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2024 Country Report - Estonia

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Recommendation for a COUNCIL RECOMMENDATION

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

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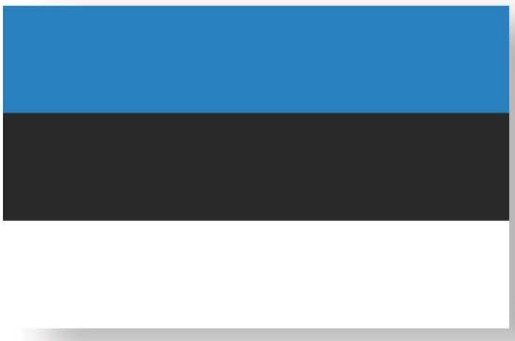
European Commission

Estonia

2024 Country Report

#EURO at 25



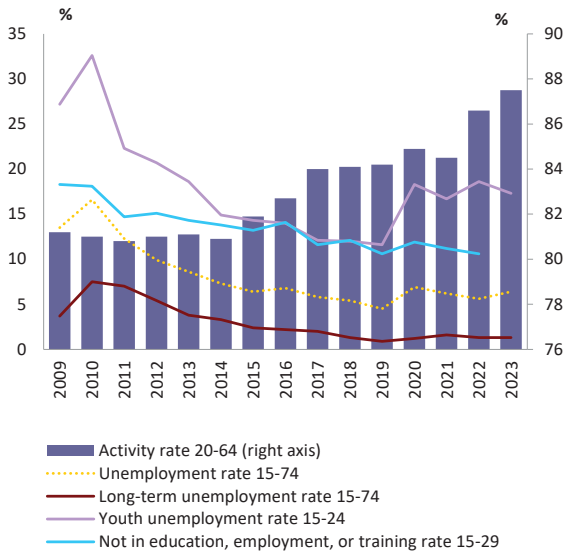
ECONOMIC AND EMPLOYMENT SNAPSHOT

Low demand from abroad drives recession

Estonia's economy has been in recession for the last 2 years and growth is expected to remain negative this year ([1]). Real GDP contracted by 3% in 2023. The country has experienced several shocks since 2021, including Russia's war of aggression against Ukraine, which led to rapidly rising energy prices, loss of input supplies from Russia and discontinued exports to Russia, as well as the challenge of foreign and local investors abstaining from investing in Estonia due to perceived geopolitical risks. Economic growth was further hampered by tighter monetary policy and the rapid transmission of this tightening to lending given the dominance of flexible interest rates in Estonia, and the worsened economic situation in the Nordic countries, the main destination of Estonian exports. Due to this varied nature of shocks, the decline in economic activity was broad-based, with contractions recorded in household consumption, private investment and, particularly, exports. Government spending and inflows of EU funds, including under the recovery and resilience plan, have played a stabilising role.

Inflation in Estonia decreased after reaching double-digit heights but still averaged 9.1% in 2023, one of the highest rates in the euro area. In the second half of 2023, inflation moderated in all major categories, particularly in energy and food, where previous increases had been the highest. It stabilised below 5% by the end of the year. The higher value added tax rate applied as of 1 January 2024 has increased inflation again.

Graph 1.1: **Employment, activity and unemployment rates**



Source: Eurostat

Despite the recession, the Estonian labour market continued its very strong performance in 2023, though the first signs of weakness are emerging. In 2023, employment rose sharply, by about 4%. The employment rate stood at 82.1% of the working-age population, above the euro area average of 74.8%. This high employment rate is even more remarkable against the background of the very large influx of Ukrainian refugees into Estonia (equal to about 2.6% of the Estonian population). More than 27 700 refugees from Ukraine had found a job by the end of January 2024. The good labour market performance led to a rise in real income of around 10% in 2023, partially compensating for real income losses inflicted by high inflation. The labour market situation started to worsen gradually in response to weak economic activity and persisting skills mismatches, and the unemployment rate rose to 7.8% in April 2024.

([1]) The cut-off date for the data used to prepare the 27 Country Reports was 15 May 2024

The government deficit increased to above 3% in 2023, due to increasing expenditure and relatively low tax revenues. The general government deficit increased from 0.9% of GDP in 2022 to 3.4% in 2023, driven by the decline in GDP and sizeable rises in expenditure on defence, education, child benefits, research and development, public wages and helping displaced people from Ukraine. Total government revenues, including revenues from taxation, increased by 8.2% in 2023, while expenditure increased by 14.5%. The deficit is projected to remain at 3.4% of GDP in 2024 due to defence spending and defence investments as well as further increases in child benefits. At the end of 2023, the government reached an agreement with commercial banks to hand out more dividends in 2024 on previously accumulated capital and profits. This is expected to lead to an increase in corporate tax revenues in 2024. Estonia's government debt is expected to rise by around 2 percentage points from 19.6% of GDP in 2023 to 21.4% in 2024, while remaining the lowest in the EU. Fiscal sustainability risks are expected to be low for Estonia over the short, medium and long term (see Annex 21).

After a very rapid increase in house prices, the real estate market is cooling. From 2010 to 2023, house prices increased by more than 210% – the highest rate of house price growth in the EU over these years. In parallel, lending for house purchases has also grown and accelerated since 2020. However, the market is showing signs of stabilisation now. In 2023, house prices remained stable, but, reportedly, they have started to decline recently. As the share of loans that are close to regulatory limits ([2]) has increased, it appears that housing has become less affordable (see Annex 18).

Estonia's geopolitical vulnerabilities have risen to the medium-high level, above the EU average. Russia's war of aggression against Ukraine has negatively affected consumer behaviour and investment. Estonia's vulnerabilities increased due to its high supplier concentration in base metals and energy carriers, its high non-EU trade partner concentration, its deteriorated net international investment position, and its significantly increased borrowing (see Annexes 5 and 12).

Higher production costs in combination with low productivity and low innovation impair competitiveness

Over two decades, Estonia's labour productivity has impressively narrowed the gap with the EU average. Labour productivity grew from less than 50% in 2004 to 77.5% of the EU average in 2023. This rise is mostly attributable to capital deepening, but also to total factor productivity ([3]) (see Annex 12).

However, over the last few years, Estonia has suffered from a large decline in labour productivity. Average pay per employee has risen rapidly, increasing by nearly 10% in 2021, by 8% in 2022 and by 7.6% in 2023. While these increases may well be justifiable given the very high inflation, they coincide with a substantial drop in labour productivity, amid a recessionary environment. Labour productivity declined by 4.8% in 2022 and by 6.0% in 2023. The sectors with the largest labour productivity losses were financial activities, agriculture and lately information and communication.

The weak investment in recent years paints a grim picture for future productivity developments. Investment declined by 3.7% in 2022 and 3.4% in 2023, with a more pronounced decline in the private sector. Skills shortages, high energy costs, a

([2]) Regulatory limits are set on the loan-to-value ratio (maximum 85%), the debt service-to-income ratio (maximum 50%) and the maturity of loans (maximum 30 years).

([3]) A measure of productivity accounting for effects in total output not caused by traditionally measured inputs of labour and capital.

Box 1: Estonia's competitiveness in brief

Estonia's competitiveness is supported by its business-friendly environment and high business and government efficiency. The country has an enabling start-up and scale-up system, and the high digitalisation level of public administration significantly reduces the administrative burden on businesses. Moreover, Estonia continues to be well integrated into the single market, and its trade within the EU accounted for 59.46% of GDP in 2023, the fifth-highest share among EU Member States. Furthermore, Estonia has a comparatively low level of trade restrictiveness compared to the EU average (see Annex 12).

However, competitiveness challenges remain:

- **skills mismatches and shortages**, which hold back investment and productivity, negatively affecting the growth outlook.
- **low resource efficiency and insufficient innovation**, especially as regards bio-based innovation that can improve resource use and increase the valorisation of natural resources such as forestry, which restrain investment and growth of value added.

lack of innovation, uncertainty about the future and increasing financing costs are the main obstacles to private sector investment (see Annexes 7, 11, 12, 14 and 18). Underinvestment can hamper competitiveness in the long run.

Skills shortages have been a pivotal factor in recent productivity losses. Businesses have identified the lack of skilled staff as the main long-term barrier to investment and a major challenge for competitiveness. Shortages of skilled workers have been particularly acute in ICT, construction, education, healthcare and long-term care, while other sectors reported significant skills mismatches (see Chapter 3). In industry, the machinery, metal and electronics sectors suffer from a lack of engineers and highly educated specialists (see Annex 12).

The underutilisation of female talent is also holding back productivity and undermining the competitiveness of the economy. Female employment is high in Estonia; however, the gender wage gap remains among the largest in the EU. While women in Estonia tend to have higher educational attainment than men, firms often hire women for less prominent positions, failing to make use of their skills, slowing their progression and hindering acquisition of entrepreneurial experience that could foster innovation (see Chapter 3).

Low resource productivity persists as a feature of Estonia's industrial system, adding to competitiveness concerns. Construction, the wood industry and the metalworking industry – major Estonian exporters – are heavy users of energy and raw materials, such as wood and energy produced from oil shale. Supply used to be cheap and abundant, so these industries were not incentivised to innovate and to increase resource productivity. Shortages in raw materials have become more pronounced in the last 2 years and, in future, geopolitical developments could still affect their accessibility (see Annex 12). Low resource productivity is one of Estonia's relative weaknesses when it comes to the country's innovation capacity and competitiveness. Estonia performs below the EU average on eco-innovation inputs and activities and resource-efficiency outcomes. Estonia's heavy reliance on oil shale has a negative impact on resource productivity and the green transition, making Estonia the second-biggest producer of hazardous waste in the EU (see Annex 9).

