its annexes due to different cut-off dates.

2024), well above the EU average (9.3% in 2024). Adult participation in learning in the past four weeks is below the EU average (DE: 9.6%; EU: 13.3% in 2024). The need for improving skills is also reflected in the low share of adults with at least basic digital skills (52.2% vs 55.6% in the EU in 2023). The German recovery and resilience plan (RRP) targets bottlenecks for the digitalisation of administration and the economy, for instance by supporting the digitalisation of vehicle supplier companies. It also helps address challenges related to digital skills.

While Germany performs well on several SDGs related to sustainability (SDGs 6, 9, 11, 14, 15), though improving, it still needs to catch up with the EU average on zero hunger (SDG 2), responsible consumption and production (SDG 12) as well as on affordable and clean energy (SDG 7) and climate action (SDG 13). Germany has made some progress on energy consumption indicators, including the share of renewable energy in gross final energy consumption (SDG 7; from 16.7% in 2018 to 21.6% in 2023). Nevertheless, it remains below the EU average (24.6%). Regarding affordable energy, the share of people unable to keep their home adequately warm has increased significantly from 2.7% in 2018 to 8.2% in 2023. On SDG 13 (Climate action), net greenhouse gas emissions decreased from 11.3 tonnes per capita in 2018 to 8.9 tonnes per capita in 2023, although they still remain above the EU average (6.8 tonnes per capita in 2023). Average CO₂ emissions per km from new passenger cars fell considerably between 2018 and 2023 (SDG 12; 157 g in 2018 vs 113 g in 2023) but are above the EU average (107.6 g in 2023). Germany performs well on sustainable agricultural production and has reduced agriculture's environmental impact. It reduced nitrate in groundwater and the use and risk of chemical pesticides (SDG 2), although both remain above the EU average, and achieved reductions in premature deaths due to fine particulate matter (SDG 11). Various measures in Germany's RRP that support the use of renewable hydrogen in industry and the

transport sector will help reduce greenhouse gas emissions and increase the share of renewable energy.

Germany is performing well on some SDG indicators related to social fairness (SDGs 1, 3, 8). However, though improving, it still needs to catch up with the EU average on quality education (SDG 4), gender equality (SDG 5), affordable and clean energy (SDG 7) and reducing inequalities (SDG 10). Germany generally performs better than the EU average in areas linked to poverty, health and decent jobs and growth. On health (SDG 3), road traffic deaths and fatal accidents at work have declined and are proportionally below their level in the rest of the EU. At the same time, 19% of the adult population was obese in 2019, up from 16.9% in 2014 and above the EU average of 14.8% (in 2022) and healthy life years declined from 66.4 years in 2016 to 65.6 years in 2021 (though remain above the EU average of 63.6 years in 2021). On gender equality (SDG 5), the unadjusted gender pay gap is particularly high in Germany (17.6%, vs 12% in the EU in 2023) and the impact of caring responsibilities on women's employment is higher than the EU average. While the overall share of people at risk of poverty or social exclusion (SDG 1) is aligned with the EU average, it is rising (21.3% in 2023 vs 18.5% in 2018), and there is a significant urban-rural gap (SDG 10). Housing cost overburden is worse than the EU average in 2023 (13%; EU: 8.8%). There is room for improvement on integrating non-EU citizens into education and training and the labour market (SDG 10). Germany performs worse than the EU average on EU/non-EU citizenship gaps for early school leaving (17.6 percentage points (pps) vs 15.4 pps in the EU in 2024), as well as for the share of young people not in education, employment or training (13.7 pps vs 9.9 pps in the EU in 2024) and for the employment rate (21.5 pps, vs 12.5 pps in the EU in 2024). Tertiary educational attainment (SDG 4), although improving, remained below the EU average in 2024 (40.5%; EU: 44.2%). The German RRP promotes apprenticeships and

helps improve educational outcomes for students with a learning backlog, often from disadvantaged backgrounds.

Germany is performing well on SDG indicators related to *macroeconomic stability* (SDGs 8, 16, 17) and has further improved its performance.

Germany performs well on SDG 16 (Peace, justice and strong institutions), showing a stable and secure environment for pursuing economic activities, and on SDG 8 (Decent work and economic growth). Germany further increased its employment rate from 79.6% in 2019 to 81.3% in 2024 (vs EU 75.8% in 2024). The share of young people not in education, employment or training reached 8.5% in 2024, below the EU average (11%), and long-term unemployment is low (0.9% vs EU 1.9% in 2024). In contrast, at 20.9% of GDP in 2024, Germany's investment share, remained below the EU average of 21.7% of GDP. The German RRP includes reforms to speed up public investment and tackle investment bottlenecks to unlock private investment and reduce the savings-investment imbalance.

As the SDGs form an overarching framework, any links to relevant SDGs are either explained or depicted with icons in the other Annexes.



Germany faces structural challenges in a wide range of policy areas, as identified in the country-specific recommendations (CSRs) addressed to the country as part of the European Semester. They refer, among other things, to the budgetary framework and fiscal governance, taxation policy, pension systems and active ageing, digital connectivity, infrastructure and market functioning, digitalisation of the public administration and public services, business environment, skills, vocational education and adult learning.

The Commission has assessed the 2019-2024 CSRs considering the policy action taken by Germany to date and the commitments in its recovery and resilience plan (RRP). At this stage, Germany has made at least 'some progress' on 61% of the CSRs ⁽³¹⁷⁾, and 'limited progress' on 38% (Table A16.2).

EU funding instruments provide considerable resources to Germany by supporting investments and structural reforms to increase competitiveness, environmental sustainability and social fairness, while helping to address challenges identified in the CSRs. In addition to the EUR 30.3 billion funding from the Recovery and Resilience Facility (RRF) in 2021-2026, EU cohesion policy funds ⁽³¹⁸⁾ are providing EUR 19.8 billion to Germany (amounting to EUR 38.8 billion with national co-financing) for 2021-2027 ⁽³¹⁹⁾ to boost regional competitiveness and growth. Support from these instruments combined represents around

1,2% of 2024 GDP ⁽³²⁰⁾. The contribution of these instruments to different policy objectives is outlined in Graphs A16.1 and A16.2. This substantial support comes on top of financing provided to Germany under the 2014-2020 multiannual financial framework, which financed projects until 2023 and has had significant benefits for the economy and German society. Project selection under the 2021-2027 cohesion policy programmes has accelerated.

The German RRP contains 28 investments and 17 reforms to stimulate sustainable growth and allow for decarbonising and digitalising all aspects of German society. A year before the end of the RRF timespan, implementation is well on its way with 65 % of the funds disbursed ⁽³²¹⁾. At present, Germany has fulfilled 54% of the milestones and targets in its RRP. Nevertheless, efforts are needed to ensure completion of all RRP measures by 31 August 2026.