Despite its business-friendly environment, Estonia remains below the EU average in terms of innovation. Supported by a dynamic research and development (R&D) base and good framework

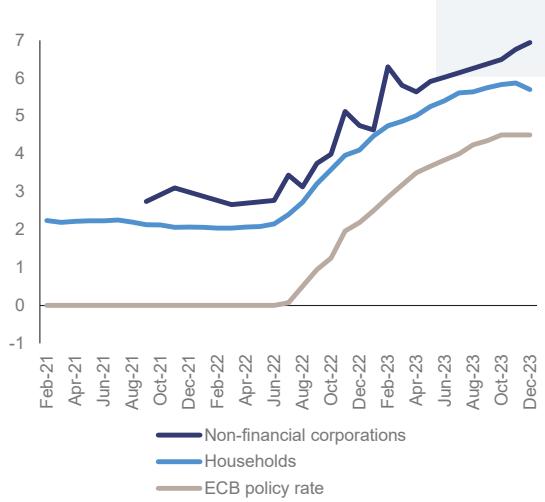
Box 2: **UN Sustainable Development Goals (SDGs)**

Estonia is performing well on all SDGs related to competitiveness and productivity (SDGs 4, 8, 9), but still needs to catch up with the EU average on SDG 9, which is related to industry, innovation and infrastructure. While Estonia is making progress, the country is performing below the EU average on SDG 9, mostly because its gross domestic expenditure on R&D has not caught up with the EU average yet. While the country is performing well and improving on some SDG indicators related to fairness (SDGs 4, 7, 10), it still needs to catch up on SDG 1 (No poverty), SDG 5 (Gender equality) and SDG 3 (Good health and well-being).

Out of the 17 indicators, Estonia is performing above the EU average on eight indicators, and the country is making progress on 16 indicators. There is only one indicator (SDG 1) where Estonia is performing below the average EU and, at the same time, moving away from the targets for this SDG. This is because in recent years, the proportion of people at risk of poverty or social exclusion and the proportion of people at risk of monetary poverty after social transfers have been increasing.

conditions for tech start-ups, Estonia still has the EU's highest number of start-ups per capita. Estonia's R&D intensity has increased, and research-based innovation activities have expanded in recent years. Yet, business enterprise expenditure on R&D remains relatively low (see Annex 11). Also, the use of some advanced digital technologies, such as big data and artificial intelligence, is lower than the EU average, dragging down competitiveness.

Graph 1.2: **Interest rates for new loans to non-financial corporations and hous**



Source: European Central Bank

Financing costs have markedly increased over the past 2 years. A vast majority of bank loans to businesses and households in Estonia is granted with floating interest rates. The rapid tightening of monetary policy, when the European Central Bank raised the refinancing rate from 0% to 4% over just slightly more than a year, implied that banks passed these costs directly on to customers (see Graph 1.2). In line with the objective to dampen inflation, this led to much higher financing costs for business investment, housing acquisition and consumption, in turn contributing to lower investment and cooling of the housing market.

Social inequality and regional disparities remain

Estonia faces some social challenges, with poverty indicators worsening and high self-reported unmet needs for medical care. According to the Social Scoreboard supporting the European Pillar of Social Rights, in 2022, most social indicators, including the risk of poverty or social exclusion, worsened among disadvantaged groups, with high income inequality and a low impact of social transfers (other than pensions) on poverty reduction. Also, the at-risk-of-poverty or social exclusion (AROPE) rate of older people (65 and over) increased significantly, from 41.6% in 2021 to 53.1% in 2022, and was one of the highest in the EU (EU average: 20.2%). The same trend was observed for the monetary poverty rate

(52.3%, compared with an EU average of 17.3%), being higher for women than for men. The AROPE rate of people with a disability increased in 2022 and it is one of the highest in the EU. Self-employed and those in non-standard forms of work continue not to be covered by unemployment benefits, which puts them at risk of poverty. Self-reported unmet needs for medical care remain among the highest in the EU although some improvements are observed thanks to ongoing reforms. Estonia also has further scope to reduce early school leaving and the gender gap in higher education.

IMPLEMENTATION OF KEY REFORMS AND INVESTMENTS USING EU INSTRUMENTS

Funding from the Recovery and Resilience Facility (RRF) and cohesion policy is mutually reinforcing Estonia's efforts to boost its competitiveness and stimulate sustainable growth. In addition to the EUR 953.2 million of RRF funding described in Annex 3, cohesion policy provides Estonia with EUR 3.4 billion for the 2021-2027 period. Support from these two instruments combined represents 11.47% of the country's 2023 GDP, compared to the EU average of 5.38% of GDP ([3]) (see Annex 4).

Under its RRP, Estonia has launched important policy measures that are expected to improve the country's competitiveness. In particular, the RRP envisages major reforms in the areas of digitalisation of the public sector, green and digital transition of businesses, social protection, healthcare, transport, and renewable energy. Also, Estonia is making substantial investments in healthcare, energy security, energy-efficient renovation of buildings, and decarbonisation of transport and of the economy overall.

The implementation of Estonia's recovery and resilience plan is well underway. Estonia submitted 2 payment requests, corresponding to 47 milestones and targets in the plan and resulting in an overall disbursement of EUR 505 million on 19 April 2024. Beyond the second payment request, the implementation of the plan is broadly on track (see Annex 3).

Cohesion policy funding helps tackle Estonia's growth and competitiveness challenges and reduce the country's territorial and social disparities. Under the 2014-2020 cohesion programming period, support focused on the areas of support businesses, energy efficiency, decarbonisation of industry, transport, research and innovation, and labour market policy. For the current 2021-2027 programming period, the focus is on fostering Estonia's competitiveness, green and digital transition and skills development, social cohesion, and long-term care, and on improving the living and working conditions of Estonia's people. The European Regional Development Fund (ERDF) and Just Transition Fund are also investing in climate change mitigation and supporting municipalities to address regional disparities.

Supporting the green transition and fostering sustainable transport

RRP implementation helps companies in the green transition. The Green Fund has been set up with the support of the RRF to finance the development and scaling-up of innovative green start-ups and small to medium-sized enterprises, improving their competitiveness. With the support of the RRP, pilot projects are being set up to boost the uptake of green hydrogen technologies in the transport and chemical industry. Both the RRF and cohesion policy funds finance multiple measures in Estonia that aim to develop the circular economy, such as developing resource-efficient production methods. The Cohesion Fund also supports the improvement of waste collection.

The Estonian RRP includes major reforms and investments for the deployment of renewable energy. These are complemented by various investments from the ERDF. The RRP includes a major reform to streamline permitting and environmental impact assessments for wind energy production. The government already decided to relax height restrictions on wind energy installations and,

as a next step, it will determine priority development areas for wind energy, and a new West-Estonia radar will be installed enabling wind energy developments in the region to take off. Furthermore, local authorities have been supported in improving administrative procedures for wind energy development. Complementing this reform, the RRF finances an investment to increase the capacity of the electricity distribution network aiming to enable the network to absorb the additional renewable capacity created. The RRP also includes measures to develop the local biogas and biomethane sectors, which are complemented by investments financed by the ERDF. Support to develop the infrastructure of biomethane filling stations and increase local municipalities' uptake of biomethane-based vehicles in public transport will increase the resilience of the energy sector, strengthening overall competitiveness.

Using various EU funding sources, Estonia is improving the energy efficiency of buildings and working to reduce regional disparities. The RRF and the ERDF support energy-efficient renovation of apartment buildings and private residences, especially in areas with low real estate values, helping to improve the quality of the housing stock, especially in regions that are lagging behind. In addition, the ERDF and the Cohesion Fund will support energy-efficient renovation projects – for instance renovation of public buildings in the healthcare sector and renovation of district heating systems – and the connection of buildings to the district heating network. These investments are facilitated by a reform under the RRP that improves advisory services and digital tools for energy-efficient renovations.

Estonia is improving its transport infrastructure and making its transport sector more sustainable. Estonia has focused on developing both rail transport and the capital city Tallinn's public transport system, as emissions from road transport are still a concern and rail transport electrification is low (see Annex 6). A major reform under the Estonian RRP concerned the adoption of the Transport and Mobility Development Plan to accelerate the reduction of CO_2 emissions in the transport sector. The plan includes measures such as developing the Tallinn capital region's public transport system and measures to promote sustainable and active urban transport in bigger towns. To boost the use of public transport, the RRP supports the construction of the Tallinn Old Port tramline, while the ERDF supports the further development of Tallinn's tram infrastructure. Both the RRF and cohesion policy funds will support the construction of cycle lanes and walkways in both cities and municipalities. In addition, Estonia is decarbonising its ferry connections and improving its port infrastructure to reduce environmental impact. The RRF and the EU Innovation Fund support deployment of low and zero emission vessels.

The RRF and other EU funds are supporting Estonia's connectivity and competitiveness by investing in the construction of Rail Baltica. In particular, the RRP finances the ongoing investments in the construction of Rail Baltica viaducts, while the 2021-2027 Cohesion Fund and the Connecting Europe Facility will finance the construction of the Rail Baltica main track, the terminal infrastructure in Tallinn and Pärnu, and local stations. In doing so, EU funds are promoting the shift from road to rail transport for both passengers and freight, helping to reduce commuting times and CO_2 emissions.

Fostering the digital transition

EU funds are supporting Estonia's reforms and investments to advance the digital transition of the public sector. Under its RRP, Estonia has taken steps to transfer basic digital public services to the national cloud infrastructure and to digitalise the supply of public services for individuals and businesses. This will also be supported by the ERDF. Another investment under the RRP, complemented by support from the ERDF, aims to improve the very high capacity broadband networks by offering access to a connection of at least 100 Mbps to 8 000 new households and socio-economically important institutions, such as hospitals, schools, public services and businesses.

Box 3:

Combined action for more impactful EU funds: investing in skills

To boost economic growth and maximise the impact of EU funding, Estonia's RRP includes measures that support investments under other EU instruments, creating significant synergies and complementarities between the various funds. For example, Estonia is strengthening the capacity of businesses in the digital transition by increasing the availability of information and communication technology professionals. The ongoing reform aims to offer new career opportunities through upskilling and retraining, and through a better recognition of skills acquired outside formal learning. In addition, the RRP investment will help ensure the availability of high-quality expertise to implement the green transition in businesses, providing upskilling and retraining programmes for adults and modernising study curricula. These measures should help improve Estonia's competitiveness by closing skills gap and tackling mismatches.

Ongoing policy action is supported by the cohesion policy funds' priority investment in skills and lifelong learning to address labour market needs. European Social Fund Plus investment will help raise the appeal of study fields related to the green and digital transitions, offering learning opportunities throughout all stages of life. The Just Transition Fund will support wider training in vocational and higher education, in areas with bigger potential for growth and in cooperation with local firms. The Fund will invest in Ida-Viru, Estonia's region of oil shale extraction, to counteract the consequences of the green transition and stimulate job creation.

Estonia has been promoting the digital transition of companies by implementing dedicated grant schemes. The Estonian business ecosystem includes many innovative and growing start-ups that are driving the country's growth and modernisation, but not all Estonian businesses make full use of the potential of digital technologies (see Annex 10). The Estonian RRP includes measures to encourage the digitalisation of companies, particularly small to medium-sized enterprises, including a measure to provide financial support for adopting digital technologies, promoting industrial R&D and training staff. The RRP also includes a tool enabling road transport and logistics companies to use digital waybills, as well as an investment to accelerate the digital transformation of the construction sector. There is also a programme that will help increase the export capacity and competitiveness of Estonian businesses, including those operating with information and communication technologies. The digital skills reform included in the RRP is supported by cohesion policy investment in skills (see Annex 4 and Box 3).

Strengthening social protection, social services and healthcare

Under the RRP, Estonia adopted major reforms and is investing to improve access to healthcare. Legislative changes introduced in 2023 make it more attractive for health workers to work in remote areas, thus strengthening primary care across the country. In addition, a strategic framework was put in place to increase the attractiveness of the health profession and the number of health workers. Also, Estonia set up a new e-health governance framework to improve access to e-health. These reforms are complemented by a major investment in the construction of the TERVIKUM health centre in Viljandi.

Under the RRP, Estonia is strengthening social protection, equality and access to long-term care. Unemployed people will be better protected thanks to the extension of the duration of unemployment insurance benefits in times of economic crisis. Estonia is creating an integrated care model for health and social services to support people with complex care needs. Steps were taken to reduce the gender pay gap by developing a prototype of a gender pay gap digital tool to help employers take informed decisions.

The RRF and other EU funds have supported better provision of long-term care. The ongoing reforms under the RRP to support people with care needs are complemented by investments from other EU funds. The European Social Fund Plus will support the overall reform of long-term care and integration of healthcare and social services in Estonia, including through measures to encourage care personnel to enter and stay in the sector. ERDF investments will support deinstitutionalisation and independent living.

FURTHER PRIORITIES AHEAD

Estonia faces additional challenges related to resource productivity, energy efficiency, transport, skills, healthcare and long-term care, and social protection. Tackling these challenges will help increase Estonia's long-term competitiveness, ensure the resilience of its economy, and foster the well-being of its people. It will also help make further progress in achieving the UN Sustainable Development Goals.

It is important that the identified challenges are addressed at both national and regional level. This will help reduce regional disparities and improve the administrative and investment capacity in a balanced way across the country.

Resource productivity, energy efficiency, and sustainable transport

Estonia's green transition requires more action. In particular, there is a need to specify the funding framework for the climate and energy transition and the policies to reach the 2030 target in the effort sharing sectors; to reduce emissions from road transport and buildings and to improve carbon sinks in the land-use sector; and the institutional framework on climate adaptation and the circular economy.

Oil shale continues to have a significant share in Estonia's energy mix, hindering the green transition. The share of oil shale in the energy mix halved in 2020 compared to 2018 and stood at 37%. However, with very high electricity prices in 2022, oil shale became competitive again, and its share in electricity generation rose to 57%. While this is expected to be a short-term development, in order to be able to gradually phase out oil shale while at the same time keeping a high degree of energy independence, further deployment of renewable energy production is needed. At the same time, action is required to ensure that the phase-out of oil shale is accompanied by measures to ensure a just transition, especially in the Ida-Viru region, where 40% of the largest employers are oil shale companies (see Annex 7). The Estonian territorial just transition plan includes measures to alleviate the impact of the transition by diversifying the region's economy and improving the living environment. The Estonian recovery and resilience plan (RRP) includes reforms to facilitate the deployment of renewables, with a focus on wind energy, as well as measures to increase the production and storage of, and access to, renewable energy. However, for more impact, further investments are needed.

The Estonian economy remains energy intensive while gains in energy efficiency are slowing. In 2022, primary energy consumption increased by 6.5% and final energy consumption increased by 1.5% compared to 2021. The economy is highly energy intensive due to the still relatively big share of oil shale in the energy sector, the transport sector and buildings. High energy intensity combined with an increase in energy consumption puts a strain on the competitiveness of the Estonian economy and increases inflation and energy poverty. Estonia aims to renovate 3% of the floor area of public buildings per year. The Recovery and Resilience Facility finances several renovation schemes, with higher support rates in areas where the value of real estate is lower, but more public and private investments are needed to reach the annual renovation rate of 3%.

Preparations to synchronise Estonia's electricity grid with the continental Europe network are progressing well.

Estonia, Lithuania and Latvia plan to synchronise their electricity grids with the continental Europe network in February 2025. Timely finalisation of preparatory work is of utmost importance to ensure smooth disconnection from Russia and Belarus and integration of the Baltic states into the internal energy market.

Estonia would benefit from investing further in the transition to green and sustainable transport. The transport sector accounts for 15% of the country's total greenhouse gas emissions. Estonia aims to reduce its transport emissions by 24% by 2030 compared to 2005. With more than 90% of emissions stemming from road transport and having one of the highest car ownership rates in the EU, Estonia has planned fiscal measures to decrease car dependency. In particular, a vehicle tax, based on the gross weight and CO_2 emissions of the vehicle, is planned for 2025. In addition, Estonia is taking measures to increase the level of electrification of railroads. However, action is needed to ensure actual implementation of the Transport and Mobility Development Plan adopted in 2023. This includes fostering electrification and increasing the number of connections, the speed and the safety of rail transport, and promoting the use of less polluting means of transport, especially in urban areas.

The Estonian economy continues to be characterised by low resource productivity and circularity. Resource productivity barely increased from 1 EUR/kg of resources used to 1.1 EUR/kg, remaining at less than half the EU average in 2022. Estonia's municipal waste recycling rate was only 30.3% in 2021, much below the EU average of 49.6% (see Annex 9).

The sector of land use, land-use change and forestry has become a CO_2 emitter instead of absorber. This is shown by the most recent available data (2021). The forestry sector is characterised by high felling volumes, but also by low resource valorisation. Estonia would benefit from increasing the efficiency of sustainable forest management, transitioning further to a circular economy, and improving waste management. Boosting eco-innovation and bio-based innovation will help improve resource productivity and competitiveness (see Annexes 9 and 11).

Closing the skills gap and skills mismatches while strengthening innovation

Skills shortages and mismatches in many sectors persist and reduce Estonia's competitiveness. Estonia's labour market is performing well and has one of the highest levels of participation and employment in the EU. Still, around 80% of businesses have identified the lack of skilled staff as a barrier to investment, and the persisting shortages of highly educated specialists in exporting industries are hindering the country's export potential in the long run (see Annex 12). The development of new industries such as information technology and digital services has increased demand for workers with specialised skills (see Annex 10). Shortages of skilled workers and high skills mismatches also remain present in many traditional sectors, most notably in education and healthcare (see Annexes 15 and 16). As a result of Estonia's market-based wage setting, skills shortages have led to rapid wage growth in certain sectors and increased cost of labour ([4]), leading to a loss of competitiveness. Skills shortages have a notable regional dimension, as rural and remote areas have bigger problems in attracting qualified professionals. Moreover, these challenges are augmented by the ageing of workers and the persistently high gender pay gap.

Over the years, measures have been taken to alleviate skills shortages, but the challenge remains. Estonia has implemented various adult and lifelong learning programmes to upskill and reskill workers to address skills gaps. While the share

([4]) European Commission, *In-Depth Review*, 2023, In-Depth Review 2023 - Estonia - European Commission (europa.eu).

of employees participating in training increased to 22% in 2022 (well above the share in other Baltic countries), the share of workers reporting a qualification mismatch is almost 40% ([5]). There is scope to address skills mismatches and skills shortages by, among other things, increasing opportunities for reskilling and upskilling and steering young people towards occupations with high shortages of workers. In addition, addressing the high gender pay gap is also critical for ensuring that workers are skilled and competitive. Investing in training and development of female employees would offer better career opportunities and better paid jobs.

Estonia has performed strongly in education, but a moderately worsening trend can be observed. The 2022 results of the Programme for International Student Assessment of the Organisation for Economic Co-operation and Development show that Estonia has performed very strongly on basic skills. Over the past decade, the proportion of low-achieving students has remained well below the EU average in mathematics, reading and science. However, the performance deteriorated recently due to underachievement among disadvantaged students, although Estonia remains the country with the smallest socio-economic gap (see Annex 15). Improving the performance of underachievers remains important in the long term to tackle skills shortages and increase innovation capacity.