Germany also receives funding from several other EU instruments, including those listed in table A16.1. Most notably, the common agricultural policy (CAP) provides Germany with an EU contribution of EUR 30.7 billion under the CAP strategic plan for 2023-2027 ⁽³²²⁾. A further EUR 2 billion are available under the Asylum, Migration and Integration Fund (AMIF), together with the border management and visa instrument (BMVI) and internal security funds. Furthermore, operations amounting to EUR 2.2 billion ⁽³²³⁾ have been signed under the InvestEU instrument backed by the EU

⁽³¹⁷⁾ 5% of the 2019-2024 CSRs have been fully implemented, 10% substantially implemented, and some progress has been made on 46%.

⁽³¹⁸⁾ In 2021-2027, cohesion policy funds include the European Regional Development Fund, the European Social Fund Plus and the Just Transition Fund. The information on cohesion policy included in this annex is based on adopted programmes with the cut-off date of 5 May 2025.

⁽³¹⁹⁾ European territorial cooperation (ETC) programmes are excluded from the figure.

⁽³²⁰⁾ RRF funding includes both grants and loans, where applicable. GDP figures are based on Eurostat data for 2024.

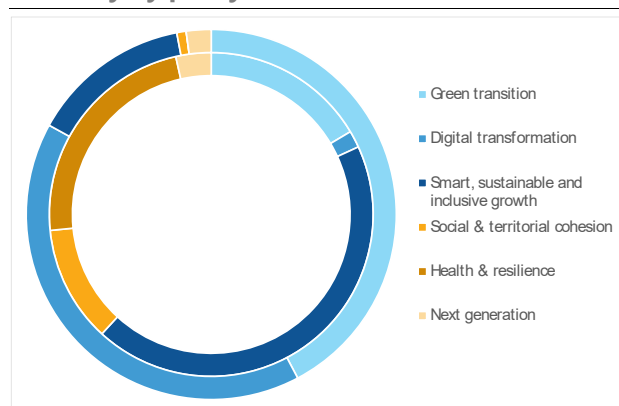
⁽³²¹⁾ As of mid-May 2025, Germany has submitted 2 payment requests.

⁽³²²⁾ An overview of Germany's formally approved strategy to implement the EU's common agricultural policy nationally can be found at: [Germany - CAP Strategic Plan](#).

⁽³²³⁾ Data reflect the situation on 31.12.2024.

guarantee, improving access to financing for riskier operations in Germany.

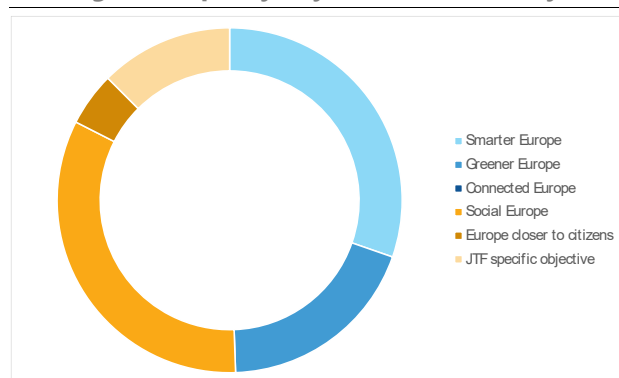
Graph A16.1: Distribution of RRF funding in Germany by policy field



(1) Each RRP measure helps achieve the aims of two of the six policy pillars of the RRF. The primary contribution is shown in the outer circle, while the secondary contribution is shown in the inner circle. Each circle represents 100% of the RRF funds. Therefore, the total contribution to all pillars displayed on this chart amounts to 200% of the RRF funds allocated.

Source: European Commission.

Graph A16.2: Distribution of cohesion policy funding across policy objectives in Germany



Source: European Commission

Cohesion policy funds aim to increase the productivity and competitiveness of German firms and improve the business environment. The European Regional Development Fund (ERDF) strengthens research and innovation capacities and supports the uptake of advanced technologies, mainly in small and medium-sized enterprises (SMEs). 43 500 businesses are expected to receive support in 2021-2027. Germany has so

far reprogrammed EUR 891 million of EU funding from the ERDF, the Just Transition Fund (JTF) and the European Social Fund + (ESF+) to support critical technologies across the sectors covered by the Strategic Technologies for Europe Platform (STEP) in five regions. This funding will support SMEs, large companies (in the Just Transition regions), as well as vocational training and research institutions – for instance, laboratory infrastructure – in the fields of critical digital technologies, biotechnology and the circular economy. In addition, other programmes support deep-tech innovation, green and resource-efficient technologies and technology transfer activities between universities, research organisations and SMEs. The European Social Fund Plus (ESF+) is providing EUR 2.13 billion for education and training measures. EUR 1.13 billion is allocated to improving equal access to education and training as well as improving the quality, inclusiveness and labour market relevance of education and training. EUR 809 million is allocated to life-long learning, in particular flexible upskilling and reskilling opportunities for all and new skills requirements based on labour market needs.

Other funds are contributing to competitiveness in Germany, for instance through open calls. Germany is one of the Member State benefiting most of the Connecting Europe Facility (CEF) for Transport and Energy funding key infrastructure projects that enhance connectivity, sustainability, and efficiency along the Trans-European Transport Network. A key project is the Fehmarnbelt Tunnel, connecting Denmark and Germany. CEF Digital has also advanced the deployment of 5G in smart communities. Horizon Europe has supported research and innovation, from scientific breakthroughs to scaling up innovations, with the European Research Council, Climate, Energy and Mobility and Digital, Industry and Space as top priorities in Germany. The Technical Support Instrument has supported Germany for the green and digital transition, including the adoption of innovative technologies (such as AI),

developing Green Budgeting practices at the regional level and helping with reform projects in the education sector.

Germany's RRP also contains ambitious measures to improve the business environment and competitiveness. Among the measures covered by the second payment request submitted over the past year, Germany has implemented some measures relating to the reduction of barriers to investment. Examples include the expansion of consulting services for the public sector and the joint Federal-Land programme for an efficient administration that benefits citizens and businesses.

EU funds are playing a significant role in promoting environmental sustainability and green transition in Germany during the current seven-year EU budget (multiannual financial framework). EUR 6.3 billion of cohesion policy funding is used to support the green transition. This contributes, for instance, to the growth in waste-recycling capacity by 285 000 tonnes/year and it provides EUR 36.5 million in support for investment against natural risks. The ERDF supports improvements in energy efficiency and the use of renewable energy. Germany's CAP strategic plan allocates approximately EUR 8.9 billion of EU funds to environmental and climate-related objectives. This supports farmers in applying more sustainable practices, such as reduced use of fertilisers and pesticides, organic farming and non-productive areas for biodiversity. Additionally, approximately EUR 624 million of EU funding is allocated to investment, for example in sustainable water resources management, flood and coastal protection and restoration of habitats.

Germany's RRP, including the REPowerEU chapter, has a comprehensive set of reforms and investments for the green transition. The measures covered by the second payment request submitted over the past year include: (i) reforms in climate and energy policy, such as advancing Germany's national hydrogen

strategy, enhancing on-and offshore wind energy and promoting clean mobility; and (ii) investment in sustainability, such as electric vehicles and use of renewable energies for business and household sectors as well as the energy efficiency of buildings.