Estonia's strong performance in education is overshadowed by structural challenges such as educational staff shortages, early school leaving and a large gender gap. Early school leaving increased to 10.8% in 2022, compared to an EU average of 9.6%. Furthermore, there are gender gaps in education as more boys leave school early, and drop-out in higher education is high. These trends result in an insufficient number of graduates (Annexes 14 and 15). At all levels of education, and especially in sciences and mathematics, there are severe teacher shortages, which are exacerbated by the large share of teachers who will be reaching retirement age in the next years, and a high rate of novice teachers who quit. Moreover, the ongoing transition to a fully Estonian-speaking education increases the demand for teachers with proficient language skills, exacerbating teacher shortages. In parallel, there is a risk of growing educational inequalities as recent data show the increasing impact of students' socio-economic background (Annex 15). These challenges need to be taken into account when designing policies on skills and education.

Strengthening innovation is another important factor in strengthening Estonia's competitiveness. Estonia has a dynamic R&D base and good framework conditions for tech start-ups, which support the innovative capacity of its economy (see Annex 11). While many Estonian businesses have increased R&D investments in recent years, R&D spending remains limited, and the innovation system focuses on digital innovation and start-ups. Diversifying the innovation system to include sectors such as advanced manufacturing, and strengthening the value chain of wood and other natural resources, could create new opportunities for economic growth and increase competitiveness, if workers are equipped with the right skills (see Annex 15). Closer collaboration between academia, industry and government is needed to promote knowledge transfer, technology commercialisation, and the development of high-value skills necessary for innovation performance. Finally, to help address these challenges, Estonia could step up its action to retain and attract talent, for instance by revising the quota for foreign workers taking into account the shortages of skilled workers in ICT, healthcare and industry.

Improving access to long-term care and healthcare

Demographic changes put pressure on the provision of affordable long-term care services. Life expectancy in Estonia is

([5]) European Commission, *Country Report – Estonia*, 2023, 2023 Country Report - Estonia - European Commission (europa.eu) and OECD, *Economic Survey of Estonia*, 2024.

increasing, driving up the number of those who will need care. This is coupled with a high share of people aged 65 and above in need of long-term care who lack assistance in personal care or household activities. In addition, Estonia has the highest proportion of persons with disabilities not able to have their care needs met. Access to long-term care is unequal across the country as local governments' capacity to provide services and funding varies significantly (Annex 14). Lack of sufficient care services may put pressure on relatives, mainly women, to provide the needed care themselves. As a result, only a limited number of these people are working or looking for a job, reducing Estonia's competitiveness.

Local governments have broad power and autonomy to develop their policies, but not all have enough capacity to fund and provide services. The financial capacity of local authorities depends mostly on intergovernmental transfers, which, in turn, depend on the number of inhabitants. The share of Estonian municipalities' own tax revenues is one of the lowest in the EU. This creates situations in which local governments may not be able to provide enough services to meet the demand ([6]), also resulting in regional disparities in care provision. Improvements are expected from reforms of long-term care services, both as part of the RRP and under the separate 'Care Reform' that started in 2023 and aims to reduce out-of-pocket payments and support local governments, among other things.

Improving the working conditions of care workers would improve the provision of quality long-term care. While the number of formal long-term care workers is around the EU average, hourly earnings in social services are well below the average earnings in Estonia. Unattractive salaries may prompt care workers to leave the profession or not to enter it at all, while the demand for care is high and will increase in the future in Estonia. This is coupled with shortages in the healthcare sector, where wages of doctors and nurses, as a percentage of the national average wage, are among the lowest of all EU Member States ([7]). Quality care can only be provided by well-trained care workers, so it is important to ensure adequate training for those working in the care sector.

There is scope to improve access to healthcare. Estonia has taken steps to improve the health situation of its people, which resulted in a steady decrease in deaths from preventable and treatable diseases. However, death rates are still well above the EU average and unmet needs for medical care remain among the highest in the EU, suggesting that access to healthcare remains a challenge. Waiting times have decreased, but this positive trend mostly concerns those with a higher income, so there is a risk of increasing inequalities in access to treatment. In 2021, out-of-pocket spending accounted for 22.1% of total spending on healthcare, compared to an EU average of 14.5% , which is a particular concern for low-income households. Shortages of health workers persist as in 2021, Estonia had fewer doctors and nurses per inhabitant than the EU average (Annex 16). Ensuring that people are healthy contributes to people's well-being, as well as to Estonia's competitiveness, as workers can stay in work longer and without interruption. Estonia is taking steps to address healthcare-related challenges, including through reforms contained in its RRP, but ensuring equal access to treatment as well as reducing out-of-pocket payments remain issues to be addressed.

Relatively low tax revenue limits the funding of public services

The success of healthcare and long-term care reforms depends on the availability of appropriate and sustainable funding.

([6]) OECD, 'Revenues by level of government', *Government at a Glance 2023*, 2023, Summary | OECD Government at a Glance.

([7]) OECD, *Health Statistics*, 2023, OECD Health Statistics 2023 - OECD.

Government spending on healthcare remains among the lowest in the EU. In Estonia, only 76.24% of health expenditure was publicly funded in 2021, well below the EU average of 81.1%. While demand is increasing, government spending on long-term care also remains among the lowest in the EU (0.4% of GDP, against an EU average of 1.7% in 2022). Due to demographic changes, demand for healthcare and long-term care is expected to increase; therefore, ensuring appropriate funding for both is warranted.

Estonia is struggling to raise tax revenues, which is needed to fund public services, including healthcare and long--term care. Total tax revenues amounted to 32.9% of GDP in 2022, slightly lower than the 33.8% in 2021, and well below the EU average of 40.2% (see Table A19.1 in Annex 19). By component, Estonia relies strongly on consumption taxes, which are generally considered least detrimental to growth. They amounted to 13% of GDP in 2022, compared to an EU average of 11%. However, recurrent property taxation, which is also considered to be one of the sources of tax revenue least detrimental to growth, made up only 0.2% of GDP in 2022, against an EU average of 1%. In addition, capital taxes accounted for only 2.7% of GDP in 2022, about a quarter of the EU average share (8.9%). Part of the difficulty in collecting and raising taxes is due to the fact that Estonia has been in recession since 2022. The country needs to avoid procyclicality in fiscal policy given the large external shocks that are hitting its economy.

The tax burden is unevenly distributed, and the forthcoming tax reform is set to further increase income inequality. Estonia's income tax burden is close to the EU average, but it is regressive, taxing higher incomes at a lower effective rate (see Graph A19.2 in Annex 19). An extensive tax reform is envisaged for 2025. The reform is set to raise the income tax rate from 20% to 22% while also increasing the basic tax exemption to EUR 8 400 per year and extending its scope to cover everyone, regardless of income. Overall, the proposed reform would reduce government revenues by EUR 290 million and worsen income inequality (see Box 4).

To help address fiscal challenges, the independent fiscal institution could be strengthened. The Estonian Fiscal Council is a relatively small independent fiscal institution, with only two staff members. It endorses the government's macroeconomic and fiscal forecasts and assesses compliance with the budget balance rule. Independence could be further strengthened, in particular as the Fiscal Council budget is part of the central bank budget.

Strengthening social protection to reduce poverty and inequality

The social protection of older people, persons with disabilities and people in non-standard forms of work and with short work spells is weak. Estonia still has one of the EU's highest at-risk-of-poverty or social exclusion (AROPE) rates for older people, persons with disabilities and those in non-standard forms of work and with short work spells. In 2022, the AROPE rate for persons with disabilities not only increased, but also was the second highest in the EU, and the gap compared to the AROPE rate for people without disabilities was the biggest in the EU (Annex 14). The low adequacy of the social safety net results in high, and increasing, income inequality, despite a few improvements in previous years. Income inequality started to increase in 2021, reversing the trend of a decrease observed since 2015. Old-age poverty has been on the rise, and it was one of the highest in the EU in 2022. The gender gap in old-age poverty narrowed slightly in 2022, but only because of a higher increase in poverty for men than for women (Annex 14). Pensions are still low relative to work incomes (the aggregate replacement ratio is 0.44, compared to an EU average of 0.58). The 2021 pension reform made it possible to opt out of the statutory funded scheme, reducing the future adequacy of pensions and putting people at a higher risk of poverty in the long term. The low coverage

Box 4:

Effects of the most relevant 2025 tax reforms in Estonia

At the end of 2023, the Estonian government adopted a series of fiscal measures that will take effect in 2024 and 2025 (including reforms of the value added tax, pension contributions, taxable income deductions, basic exemptions and the income tax rate). This box summarises the results of an *ex ante* assessment of the distributional effects of the two measures with the largest budgetary impact, both taking effect in 2025: (i) an increase in the income tax rate from 20% to 22%, estimated to raise government revenues by EUR 260 million; and (ii) an increase in the basic tax exemption and an extension of its scope to cover all income tax payers, expected to reduce government revenues by around EUR 550 million. EUROMOD simulations ([10]) show that the increase in the tax rate will be offset by the increase in the tax exemption for most households (60.8% will be net gainers). Poorer households are mostly unaffected by the reform: they will only benefit from the small increase in the basic tax exemption (from EUR 7 848 to EUR 8 400) and they often rely on social income or pensions (rather than on employment income), which are not affected by the increase in the income tax rate. For richer households, the combined effect of both measures is expected to be positive: the gain in income due to increase in the basic tax exemption is expected to fully offset the income loss due to the increase in the tax rate. Overall, the combined impact on poverty reduction is minimal, while income inequality is expected to rise (the Gini coefficient on disposable income increasing from 0.307 to 0.310).

of unemployment benefits, especially for those in non-standard forms of work or with short work spells, plays a role in income inequality (see Annex 14). Although the duration of unemployment benefits has been adjusted (under the RRP), the extension of the coverage is only planned for 2025. Accelerating the legislative work would help improve the situation of unemployed people in non-standard forms of work or with short work spells. The income tax reforms planned for 2025 are set to increase income inequality as well (see Box 4).