Germany's RRP is helping Germany in enhancing the digitalisation of public services for citizens and businesses. The measures covered by the second payment request submitted over the past year covered reforms related to the digitalisation of public administration.

Promoting fairness, social cohesion and improving access to education and training measures and social inclusion are among the key priorities of EU funding in Germany. In the four German regions where the phasing-out of fossil fuel extraction and related activities are expected to have the strongest socio-economic impacts, the JTF is boosting innovation, promoting economic diversification and counteracting deindustrialisation, supporting around 4 300 businesses. It is expected that over 27 000 people will benefit from improved education facilities and nearly 7 400 will be able to participate in professional training. In addition to the education and training measures (EUR 2.13 billion) the ESF+ also supports labour market measures (EUR 1.8 billion), social inclusion (EUR 2.14 billion) and social innovation (EUR 0.24 billion). Almost 13% of the ESF+ funding is allocated to youth employment measures and more than 5.5% to combating child poverty. In addition, the AMIF programme promotes, among others, legal migration pathways, family reunification, and structured migration operations, with a focus on pre-departure measures to equip migrants with basic knowledge of the German language and society before arrival. It also plays a key role in enhancing reception conditions and addressing the needs of vulnerable individuals.

Germany's RRP contains several reforms and investments related to fairness and social policies. As part of the measures covered by

Table A16.1: **Selected EU funds with adopted allocations - summary data (million EUR)**

Instrument/policy	Allocation 2021-2026		Disbursed since 2021 (1)
RRF grants (including the RepowerEU allocation)	30 324.7		19 760.1
RRF loans	0		0
Instrument/policy	Allocation 2014-2020 (2)	Allocation 2021-2027	Disbursed since 2021 (3) (covering total payments to the Member State on commitments originating from both 2014-2020 and 2021-2027 programming periods)
Cohesion policy (total)	20 673.3	19 860.6	12 871.5
European Regional Development Fund (ERDF)	12 288.2	10 820.4	7 962.7
European Social Fund (ESF, ESF+)	8 385.1	6 562.6	4 140.8
Just Transition Fund (JTF)		2 477.7	768.1
Fisheries			
European Maritime, Fisheries and Aquaculture Fund (EMFAF) and the European Maritime and Fisheries Fund (EMFF)	219.6	211.8	138.6
Migration and home affairs			
Migration, border management and internal security - AMIF, BVM and ISF (4)	794.9	2 044.3	892.8
The common agricultural policy under the CAP strategic plan (5)	Allocation 2023-2027		Disbursements under the CAP Strategic Plan (6)
Total under the CAP strategic plan	30 727.6		9 822.7
European Agricultural Guarantee Fund (EAGF)	22 488.4		8 714.0
European Fund for Agricultural Development (EAFRD)	8 239.2		1 108.7

(1) The cut-off date for data on disbursements under the RRF is 31 May 2025.

(2) Cohesion policy 2014-2020 allocations include REACT-EU appropriations committed in 2021-2022.

(3) These amounts relate only to disbursements made from 2021 onwards and do not include payments made to the Member State before 2021. Hence the figures do not comprise the totality of payments corresponding to the 2014-2020 allocation. The cut-off date for data on disbursements under EMFAF and EMFF is 29 April 2025. The cut-off date for data on disbursements under cohesion policy funds, AMIF, BMVI and ISF is 5 May 2025.

(4) AMIF - Asylum, Migration and Integration Fund; BMVI - Border Management and Visa Instrument; ISF - Internal Security Fund.

(5) Expenditure outside the CAP strategic plan is not included.

(6) The cut-off date for data on EAFRD disbursements is 5 May 2025. The information on EAGF disbursements is based on the Member State declarations until March 2025. Disbursements for the Direct Payments (EAGF) started in 2024.

Source: European Commission

the second payment request submitted over the past year, Germany included several measures among others focusing on modernising hospitals and local health administrations to improve their digital capacities and increasing the availability of childcare places as well as supporting apprentices.

Table A16.2: Summary table on 2019-2024 CSRs

Germany	Assessment in May 2025*	Relevant SDGs
2019 CSR 1	Some progress	
<i>While respecting the medium-term budgetary objective, use fiscal and structural policies to achieve a sustained upward trend in private and public investment, in particular at regional and municipal level.</i>	Some progress	SDGs 8, 9, 16
<i>Focus investment-related economic policy on education;</i>	Limited progress	SDGs 4, 10, 11
<i>research and innovation;</i>	Some progress	SDGs 9, 10, 11
<i>digitalisation and very-high capacity broadband;</i>	Some progress	SDGs 9, 10, 11
<i>sustainable transport</i>	Some progress	SDGs 10, 11
<i>as well as energy networks</i>	Some progress	SDGs 7, 9, 10, 11, 13
<i>and affordable housing, taking into account regional disparities.</i>	Limited progress	SDGs 1, 2, 8, 10, 11
<i>Shift taxes away from labour to sources less detrimental to inclusive and sustainable growth.</i>	Some progress	SDGs 8, 10, 12
<i>Strengthen competition in business services and regulated professions.</i>	Limited progress	SDG 9
2019 CSR 2	Some progress	
<i>Reduce disincentives to work more hours.</i>	Some progress	SDGs 8, 10, 12
<i>including the high tax wedge, in particular for low-wage and second earners.</i>	Some progress	SDGs 8, 10, 12
<i>Take measures to safeguard the long-term sustainability of the pension system, while preserving adequacy.</i>	Limited progress	SDG 8
<i>Strengthen the conditions that support higher wage growth, while respecting the role of the social partners.</i>	Substantial progress	SDG 8
<i>Improve educational outcomes and skills levels of disadvantaged groups.</i>	Limited progress	SDGs 4, 8, 10
2020 CSR 1	Some progress	
<i>Take all necessary measures, in line with the general escape clause of the Stability and Growth Pact, to effectively address the COVID-19 pandemic, sustain the economy and support the ensuing recovery. When economic conditions allow, pursue fiscal policies aimed at achieving prudent medium-term fiscal positions and ensuring debt sustainability, while enhancing investment.</i>	Not relevant anymore	SDGs 8, 16
<i>Mobilise adequate resources and strengthen the resilience of the health system, including by deploying e-health services.</i>	Some progress	SDG 3
2020 CSR 2	Some progress	
<i>Front-load mature public investment projects</i>	Some progress	SDGs 8, 16
<i>and promote private investment to foster the economic recovery.</i>	Some progress	SDGs 8, 9
<i>Focus investment on the green and digital transition, in particular on sustainable transport,</i>	Some progress	SDG 11
<i>clean, efficient and integrated energy systems,</i>	Some progress	SDGs 7, 9, 13
<i>digital infrastructure and skills,</i>	Some progress	SDG 4, 9
<i>housing,</i>	Limited progress	SDGs 1, 2, 8, 10
<i>education</i>	Limited progress	SDG 4
<i>and research and innovation.</i>	Some progress	SDG 9
<i>Improve digital public services across all levels</i>	Limited progress	SDGs 9, 16
<i>and foster the digitalisation in SMEs.</i>	Substantial progress	SDGs 8, 9
<i>Reduce the regulatory and administrative burden for businesses.</i>	Some progress	SDGs 8, 9
2021 CSR 1	Not relevant anymore	
<i>In 2022, maintain a supportive fiscal stance, including the impulse provided by the Recovery and Resilience Facility, and preserve nationally financed investment.</i>	Not relevant anymore	SDGs 8, 16
<i>When economic conditions allow, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions and ensuring fiscal sustainability in the medium term.</i>	Not relevant anymore	SDGs 8, 16
<i>At the same time, enhance investment to boost growth potential. Pay particular attention to the composition of public finances, on both the revenue and expenditure sides of the budget, and to the quality of budgetary measures in order to ensure a sustainable and inclusive recovery. Prioritise sustainable and growth-enhancing investment, in particular investment supporting the green and digital transition.</i>	Not relevant anymore	SDGs 8, 16
<i>Give priority to fiscal structural reforms that will help provide financing for public policy priorities and contribute to the long-term sustainability of public finances, including, where relevant, by strengthening the coverage, adequacy and sustainability of health and social protection systems for all.</i>	Not relevant anymore	SDGs 8, 16

(Continued on the next page)

Table (continued)

2022 CSR 1	Limited progress	
<i>In 2023, ensure that the growth of nationally financed primary current expenditure is in line with an overall neutral policy stance, taking into account continued temporary and targeted support to households and firms most vulnerable to energy price hikes and to people fleeing Ukraine. Stand ready to adjust current spending to the evolving situation.</i>	Not relevant anymore	SDGs 8, 16
<i>Expand public investment for the green and digital transitions, and for energy security taking into account the REPowerEU initiative, including by making use of the Recovery and Resilience Facility and other Union funds.</i>	Not relevant anymore	SDGs 8, 16
<i>For the period beyond 2023, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions.</i>	Not relevant anymore	SDGs 8, 16
<i>Improve the tax mix for more inclusive and sustainable growth, in particular by improving tax incentives to increase hours worked.</i>	Some progress	SDGs 8, 10, 12
<i>Safeguard the long-term sustainability of the pension system.</i>	Limited progress	SDG 8
2022 CSR 2		
<i>Proceed with the implementation of its recovery and resilience plan, in line with the milestones and targets included in the Council Implementing Decision of 13 July 2021.</i>	RRP implementation is monitored by assessing RRP payment requests and analysing reports published twice a year on the achievement of the milestones and targets. These are to be reflected in the country reports.	
<i>Swiftly finalise the negotiations with the Commission on the 2021–2027 cohesion policy programming documents with a view to starting their implementation.</i>	Progress on the cohesion policy programming documents is monitored under the EU cohesion policy.	
2022 CSR 3	Some progress	
<i>Remove investment obstacles</i>	Limited progress	SDGs 8, 9
<i>and boost investment in very-high-capacity digital communication networks.</i>	Some progress	SDG 9
2022 CSR 4	Some progress	
<i>Reduce overall reliance on fossil fuels and diversify their imports</i>	Some progress	SDGs 7, 9, 13
<i>by improving energy efficiency, incentivising energy savings, diversifying energy supplies and routes.</i>	Some progress	SDG 7
<i>removing investment bottlenecks, further streamlining permitting procedures, boosting investment in and accelerating the deployment of electricity networks and renewable energy.</i>	Substantial progress	SDGs 7, 8, 9, 13
<i>and further advancing participation in energy-related cross-border cooperation.</i>	Limited progress	SDGs 7, 9, 13
2023 CSR 1	Some progress	
<i>Wind down the emergency energy support measures in force, using the related savings to reduce the government deficit, as soon as possible in 2023 and 2024. Should renewed energy price increases necessitate new or continued support measures, ensure that these are targeted at protecting vulnerable households and firms, fiscally affordable and preserve incentives for energy savings.</i>	Substantial progress	SDGs 8, 16
<i>Ensure prudent fiscal policy, in particular by limiting the nominal increase in nationally-financed net primary expenditure in 2024 to not more than 2.5%.</i>	No progress	SDGs 8, 16
<i>Preserve nationally-financed public investment and ensure the effective absorption of RRF grants and other EU funds, in particular to foster the green and digital transitions. Implement public investment initiatives as planned.</i>	Full implementation	SDGs 8, 16
<i>For the period beyond 2024, continue to pursue a medium-term fiscal strategy of gradual and sustainable consolidation, combined with investments and reforms conducive to higher sustainable growth, to achieve a prudent medium-term fiscal position.</i>	Full implementation	SDGs 8, 16
<i>Improve the tax mix for more inclusive and sustainable growth, in particular by improving tax incentives in order to increase hours worked.</i>	Some progress	SDGs 8, 10, 12
<i>Safeguard the long-term sustainability of the pension system.</i>	Limited progress	SDG 8
2023 CSR 2		
<i>Significantly accelerate the implementation of its revised recovery and resilience plan, also by ensuring sufficient resources, and swiftly finalise the addendum and the REPowerEU chapter with a view to rapidly starting its implementation. Proceed with the speedy implementation of cohesion policy programmes, in close complementarity and synergy with the recovery and resilience plan.</i>	RRP implementation is monitored by assessing RRP payment requests and analysing reports published twice a year on the achievement of the milestones and targets. These are to be reflected in the country reports. Progress on the cohesion policy programming documents is monitored under the EU cohesion policy.	
2023 CSR 3	Limited progress	
<i>Speed up the digitalisation of the entire service chain for public services and</i>	Limited progress	SDGs 9, 16
<i>improve people's digital skills.</i>	Limited progress	SDG 4
<i>Remove investment obstacles</i>	Limited progress	SDGs 8, 9
<i>and boost investment in very-high-capacity digital communication networks.</i>	Some progress	SDG 9

(Continued on the next page)

Table (continued)