Rising inequality is linked to the significant increase in cost of living. This increase was not accompanied by a corresponding increase in social benefits and minimum wages. The 2022 nominal increases in social benefits and pensions raised household disposable income on average by 1.57%. However, these positive effects were offset by the increased cost of living, resulting in an average real loss in household disposal income of about 3.64% ([8]). The situation of low-income households has worsened due to high and persistent inflation in the past and is set to deteriorate further as a result of planned tax reforms in 2024-2025 (see Box 4 and Annex 14). Therefore, ensuring appropriate mitigation measures, including as regards pensions, for those at risk of poverty will remain a key challenge. Increasing the adequacy of the social protection system could reduce poverty and inequalities. This should help Estonia achieve the 2030 EU headline target on poverty reduction of 39 000 fewer people at risk of poverty or social exclusion compared to 2019.

These findings are consistent with the second-stage analysis in line with the features of the Social Convergence Framework. The analysis points to challenges related to social protection and inclusion, and education but does not point to major social convergence challenges for Estonia overall, in light of the positive developments recorded, especially in the area of employment ([9]).

([8]) The EUROMOD methodology was used for the analysis in this chapter. See Paulus, A., & Tasseva, I. V., *Europe Through the Crisis: Discretionary Policy Changes and Automatic Stabilizers,* 2020, Europe Through the Crisis: Discretionary Policy Changes and Automatic Stabilizers - Paulus - 2020 - Oxford Bulletin of Economics and Statistics - Wiley Online Library.

([9]) European Commission, SWD(2024)132. The analysis relies on all the available quantitative and qualitative evidence and analysing the policy response undertaken and planned.

Box 5:

The mid-term review of cohesion policy funds for Estonia

The mid-term review of cohesion policy funds is an opportunity to assess cohesion policy programmes and tackle emerging needs and challenges in EU Member States and their regions. Member States are reviewing each programme taking into account, among other things, the challenges identified in the European Semester, including in the 2024 country-specific recommendations. This review forms the basis for a proposal by the Member State for the definitive allocation of 15% of the EU funding included in each programme.

Estonia has made progress in implementing cohesion policy programmes and the European Pillar of Social Rights, but challenges remain as outlined in this report (see Annexes 14 and 17). In particular, disparities persist in terms of GDP per capita and productivity between the capital region and the rest of the country. Against this background, it remains important to continue to implement the planned investments, with particular attention to: (i) increasing competitiveness of businesses, especially outside the capital area, and improving their capacity to innovate; (ii) improving the energy efficiency of private and public buildings, as well as helping businesses to become more energy-efficient; (iii) access to employment through active and preventive labour market measures and promoting a healthy work environment; (iv) the quality, effectiveness and labour market relevance of education and training and promoting lifelong learning, notably flexible upskilling and reskilling; and (v) active inclusion and increasing the accessibility, effectiveness and resilience of long-term care services.

The needs related to accessibility and quality of long-term care prioritising independent living merit specific consideration in the preparation of the mid-term review. Estonia could also benefit from the opportunities available under the Strategic Technologies for Europe Platform (STEP) initiative ([11]) to facilitate investments in net-zero technologies manufacturing and support the transformation of industry, for instance in the areas of deep tech innovation, green and digital technologies, and biomedicine. Estonia could also increase its capacity to process rare earth metals as well as to perform R&D supporting it.

([10]) Based on EU-SILC 2021 data (2020 income reference period). Budgetary and distributional results are expressed in 2023 prices.

([11]) Regulation (EU) 2024/795 of the European Parliament and of the Council of 29 February 2024 establishing the Strategic Technologies for Europe Platform (STEP), and amending Directive 2003/87/EC and Regulations (EU) 2021/1058, (EU) 2021/1056, (EU) 2021/1057, (EU) No 1303/2013, (EU) No 223/2014, (EU) 2021/1060, (EU) 2021/523, (EU) 2021/695, (EU) 2021/697 and (EU) 2021/241 (europa.eu)

KEY FINDINGS

With its wide policy scope and substantial financial envelope, Estonia's recovery and resilience plan (RRP) includes measures to address a series of structural challenges, in synergy with other EU funds, including cohesion policy funds, by:

- **Reducing the economy's energy intensity** by improving the energy efficiency of buildings, further developing renewable energy production, streamlining permitting and developing green skills;
- **Improving the circular economy** by valorising natural resources, in particular by incentivising the production of local sustainable biomethane;
- **Addressing sustainable transport**, including by introducing a common pricing and ticketing system in the Tallinn area, advancing the Rail Baltic project, and constructing the Tallinn Old Port tramline;
- **Strengthening the productivity and innovation capability** of businesses and setting up a dedicated Green Fund to foster the development and uptake of innovative green technologies;
- **Upgrading digital government services** and improving digital skills;
- **Improving the accessibility and resilience of the health system**, including by increasing the number of health workers and strengthening primary care;
- **Strengthening social protection** by extending the duration of unemployment benefits, reducing the gender pay gap, and improving long-term care and employment of young people.

Continued efforts are key for a successful implementation of all the measures of Estonia's RRP by August 2026.

Beyond the reforms and investments in the RRP and the cohesion policy programmes, Estonia would benefit from:

- **Broadening the tax base**, also to ensure adequate and sustainable financing for healthcare, long-term care and social protection;
- **To support upward social convergence, strengthening social protection and tackling inequalities**, by addressing old-age poverty, increasing support for people with disabilities, and extending the coverage of unemployment benefits, in particular to those with short work spells and in non-standard forms of work;
- **Improving access to long-term care and healthcare**, in particular by addressing shortages of workers and improving the capacity of local governments to provide affordable long--term care services;
- **Addressing skills shortages and mismatches** to strengthen labour productivity and innovation performance, including by reducing early school leaving and drop-out from higher education, improving skills supply through reskilling and upskilling, and better attracting and retaining talent.
- **Improving energy and resource efficiency** for increased competitiveness by accelerating the deployment of renewables, reducing the overall reliance on fossil fuels and phasing out oil shale, and increasing the valorisation of natural resources, such as forestry, through eco- and bio-innovation.

ANNEXES

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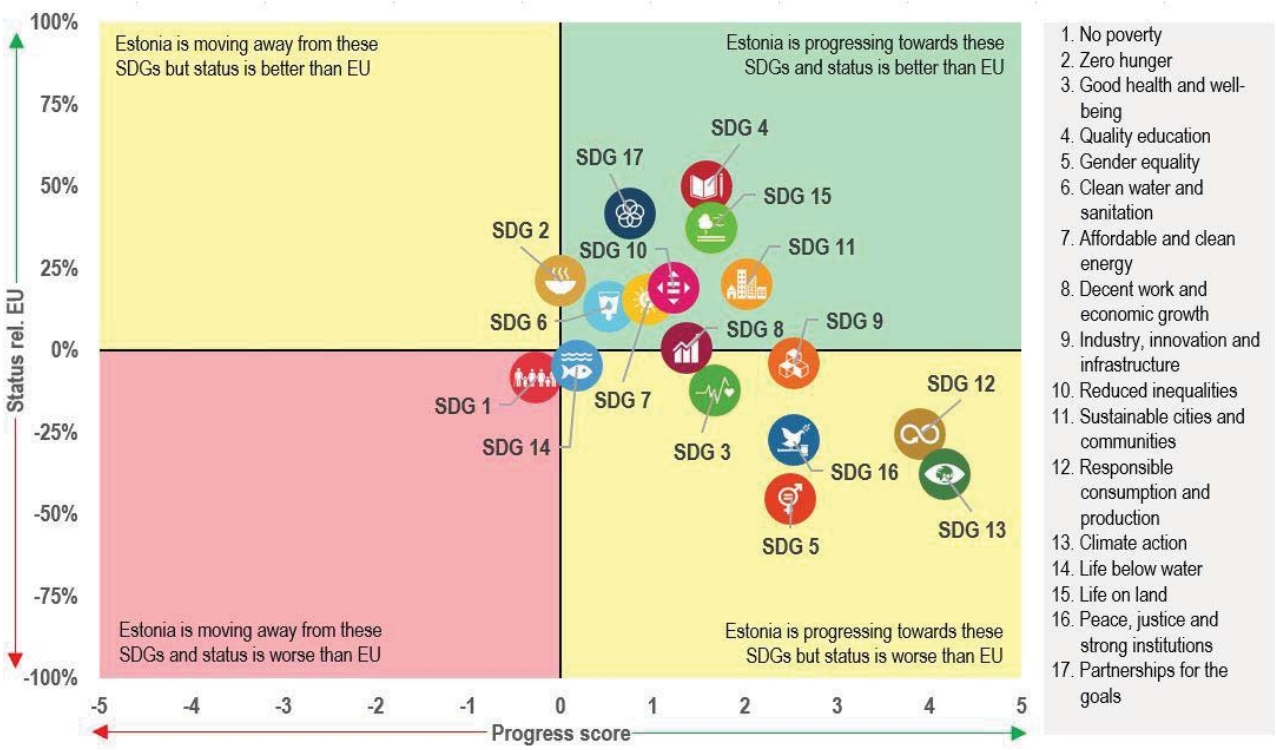
ANNEX 1: SUSTAINABLE DEVELOPMENT GOALS

This Annex assesses Estonia's progress on the Sustainable Development Goals (SDGs) along the four dimensions of competitive sustainability. 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 an EU context.