2023 CSR 4	Some progress	
Increase efforts to further reduce the overall reliance on fossil fuels by	Some progress	SDGs 7, 9, 13
boosting investment in and accelerating the deployment of renewable energy and electricity networks through improved administrative capacity and streamlined processes, including permitting procedures.	Substantial progress	SDGs 7, 8, 9, 13
Step up energy efficiency efforts in transport,	Limited progress	SDGs 7, 9, 11, 13
building and industry, including through investments in heating systems and	Some progress	SDGs 7, 9, 13
further policy measures aimed at the provision and acquisition of skills and competences needed for the green transition.	Limited progress	SDG 4
2024 CSR 1	Some progress	
Submit the medium-term fiscal-structural plan in a timely manner.	Limited progress	SDGs 8, 16
In line with the requirements of the reformed Stability and Growth Pact, limit the growth in net expenditure in 2025 to a rate consistent with, inter alia, putting the general government debt on a plausibly downward trajectory over the medium term and reducing the general government deficit towards the 3% of GDP Treaty reference value.	Full implementation	SDGs 8, 16
Strengthen public investment	Some progress	SDGs 8, 16
and remove obstacles to private investment to boost competitiveness.	Limited progress	SDG 3
Enhance the fiscal space for productive spending including by reforming the financing side of the first pillar pension system.	Limited progress	SDGs 8, 10, 12
Improve the tax mix for more inclusive growth and sustainable competitiveness, also by reducing disincentives to increase hours worked, in particular for second earners.	Some progress	SDGs 8, 10, 12
2024 CSR 2		
Significantly accelerate the implementation of the recovery and resilience plan, including the REPowerEU chapter, ensuring completion of reforms and investments by August 2026, by ensuring effective governance. Accelerate the implementation of cohesion policy programmes. In the context of their mid-term review, continue focusing on the agreed priorities, while considering the opportunities provided by the Strategic Technologies for Europe Platform initiative to improve competitiveness.	RRP implementation is monitored through the assessment of RRP payment requests and analysis of the bi-annual reporting on the achievement of the milestones and targets. Progress with the cohesion policy is monitored in the context of the Cohesion Policy of the European Union.	
2024 CSR 3	Limited progress	
Address the shortage of skilled workers, particularly by strengthening basic and digital skills,	Limited progress	SDGs 4, 8, 10
and improving education outcomes, including by enhancing the provision of targeted support to disadvantaged groups.	Limited progress	SDG 4
Speed up the digitalisation of public administration including by increasing the geographic coverage of digital public services.	Limited progress	SDGs 9, 16
Further boost the deployment of very high-capacity digital communication networks, including by facilitating the necessary implementation of private investment projects and mobilising public resources where needed.	Limited progress	SDG 9
2024 CSR 4	Some progress	
Accelerate the decarbonisation of the transport sector, including by upgrading the rail network.	Some progress	SDGs 8, 9, 11

Source: European Commission.

ANNEX 17: COMPETITIVE REGIONS

The German economy has a solid and diversified industrial base undergoing transformation towards the low carbon economy in the face of global competition, but persisting regional disparities remain a challenge especially in the context of slow growth. German regions could leverage competitive advantages in net-zero technologies (such as batteries, solar, wind, and green hydrogen), invest in research and innovation, businesses, education and training, and ensure affordable housing.

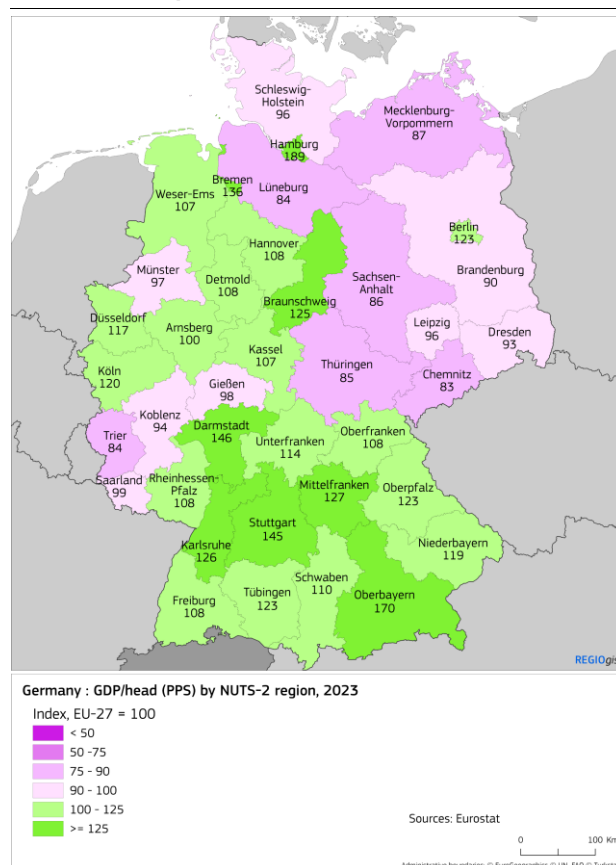
Germany's economy grew slowly from 2013 to 2023, and its ranking within the EU-27 fell. Real GDP per head growth averaged only 0.8% compared to the EU average of 1.55%. Regional disparities in Germany have been decreasing since 2013 but remain substantial. In 2023, Hamburg led with 189% GDP per head (purchasing power standard (PPS)) of the EU average, followed by Oberbayern (170%), Darmstadt (146%) and Stuttgart (145%). Two least developed⁽³²⁴⁾ eastern regions Thüringen and Chemnitz scored 83-85%. (Map A17.1).

Internal disparities narrowed in 2013-2023 as less developed eastern regions grew faster (1.0%–1.7%) than the national average, as did several southern regions. Only Berlin (2.2%) and Mecklenburg-Vorpommern (1.7%) in the east matched the EU average of 1.55%. Most western regions underperformed, with Saarland and Bremen remaining static (Map A17.2). The Federal Equivalence Report⁽³²⁵⁾ confirms also regional convergence at NUTS3 level (for a range of indicators).

⁽³²⁴⁾ In this annex, 'less/least developed regions' are defined as having a GDP per capita (PPS) below the EU average (100%) in 2022 and 'more/most developed' 126 or higher. These terms should not be confused with the classification for eligibility criteria.

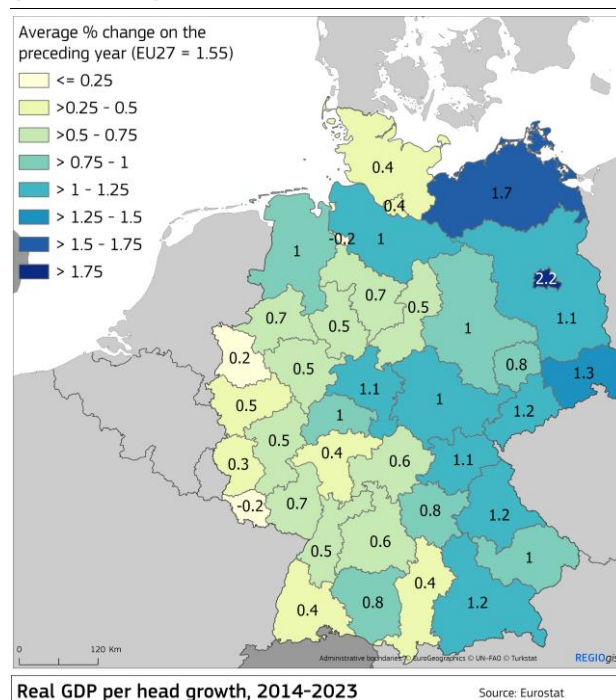
⁽³²⁵⁾ [BMWK - Equivalence Report 2024](#).