While Estonia performs well and is improving on several of the SDG indicators related to *environmental sustainability* (SDGs 6, 7, 11, 15), it needs to catch up with the EU average on SDG 9 (Industry, innovation and infrastructure), SDG 12 (Responsible consumption and production) and SDG 13 (Climate action). The country performs well, but is not improving, on SDG 2 (Zero hunger). While Estonians' material footprint (SDG 12) decreased from 28.0 tonnes per inhabitant in 2017 to 27.4 in 2022, it is still above the EU average of 14.9 tonnes per inhabitant. Similarly, while net greenhouse gas emissions (SDG 13) decreased from 17.2 tonnes per capita in 2017 to 10.7 in 2022, they are still above the EU average of 7.3 tonnes per capita. However, Estonia is performing well and has made progress on most of the affordable and clean energy indicators (SDG 7), including on the share of renewable energy in gross final energy consumption, from 29.5% in 2017 to 38.5% in 2022 (EU average 23.0%). Although Estonia is not improving on SDG 2 as regards the environmental impacts of agricultural production, with the amount of nitrate in groundwater increasing from 4.6 mg NO_3 per litre in 2016 to 5.2 mg NO_3 per litre in 2021, the amount remains well below the EU average

Graph A1.1: **Progress towards the SDGs in Estonia**



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 5 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 25 April 2024. Data refer mainly to the period 2017-2022 or 2018-2023. Data on SDGs may vary across the report and its annexes due to different cut-off dates.

(20.5 mg NO_3 per litre in 2021).

While Estonia performs well and is improving on some SDG indicators related to *fairness* (SDGs 4, 7, 10), it still needs to catch up on SDG 1 (No poverty), SDG 5 (Gender equality) and SDG 3 (Good health and well-being). Compared to 2018, tertiary educational attainment (SDG 4) increased from 41.1% of the population aged 25 to 34 to 43.5% in 2023 (EU average: 43.1%). The country also performs well on low-achieving 15-year-olds in mathematics (SDG 4; 15.0% of 15-year-old students in 2022; EU average in 2022: 29.5%), although there has been an increase in recent years (10.2% in 2018). Estonia still needs to catch up on some gender equality indicators (SDG 5). Estonia is improving in terms of the gender pay gap in its unadjusted form (the average gross hourly earnings of women went from being 24.9% lower than men in 2017 to 21.3% lower in 2022). However, it still needs to catch up with the EU average of 12.7%. Estonia is moving away from, and needs to catch up with, the EU average on poverty reduction (SDG 1), including on people at risk of poverty or social exclusion (up from 23.3 % of the population in 2017 to 25.2% in 2022; EU average: 21.6%). Similarly, the share of people at risk of monetary poverty after social transfers increased from 21.0% of the population in 2017 to 22.8% in 2022 (EU average: 16.5%). As for SDG 3 (Good health and well-being), healthy life expectancy has plateaued at a level well below the EU average (falling from 56.8 years in 2016 to 56.5 years in 2021; EU average: 63.6). There is also improvement on self-reported unmet needs for medical care, although also from a level well below the EU average (falling from 11.8% of the population aged 16 or over in 2017 to 9.1% in 2022; EU average: 2.2%). The Estonian recovery and resilience plan (RRP) includes measures to address challenges in primary healthcare and long-term care.

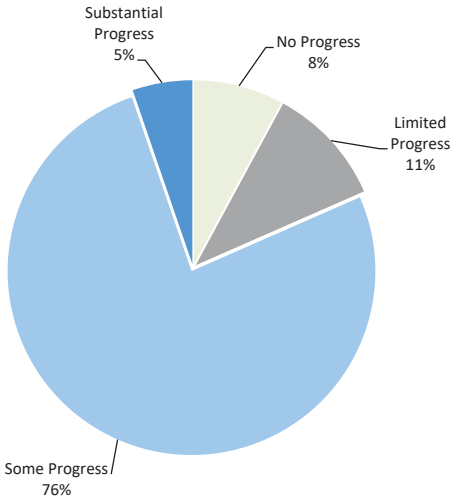
Estonia is performing well and improving on two SDGs on *productivity* (SDGs 4 and 8), but still needs to catch up with the EU average on SDG 9 (Industry, innovation and infrastructure). The country is performing well and improving on adult learning (SDG 4; participation in learning in the past 4 weeks is up from 19.3% of the active population aged 25-64 in 2018 to 23.2% in 2023; EU average 12.7%). Estonia is also performing well and improving on the share of households with a high-speed internet connection (SDG 9; from 50.7% in 2017 to 79.2% in 2022; EU average 73.4%). However, while gross domestic expenditure on R&D (SDG 9) increased from 1.3% of GDP in 2017 to 1.8% in 2022, it is still below the EU average of 2.2%. The Estonian RRP includes significant reforms and investments to boost innovation and digital transition in businesses. However, there is still room for improvement in addressing the remaining challenges.

Estonia is performing well and improving on one SDG indicator related to *macroeconomic stability* (SDGs 8 and 17). However, the country needs to catch up with the EU average on SDG 16 (Peace, justice and strong institutions). Real GDP per capita (SDG 8) increased from EUR 14 920 in 2018 to EUR 15 370 in 2023 (EU average in 2023: EUR 28 940). Similarly, Estonia is making progress on peace and personal security (SDG 16) but needs to catch up with the EU average. While the standardised death rate due to homicide decreased from 2.7 per 100 000 in 2016 to 2.0 in 2021, it is still above the EU average of 0.7. Estonia is improving on the SDG indicators on global partnerships. Official development assistance (SDG 17) increased from 0.16% of gross national income (GNI) in 2017 to 0.54% of GNI in 2021, staying below the EU average of 0.58%.

As the SDGs form an overarching framework, any links to relevant SDGs are either explained or depicted with icons in the other annexes.

The Commission has assessed the 2019-2023 country-specific recommendations (CSRs) ([12]) addressed to Estonia as part of the European Semester. These recommendations concern a wide range of policy areas that are related to 14 of the 17 Sustainable Development Goals (see Annexes 1 and 3). The assessment considers the policy action taken by Estonia to date ([13]) and the commitments in its recovery and resilience plan (RRP) ([14]). At this stage of RRP implementation, 81% of the CSRs focusing on structural issues from 2019-2023 have recorded at least 'some progress', while 11% recorded 'limited progress' (see Graph A2.1). As the RRP is implemented further, considerable progress in addressing structural CSRs is expected in the years to come.

Graph A2.1: **Estonia´s progress on the 2019-2023 CSRs (2024 European Semester)**



Source: European Commission

([12]) 2023 CSRs: EUR-Lex - 32023H0901(06) - EN - EUR-Lex (europa.eu)

2022 CSRs: EUR-Lex - 32022H0901(06) - EN - EUR-Lex (europa.eu)

2021 CSRs: EUR-Lex - 32021H0729(06) - EN - EUR-Lex (europa.eu)
2020 CSRs: EUR-Lex - 32020H0826(06) - EN - EUR-Lex (europa.eu)
2019 CSRs: EUR-Lex - 32019H0905(06) - EN - EUR-Lex (europa.eu)

([13]) Including policy action reported in the national reform programme and in Recovery and Resilience Facility (RRF) reporting (twice a year reporting on the progress made in implementing milestones and targets and resulting from the payment requests assessment).

([14]) Member States were asked to effectively address in their RRPs all or a significant subset of the relevant country-specific recommendations issued by the Council. The CSR assessment presented here takes into account the degree of implementation of the measures included in the RRP and of those carried out outside of the RRP at the time of assessment. Measures laid down in the Annex of the adopted Council Implementing Decision on approving the assessment of the RRP, which are not yet adopted or implemented but considered credibly announced, in line with the CSR assessment methodology, warrant 'limited progress'. Once implemented, these measures can lead to 'some/substantial progress or full implementation', depending on their relevance.

Table A2.1: **Summary table on 2019-2023 CSRs**

Estonia	Assessment in May 2024	RRP coverage of CSRs until 2026**	Relevant SDGs
2019 CSR 1	**Some progress**		
Ensure that the nominal growth rate of net primary government expenditure does not exceed 4.1% in 2020, corresponding to an annual structural adjustment of 0.6% of GDP.	Not relevant anymore	Not applicable	SDG 8, 16
Ensure effective supervision and the enforcement of the anti-money laundering framework.	Some progress	Not applicable	SDG 8, 16
2019 CSR 2	**Some progress**		
Address skills shortages and foster innovation by improving the capacity and labour market relevance of the education and training system.	Some progress	Relevant RRP measures being planned as of 2022	SDG 4
Improve the adequacy of the social safety net and access to affordable and integrated social services.	Some progress	Relevant RRP measures being planned as of 2022 and 2023	SDG 1, 2, 10
Take measures to reduce the gender pay gap, including by improving wage transparency.	Some progress	Relevant RRP measures being planned as of 2022	SDG 8, 10
2019 CSR 3	**Some progress**		
Focus investment-related economic policy on sustainable transport and energy infrastructure, including interconnections, on fostering research and innovation, and on resource and energy efficiency, taking into account regional disparities.	Some progress	Relevant RRP measures being planned as of 2021, 2022, 2023 and 2024	SDG 7, 9, 10, 11, 13
2020 CSR 1	**Some Progress**		
In line with the general escape clause, take all necessary measures to effectively address the 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.	Not relevant anymore	Not applicable	SDG 8, 16
Improve the accessibility and resilience of the health system, including by addressing the shortages of health workers, strengthening primary care and ensuring the supply of critical medical products.	Some Progress	Relevant RRP measures being planned as of 2020, 2021, 2022 and 2023	SDG 3
2020 CSR2	**Some Progress**		
Strengthen the adequacy of the social safety net, including by broadening the coverage of unemployment benefits.	Some Progress	Relevant RRP measures being planned as of 2022 and 2023	SDG 1, 2, 10
2020 CSR 3	**Some Progress**		
Front-load mature public investment projects	Some Progress	Relevant RRP measures being planned as of 2021, 2022 and 2023	SDG 8, 16
and promote private investment to foster the economic recovery.	Some Progress	Relevant RRP measures being planned as of 2021, 2022 and 2023	SDG 8, 9
Focus investment on the green and digital transition, in particular on digitalisation of companies,	Some Progress	Relevant RRP measures being planned as of 2021, 2022, 2023 and 2024	SDG 9
research and innovation,	Some Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 9
clean and efficient production and use of energy,	Limited Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 7, 9, 13
resource efficiency, and	Limited Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 6, 7, 12, 15
sustainable transport, contributing to a progressive decarbonisation of the economy.	Some Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 11
Support the innovation capacity of small and medium-sized enterprises,	Some Progress	Relevant RRP measures being planned as of 2021, 2022, 2023 and 2024	SDG 8, 9
and ensure sufficient access to finance.	Some Progress	Relevant RRP measures being planned as of 2021	SDG 8, 9