Map A17.1: GDP per head (in purchasing power standard PPS), 2023



Source: Eurostat

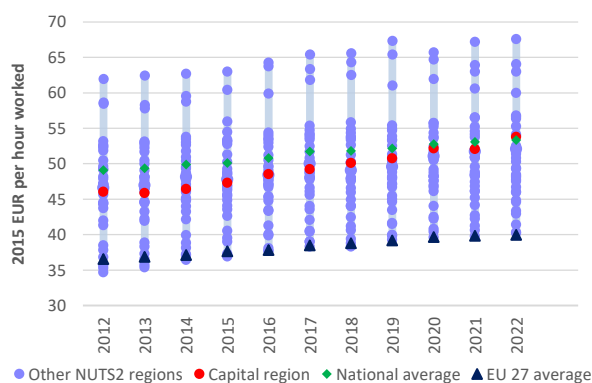
Map A17.2: Real GDP per head growth (2014-2023)



Source: Eurostat



Graph A17.1: Labour productivity per hour



Unit: Real GDP per hour worked (EUR, 2015 prices)

Source: ARDECO (JRC)

Regional disparities in GDP per capita in Germany largely reflect differences in labour productivity. In 2022, productivity, measured as GDP per hour worked, averaged 122% of the EU level in PPS terms. A total of 11 German regions ranked among the top 30 EU regions in terms of productivity (all over 125%), with Hamburg and Oberbayern exceeding 150%. Only three of the less developed eastern regions (Thüringen, Chemnitz and Mecklenburg-Vorpommern) are around the EU average. Disparate labour productivity growth challenges economic development (Graph A17.1).

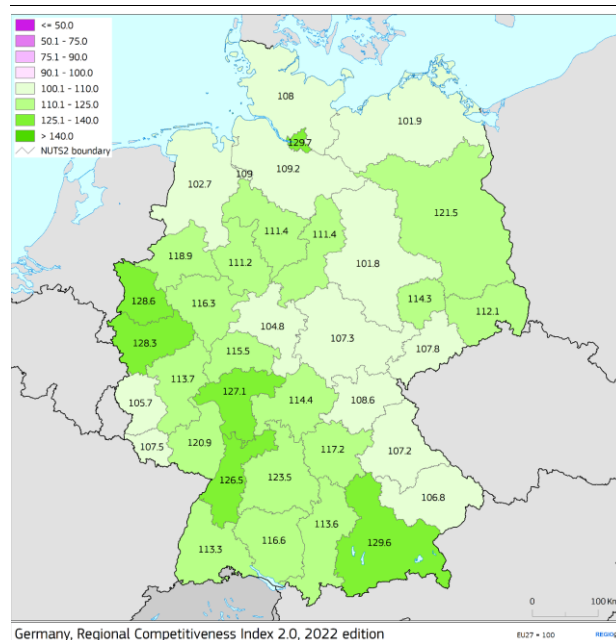
The productivity gap has been closing slowly but steadily, matching overall moderate economic growth. From 2013 to 2022, annual real hourly productivity growth reached 1.8% in Thüringen and 1.6% in Berlin. All other eastern regions followed with growth rates of at least 1.2%. Only western Rheinhessen-Pfalz (1.5%) and southern Tübingen, Niederbayern and Oberfranken (1.2% and 1.1%, respectively) showed comparable rates to eastern regions. Some western regions recorded minimal productivity growth, in particular Düsseldorf and Hannover (0.3%) and the less developed regions Münster and Saarland (0.2%). Targeted investment would be beneficial to regions struggling with low productivity and low productivity growth.

Competitiveness

In 2022, all German regions ranked above the EU average in terms of competitiveness.

However, there are significant differences between regions, with Oberbayern and Hamburg at the top (130) and Sachsen-Anhalt and Mecklenburg-Vorpommern at the bottom (102). This is due to regional differences in the pillars of higher education and lifelong learning, labour market efficiency and innovation (Map A17.3).

Map A17.3: Regional Competitiveness Index 2.0, 2022 edition



Germany, Regional Competitiveness Index 2.0, 2022 edition

Source: DG REGIO, JRC based on Eurostat

Most competitive regions, with strong high-productivity sectors, innovation, R&D activity and human capital⁽³²⁶⁾ are leading in terms of economic performance. These regions include Oberbayern, Darmstadt, Berlin, Stuttgart, Tübingen, Karlsruhe, Köln, and Rheinhessen-Pfalz.

⁽³²⁶⁾ Human capital encompasses knowledge, skills and competences, highlighting the importance of education, training and experience in building a workforce that drives economic growth, innovation and productivity.

Table A17.1: Selected indicators at regional level in Germany

	GDP per head (PPS)	Real GDP per head growth	Productivity - GDP per person employed (PPS)	Real productivity growth (per person employed)	Productivity - GDP per hour worked (PPS)	Real productivity growth (per hour worked)	R&D expenditure	Regional Competitiveness Index	Population growth	Population aged 65+	Unemployment rate	At-risk-of poverty or social exclusion	Energy poverty
	Index EU-27 = 100	Average annual % change	Index EU-27 = 100	Average annual % change	Index EU-27 = 100	Average annual % change	% of GDP	Index EU-27 = 100	Average annual change per 1000 residents	% of total population	% of labour force	% of total population	Inability to keep home adequately warm % of total population
	2023	2014-2023	2023	2014-2023	2022	2013-2022	2021	2022	2014-2023	2024	2024	2024	2024
European Union (27 MS)	100	1.6	100	0.6	100	0.9	2.28	100	1.7	21.6	5.9	21.0	9.2
Germany	116	0.8	102	0.3	122	0.8	3.18	117	3.3	22.4	3.4	21.1	6.3
Baden-Württemberg	129	0.6	109	0.4	130	0.8	5.61	121	5.5	21.2	3.0	18.8	6.6
Bayern	136	1.0	111	0.4	132	0.9	3.37	118	4.4	21.3	2.6	15.2	3.5
Berlin	123	2.2	101	0.8	121	1.6	3.32	122	6.8	19.1	5.5	21.5	4.1
Brandenburg	90	1.1	97	1.0	107	1.5	1.71	122	4.2	26.0	3.1	19.3	7.3
Bremen	136	-0.2	101	-0.2	129	0.6	3.16	109	6.7	20.7	4.9	34.9	12.3
Hamburg	189	0.4	128	-0.3	154	0.8	2.14	130	5.9	18.0	4.8	24.5	4.9
Hessen	131	0.7	111	0.0	132	0.5	3.06	121	3.6	21.4	3.2	22.5	6.4
Mecklenburg-Vorpommern	87	1.7	89	1.1	97	1.2	1.76	102	-1.2	27.4	3.9	22.4	6.1
Niedersachsen	106	0.8	98	0.2	118	0.6	2.71	108	2.8	22.9	3.1	23.4	7.1
Nordrhein-Westfalen	110	0.4	98	-0.1	120	0.4	2.19	123	2.5	21.7	3.7	24.0	8.1
Rheinland-Pfalz	100	0.6	97	0.3	123	1.1	2.77	116	3.2	22.9	3.4	22.0	8.4
Saarland	99	-0.2	90	-0.1	108	0.2	1.94	108	2.3	24.9	3.3	21.9	10.9
Sachsen	91	1.2	86	0.8	99	1.5	3.08	111	0.2	26.8	3.7	19.8	4.7
Sachsen-Anhalt	86	1.0	90	0.7	103	1.4	1.58	102	-4.6	28.0	4.3	25.9	3.8
Schleswig-Holstein	96	0.4	92	-0.1	111	0.5	1.67	108	4.8	23.7	3.4	19.8	4.2
Thüringen	85	1.0	85	1.0	96	1.8	2.74	107	-2.2	27.5	3.4	22.2	8.2

Source: Eurostat and JRC

Regional disparities in Germany are driven by sector specialisation and human capital.

In 2021, the most developed regions excelled in high-value sectors, such as: i) finance, ii) ICT, iii) professional, scientific and technical activities, iv) administrative and support service activities, and v) manufacturing. Less developed regions had lower shares in the areas of finance and ICT. In addition, Hamburg, Köln, Darmstadt, Oberbayern and Berlin have high shares of employment in knowledge-intensive sectors (over 45%) and high-technology sectors (more than 7%). By contrast, the regions with the lowest shares of employment in high-technology sectors were Trier in the West and Mecklenburg-Vorpommern and Sachsen-Anhalt in the East (less than 3%). This indicates that high-value sectors/sectors with growth potential could be further strengthened in some regions.

Tech take-up in Germany is moderate but above the EU average. 47% of businesses buy cloud computing services used over the internet, 32% conducted in-house data analytics and 12% used at least one AI technology (see Annex 3). The ICT sector led in all of these three areas (83%, 53% and 33%, respectively), followed by the sectors of real estate activities and professional, scientific and

technical activities combined (64%, 33% and 24%). Regions with a high concentration of these sectors are benefiting from the use of advanced technology and thereby boosting their economic performance.

Germany has a strong industrial base, with a high share of Gross Value Added (GVA) for industry (24%) and for manufacturing (20.3%). There is a competitive advantage in the manufacturing of net-zero technologies (solar, wind, batteries, green hydrogen) (see Annex 8). Many German regions use this competitive advantage by investing in critical technologies (digital technologies and deep-tech innovation, clean and resource-efficient technologies, biotechnologies) under the Strategic Technologies for Europe Platform.

The heavy reliance on automotive manufacturing, the largest industry sector, manufacture of other transport equipment as well as heavy and chemical industries poses several challenges for transformation in the regions where these industries are located.

Regional innovation in Germany shows significant disparities. In 2023, innovation leaders in the most developed regions of

Hamburg, Karlsruhe, Oberbayern and Berlin outperformed the least developed regions of Mecklenburg-Vorpommern, Sachsen-Anhalt and Trier by a factor of 1.7. The least developed regions of Sachsen-Anhalt, Trier, Chemnitz, Mecklenburg-Vorpommern and Lüneburg are moderate innovators.

R&D expenditure and patent activity is heavily concentrated in the most developed regions in the west and south. In 2021, business enterprise R&D (BERD) expenditure was highest in Stuttgart, Braunschweig, Tübingen and Karlsruhe (3.6-6.4% of GDP), driven by a strong industrial sector. Other more developed regions (except Hamburg and Bremen) and Rheinhessen-Pfalz also exceeded 2.5%. By contrast, BERD investment was below 0.6% in the less developed western region of Trier and eastern regions of Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt and Leipzig. With 285 biotechnology and 25 ICT patents per million inhabitants in 2021, Oberbayern is one of the leading regions in the EU. Less developed regions applied for 1.2-2.3 biotechnology patents and less than 0.4 ICT patents per million inhabitants ⁽³²⁷⁾. Investment in research and innovation could be strengthened in less and least developed regions.

Regional disparities in human capital affect innovation performance. The more highly educated population tends to be located in more developed regions. In 2024, in Berlin, Oberbayern, Hamburg and Tübingen, at least 40% of people aged 25-64 had a tertiary degree, and five more western regions reached 37%. In contrast, Sachsen-Anhalt had the lowest percentage with 26.0%.

Disparities in high-level educational attainment are even greater for young adults. The proportion of people with a tertiary education among those aged 30-34 in Berlin (58.0%), and Oberbayern (55.5%) as well as in

Hamburg (51%) are well above the EU average (44.8%). Chemnitz and Sachsen-Anhalt have proportions below 30%.

Digital literacy remains moderate. 52% of people had at least basic digital skills in 2023 (up from 49% in 2021), compared to the EU average (56%). Urban areas performed better (57%) than rural areas (47%). So, there is scope to improve education, including digital literacy.

Demographic dynamics structurally impact Germany's growth and development performance. The population has increased, mainly due to positive net migration. Nationally, the population grew by an annual rate of 3.3 per 1 000 inhabitants over 2014-2023. Net migration growth was 5.7 per 1 000 inhabitants per year, offsetting a natural decrease of 2.4 per 1 000 inhabitants per year. The increase in net migration was significant in most southern regions, but particularly strong in Brandenburg and Leipzig (10-11 per 1 000 per year). On the other hand, some less developed eastern regions registered minimal net migration and saw significant demographic declines (-2.2 to -5.1 per 1 000 per year). This reflects broader trends in rural-urban migration across Germany, resulting in growing urban population and expanding metropolises.

The decline in the working-age population and an ageing population poses challenges for all German regions. Germany's working-age population (20-64 years old) increased at a sluggish average of 0.1% per year between 2014-2023. While the working population increased or remained stable in many regions, some of the eastern regions (Dresden, Thüringen, Mecklenburg-Vorpommern, Sachsen-Anhalt and Chemnitz) recorded declines (-0.9% to -1.7% per year).

The share of population aged 65+ increased to 22.4% by 2024 nationally, slightly above the EU average. The highest increases (around 2%) were recorded in southern Niederbayern and eastern Mecklenburg-Vorpommern and Brandenburg. In several eastern regions, 25-30% of the population are aged 65+.

⁽³²⁷⁾For more information on Germany's performance in research and innovation see Annex 3.

Demographic change is likely to put pressure on public finances, the labour market and strain the provision of services, especially in some (less developed) regions in the East. In the medium to long term, this may significantly affect their capacity to grow, or even to cope with the inherent challenges of an ageing population.