(Continued on the next page)

Table (continued)

2020 CSR 4	**Some progress**		
Step up the efforts to ensure effective supervision and enforcement of the anti-money laundering framework.	Some progress	Relevant RRP measures being planned as of 2024 and 2026	SDG 8, 16
2021 CSR 1	**Not relevant anymore**		
In 2022, maintain a supportive fiscal stance, including the impulse provided by the Recovery and Resilience Facility, and preserve nationally financed investment.	Not relevant anymore	Not applicable	SDG 8, 16
When economic conditions allow, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions and ensuring fiscal sustainability in the medium term.	Not relevant anymore	Not applicable	SDG 8, 16
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.*	Not relevant anymore	Not applicable	SDG 8, 16
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.	Not relevant anymore	Not applicable	SDG 8, 16
2022 CSR 1	**Limited Progress**		
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.	No Progress	Not applicable	SDG 8, 16
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.	Substantial Progress	Not applicable	SDG 8, 16
For the period beyond 2023, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions.	No Progress	Not applicable	SDG 8, 16
2022 CSR 2			
Proceed with the implementation of its recovery and resilience plan, in line with the milestones and targets included in the Council Implementing Decision of 29 October 2021.	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.		
Submit the 2021-2027 cohesion policy programming documents with a view to finalising their negotiations with the Commission and subsequently starting their implementation.	Progress on the cohesion policy programming documents is monitored under the EU cohesion policy.		
2022 CSR 3	**Some Progress**		
Strengthen social protection, including by extending the coverage of unemployment benefits, in particular to those with short work spells and in non-standard forms of work.	Some Progress	Relevant RRP measures being planned as of 2023	SDG 1, 2, 10
Improve the affordability and quality of long-term care, in particular by ensuring its sustainable funding and integrating health and social services.	Some Progress	Relevant RRP measures being planned as of 2022	SDG 3
2022 CSR 4	**Some Progress**		
Reduce overall reliance on fossil fuels and diversify imports of fossil fuels	Some Progress	Relevant RRP measures being planned as of 2022 and 2024	SDG 7, 9, 13
by accelerating the deployment of renewables, including through further streamlining of permitting procedures	Some Progress	Relevant RRP measures being planned as of 2022 and 2024	SDG 7, 8, 9, 13
ensuring sufficient capacity of interconnection	Some Progress		SDG 7, 9, 13
and strengthening the domestic electricity grid.	Some Progress	Relevant RRP measures being planned as of 2022	SDG 7, 9, 13
Increase energy efficiency, including of buildings, to reduce energy consumption.	Some Progress	Relevant RRP measures being planned as of 2022	SDG 7
Intensify efforts to improve the sustainability of the transport system, including through electrification of the rail network and by increasing incentives to encourage sustainable and less polluting transport, including the renewal of the road vehicle stock.	Limited Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 11

(Continued on the next page)

Table (continued)

2023 CSR 1	**Some progress**		
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 such support measures are targeted at protecting vulnerable households and firms, are fiscally affordable and preserve incentives for energy savings.	Full implementation	Not applicable	SDG 8,16
Ensure prudent fiscal policy, in particular by limiting the nominal increase in nationally financed net primary expenditure in 2024 to not more than 4,9%.	Full implementation	Not applicable	SDG 8,16
Preserve nationally financed public investment and ensure the effective absorption of grants under the Facility and of other Union funds, in particular to foster the green and digital transitions.	Full implementation	Not applicable	SDG 8,16
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, in order to achieve a prudent medium-term fiscal position.	No progress	Not applicable	SDG 8,16
2023 CSR 2			
Proceed with the steady implementation of its recovery and resilience plan including its REPowerEU chapter. Proceed with the swift implementation of cohesion policy programmes, in close complementarity and synergy with the recovery and resilience plan.	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, to be reflected in the country reports. Progress with the cohesion policy is monitored in the context of the Cohesion Policy of the European Union.		
2023 CSR 3	**Some progress**		
Strengthen social protection, including to address old-age poverty, and by extending the coverage of unemployment benefits, in particular for those with short work spells and in non-standard forms of work.	Some progress	Relevant RRP measures being planned as of 2023	SDG 1,2,10
Improve access to and the affordability of healthcare and	Some progress	Relevant RRP measures being planned as of 2020, 2021, 2022 and 2023	SDG 3
long-term care, in particular by ensuring their sustainable funding.	Some progress	Relevant RRP measures being planned as of 2022	SDG 3
2023 CSR 4	**Some progress**		
Reduce overall reliance on fossil fuels,	Some progress	Relevant RRP measures being planned as of 2022 and 2024	SDG 7,9,13
accelerate the deployment of renewable energy sources, including by strengthening the domestic electricity grid capacity.	Some progress	Relevant RRP measures being planned as of 2022 and 2024	SDG 7,9,13
Ensure sufficient capacity of electricity interconnections to increase the security of supply and continue the synchronisation with the Union electricity grid.	Substantial progress	Relevant RRP measures being planned as of 2022	SDG 7,9,13
Strengthen energy efficiency through new financing and support measures to meet the targets of the long-term renovation strategy.	Some progress	Relevant RRP measures being planned as of 2022	SDG 7
Continue efforts to increase the share of sustainable transport by electrifying the rail network and through taxation that incentivises the gradual renewal of the vehicle stock towards zero or low-emission vehicles.	Limited Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 8, 10, 11, 12
Step up policy efforts aimed at the provision and acquisition of skills and competences needed for the green transition.	Some progress	Relevant RRP measures being planned as of 2022	SDG 4

Note:

* See footnote ([14]).

** RRP measures included in this table contribute to the implementation of CSRs. Nevertheless, additional measures outside the RRP may be necessary to fully implement CSRs and address their underlying challenges. Measures indicated as 'being implemented' are only those included in the RRF payment requests submitted and positively assessed by the European Commission.Measures indicated as "being implemented" are only those included in the RRF payment requests submitted and positively assessed by the European Commission.

Source: European Commission

This Annex provides a snapshot of Estonia's implementation of its recovery and resilience plan (RRP), past the mid-way point of the Recovery and Resilience Facility's (RRF) lifetime. The RRF has proven central to the EU's recovery from the COVID-19 pandemic, helping speed up the twin green and digital transition, while adapting to geopolitical and economic developments, and strengthening resilience against future shocks. The RRF is also helping implement the UN Sustainable Development Goals and address the country-specific recommendations (see Annex 2).

The RRP paves the way for disbursing up to EUR 953.2 million in grants under the RRF over the 2021-2026 period, representing 2.5% of Estonia's GDP ([15]). As of mid-May 2024, EUR 0.5 billion has been disbursed to Estonia under the RRF.

Estonia still has EUR 450 million available in grants from RRF. This will be disbursed after the assessment of the future fulfilment of the remaining 86 milestones and targets ([16]) included in the Council Implementing Decision ([17]) (CID), ahead of the 2026 deadline established for the RRF.

Estonia's progress in implementing its plan is recorded in the Recovery and Resilience Scoreboard ([18]). The scoreboard gives an overview of the progress made in implementing the RRF as a whole. Graph A3.1 shows the current state of play as reflected in the scoreboard.

Estonia's RRP includes a REPowerEU chapter to phase out its dependency on Russian fossil fuels, diversify its energy supplies, and produce more clean energy in the coming years. To kick-start the REPowerEU chapter's implementation, EUR 18 million was disbursed as pre-financing on 13 December 2023. This helped launch relevant reforms like accelerating the decarbonisation of the energy system and supporting the transition to renewable energy.

The plan has a strong focus on the green transition, dedicating 59.5% of the available funds to measures that support climate objectives and 24.1% of its total allocation to support the digital transition. It also retains a strong social dimension with social protection measures, especially related to improving the accessibility and resilience of the health system, improving the social safety net and access to social services.

Table A3.1: **Key facts of the Estonian RRP**

Initial plan CID adoption date	29 October 2021
Scope	Revised plan with REPowerEU chapter
Last major revision	16 June 2023
Total allocation	EUR 953 million in grants (2.5% of 2023 GDP)
Investments and reforms	28 investments and 17 reforms
Total number of milestones and targets	133
Fulfilled milestones and targets	47 (35.3% of total)

Source: RRF Scoreboard

With two payment requests completed, Estonia's implementation of its RRP is well underway. The Commission gave a positive assessment of Estonia's first payment request, taking into account the opinion of the Economic and Financial Committee. This led to EUR 0.2 billion being disbursed in financial support on 6 November 2023 ([19]). The related 28 milestones and targets covered reforms and investments such as projects related to green skills to support the green transition of enterprises, as well as the creation and development of a centre of excellence for data governance, and others in the areas of skills for the digital transformation of

([15]) GDP information is based on 2023 data. Source: https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/index.html?lang=en

([16]) A milestone or target is satisfactorily fulfilled once a Member State has provided evidence to the Commission that it has reached the milestone or target and the Commission has assessed it positively in an implementing decision.

([17]) https://data.consilium.europa.eu/doc/document/ST-12532-2021-ADD-1/en/pdf

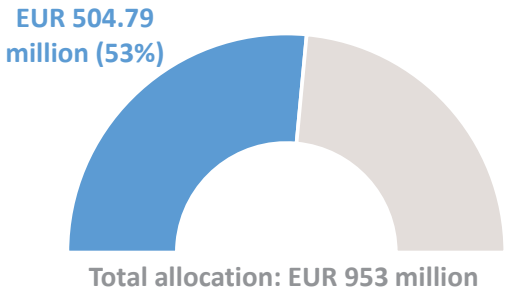
([18]) https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html

([19]) When requested payments are disbursed, the pre-financing is cleared proportionally. The net amounts are quoted here.

businesses, the competitiveness of enterprises in foreign markets and the provision of long-term care.