Social fairness

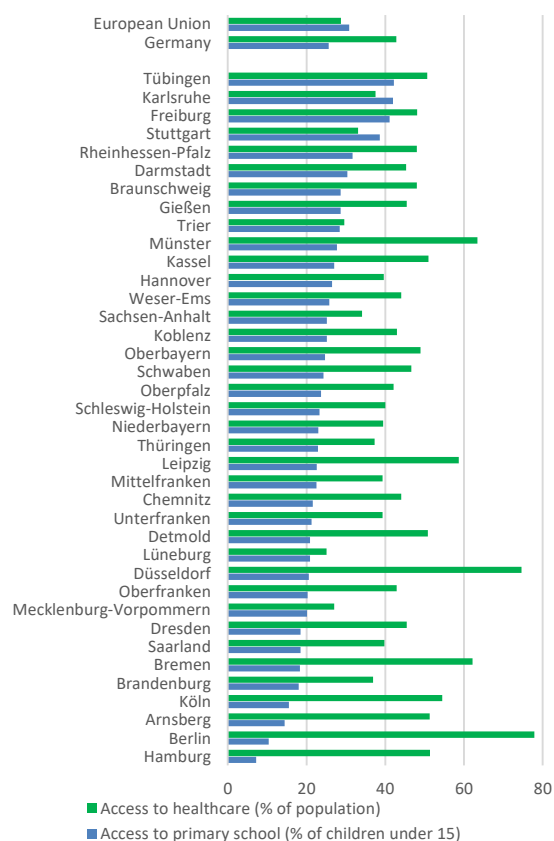
Labour market conditions are among the strongest in the EU, although some disparities remain. In 2024, 15 regions reached or exceeded the national employment target of 83% for people aged 20 to 64. In four of these regions workers who commute to other regions contribute significantly to very high employment rates (but not to the GDP), namely Trier (25% working in other regions, of which 17% abroad), Tübingen (15% work in other regions), Schwaben (15% work in other regions) or Freiburg (6% working abroad). Berlin, Bremen and Düsseldorf had the lowest employment rates (76-78%).

Though the national unemployment rate rose from 3.1% to 3.3% in 2024, the rate was lower than the EU average (5.9%) in all German regions. The lowest rates were recorded in Niederbayern, Kassel, Schwaben and Trier (below 2.5%) with the highest recorded in Berlin (5.5%). Combined with Germany's high job vacancy rate of 3.2%, the low unemployment rate points to the presence of labour shortages in many regions. The job vacancy rate in Germany is one of the highest in the EU with 92 vacancies per 100 unemployed. Despite the decline in the unemployment rate in the eastern regions over the last decade, their rates remain among the highest in Germany. All these regions have recovered from a temporary spike during the COVID-19 pandemic. Labour shortages remain a key challenge in all regions.

Labour market performance is also closely linked to disparities in the risk of poverty or social exclusion (AROPE) at the regional level. In Germany, cities (25%) are affected more than rural areas (16.9%). The energy poverty rate, measured by the inability to keep homes adequately warm, is below the EU average (9.2%) at national level (see Annex 11). It increased across all regions from 2021 to 2022 and/or 2023. Despite some declines in 2024, it remained above 2021 levels in most regions. Regional disparities in household income per capita remain, even though all regions are above the EU average. The list of top regions as regards household income (130-155% of the EU average) coincides with that of GDP.

Access to basic services varies strongly between rural parts of the different regions and between rural and urban parts. The share of people in rural areas whose access to healthcare is within a 10-minute drive is well above the EU average (29%) in all regions except Trier, Lüneburg, and Mecklenburg-Vorpommern. However, the share of children with a primary school within a 15-minute walk is well below the EU average (31%) for all regions except for five (Tübingen, Karlsruhe, Freiburg, Stuttgart, Rheinhessen-Pfalz) (Graph A17.2). By contrast, 99% of the urban population has close access to healthcare and 77% of pupils to school. Fairness could be increased by addressing the poverty risk, especially in cities and improving access to basic services, including education in rural areas.

Graph A17.2: Access to healthcare and primary education in rural areas, 2023



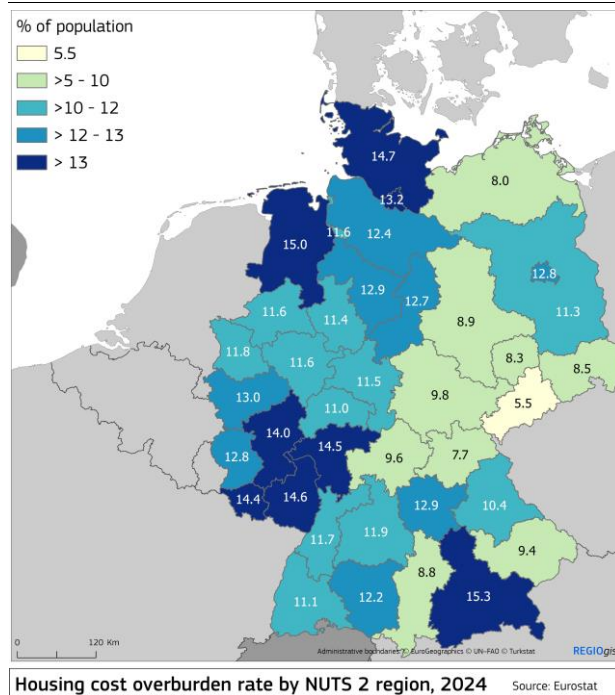
Units: Percentage of population that can reach nearest hospital within 10 minutes by car (EU-27); Percentage of children under 15 years old who can reach primary school within 15-minute walk (EU-24).

Source: Eurostat

Affordable housing is becoming a growing concern in Germany (see Annex 11), with noticeable regional disparities. In 2024, the housing cost overburden ⁽³²⁸⁾ was highest in Oberbayern, Weser-Ems, Schleswig-Holstein and Rhein Hessen-Pfalz impacted by increases in 2022 and 2023. In contrast, it was below the EU average (8.2% in 2024) in Chemnitz, Oberfranken and Mecklenburg-Vorpommern (Map A17.4).

⁽³²⁸⁾ The housing cost overburden rate is the percentage of the population living in households where the total housing costs ('net' of housing allowances) represent more than 40% of disposable income ('net' of housing allowances).

Map A17.4: Housing cost overburden, 2024



Source: Eurostat

Sustainability

Environmental sustainability, which depends on the intensity and sectoral composition of activities and geographical features, is mixed overall. In 2023, average greenhouse gas emissions per capita in Germany were slightly higher than the EU average. Some 23 regions recorded values above the EU average, reaching 16-18 tCO₂eq in Sachsen-Anhalt and Brandenburg. In contrast, Berlin and Hamburg recorded only 3.14-3.45 tCO₂eq. The share of renewables in electricity production accounted for 63.4% in Q3-2024.

Most regions score below the EU average as regards air quality and the average of more developed EU regions in terms of green infrastructure and employment. In most German regions, the infrastructure for charging electric vehicles ⁽³²⁹⁾ is below the EU average of

⁽³²⁹⁾ Indicators of access to alternative fuel infrastructure are based on calculations by DG REGIO and the JRC, using data from the European Alternative Fuels Observatory (EAFO), Eurostat, TomTom and Eco-Movement.

287 charging points within 10 km, with an average of 222 for Germany. Only six regions have a higher density, including Hamburg (968) and Oberbayern (600).

Green employment ⁽³³⁰⁾, with 20% of jobs classified as sustainable and competitive, is above the EU average of 15%. It is concentrated in the most developed regions: Hamburg (38%), Oberbayern (40%) and Stuttgart (42%). By contrast, Chemnitz and Mecklenburg-Vorpommern are below the EU benchmark for less developed regions (6%). There is scope for increasing green employment in some regions.

⁽³³⁰⁾Regional Competitive Environmental Sustainability indicator, [Measuring transition to a competitive and sustainable economy](#).