The recent payment request, which the Commission assessed positively on 12 March 2024, led to the disbursement of EUR 100 million on 19 April 2024. The disbursement reflected the positive assessment of 18 milestones and targets covering the development of proactive digital public services for individuals, investment projects on green hydrogen integrated value chains, as well as renewable energy production, supply solutions, and final consumption in different application areas, among others.

Graph A3.1: **Total grants disbursed under the RRF**



Note: This graph displays the amount of grants, including pre-financing, disbursed so far under the RRF. Grants are non-repayable financial contributions. The total amount of grants given to each Member State is determined by an allocation key and the total estimated cost of the respective RRP.
Source: RRF Scoreboard

As of 15 May 2024, Estonia is working towards its third payment request. Table A3.2 highlights some relevant measures achieved so far, and some that will be implemented before 2026 to keep making Estonia's economy greener, more digital, inclusive, and resilient.

Table A3.2: **Measures in Estonia's RRP**

Reforms and investments implemented
• Creation of a Green Transition Task Force • Transport and Mobility Development Plan 2021-2035 • Digital gender pay gap tool
Upcoming reforms and investments
• Deployment of national private cloud infrastructure by public authorities • Support for the construction of the Rail Baltic viaducts • New tramway line

Source: FENIX

EU funding instruments provide considerable resources for recovery and growth to the EU Member States. In addition to the EUR 953.2 million of Recovery and Resilience Facility (RRF) funding described in Annex 3, EU cohesion policy funds ([20]) provide EUR 3.4 billion to Estonia for the 2021-2027 period ([21]). Support from these two instruments combined represents around 11.47% of the country's 2023 GDP, compared to an EU average of 5.38% of GDP ([22]). Cohesion policy supports regional development, economic, social and territorial convergence and competitiveness through long-term investment in line with EU priorities and with national and regional strategies.

During the 2014-2020 programming period, cohesion policy funds boosted Estonia's competitiveness, with tangible achievements notably in business development, energy efficiency, transport, research, and inclusive labour market measures. By the end of the eligibility period in December 2023, 2014-2020 cohesion policy funds ([23]) had made EUR 3.7 billion available to Estonia ([24]), of which EUR 2 billion has been disbursed since March 2020, when the COVID-19 pandemic began ([25]). Including national financing, the total investment under the 2014-2020 programmes amounted to EUR 4.9 billion – around 2.9% of GDP. The achievements of cohesion policy funds over the programming period included the reconstruction of 214 km of railway, the creation of 5 220 new full-time jobs, and the improvement of the energy efficiency of 19 926 households. The European Regional Development Fund (ERDF) also supported the improvement of higher education infrastructure, which benefited more than 1 100 researchers, and invested in 251 companies to help them develop new products and bring them to market. During the same period, the European Social Fund (ESF) helped make labour markets more inclusive by offering labour-market services to over 97 000 people with reduced work ability. The ESF also supported more than 2 000 people who had become unemployed or were at the risk of unemployment due to the COVID-19 pandemic. Since 2022, the ESF has also supported people fleeing Russia's war of aggression against Ukraine, including by providing mentoring and training support.

In the current programming period (2021-2027), cohesion policy will provide a further boost to Estonia's competitiveness, to the green transition and to social cohesion, improving the living and working conditions of Estonia's people. In 2021-2027, the ERDF and Cohesion Fund (CF) will promote innovation and cooperation between research and businesses by supporting more than 290 businesses closely cooperating with research institutions. Particular attention will be paid to the greening of the economy, which is a priority in 2021-2027. EUR 2.6 billion will be invested in green transition, including in measures to help people overcome the challenges of the green transition. The CF will support the electrification of 450 km of railway. The Just Transition Fund will support further economic diversification and help create jobs in the Ida-Viru region, and 100 hectares of land will be rehabilitated. The European Social Fund Plus (ESF+) will invest EUR 91 million in removing obstacles to the labour-market participation of vulnerable groups, including unemployed people, older people and minorities. Active labour market measures will help to train more than 20 000 people. The ESF+ will also address gender segregation in the labour market, by offering more diverse vocational and career choices, and focus on promoting healthy workplaces. With this work, cohesion policy substantially contributes to achieving the UN Sustainable Development Goals (SDGs) in Estonia, in particular SDG 9 (Industry, innovation, infrastructure), SDG 7 (Affordable and clean energy) and SDG 1 (No poverty).

([20]) In 2021-2027, cohesion policy funds include the Cohesion Fund, the European Regional Development Fund, the European Social Fund Plus and the Just Transition Fund.

([21]) European territorial cooperation (ETC) programmes are excluded from the figure. In 2021-2027, the total investment, including national financing, amounts to EUR 5.2 billion.

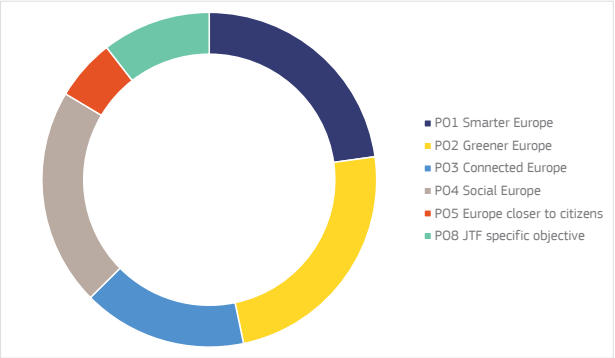
([22]) RRF funding includes both grants and loans, where applicable. The EU average is calculated for cohesion policy funds excluding ETC programmes. GDP figures are based on Eurostat data for 2022.

([23]) In 2014-2020, cohesion policy funds included the European Regional Development Fund and the European Social Fund. REACT-EU allocations are included but ETC programmes are excluded.

([24]) In 2014-2020, the total investment, including national financing, amounted to EUR 4.9 billion.

([25]) Cut-off date: 14 May 2024.

Graph A4.1: **Distribution of cohesion policy funding across policy objectives in Estonia**

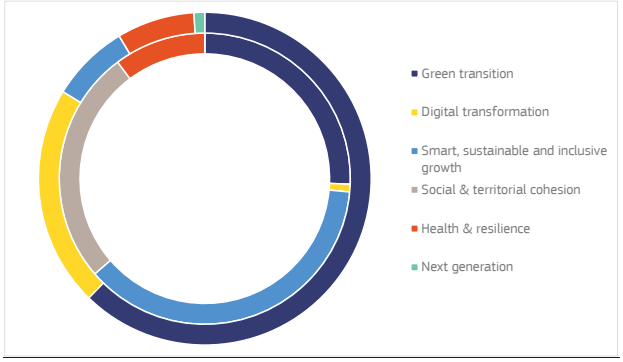


Source: European Commission

Through combined action, cohesion policy and the recovery and resilience plan (RRP) have a mutually reinforcing impact in Estonia. For instance, in energy efficiency, the RRP has been key in providing financial support for energy efficiency measures in residential and private buildings in the first years, while substantial cohesion policy funding is planned until the end of the 2021-2027 programming period to continue investments in this area. In addition, the 2021-2027 cohesion policy funds will finance energy efficiency investments in public buildings in the healthcare sector. Furthermore, the Connecting Europe Facility will invest in the construction of the Rail Baltic main track, while the CF will support the construction of Rail Baltic railway stations. The RRP envisages the construction of five viaducts, supplementing these investments. The contribution of cohesion policy and RRP funding by policy objective is illustrated by Graphs A4.1 and A4.2.

The Technical Support Instrument (TSI) helps Estonia invest in its public administration and create a better enabling environment for EU and national investment. The TSI has funded projects in Estonia to design and implement growth-enhancing reforms since 2017. The support provided in 2023 included action to develop a national strategy on critical entities; to implement the action plan for sustainable water services; and to promote the uptake of strategic public procurement in Estonia by professionalising the public procurement workforce. The TSI also helps Estonia to implement specific reforms and investments included in its RRP, e.g. relating to setting up data offices and increasing public authorities' capacity for managing and processing of data.

Graph A4.2: **Distribution of RRF funding by pillar in Estonia**



(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 contribution 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 to Estonia.

Source: European Commission

Estonia also receives funding from several other EU instruments, including those listed in Table A4.1.

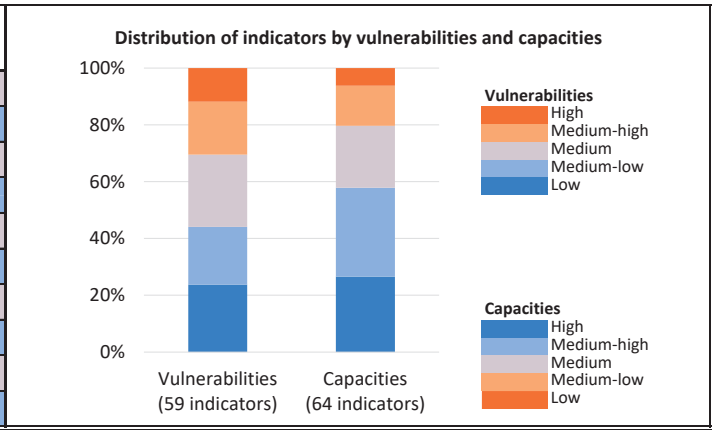
Table A4.1: **Support from EU instruments in Estonia**

EU grants			
	Amount 2014-2020 (EUR million)		Amount 2021-2027 (EUR million)
Cohesion policy	3 702.1		3 369.3
RRF grants (1)	-		953.2
Public sector loan facility (grant component) (2)	-		26.9
Common agricultural policy (3)	2 200.0		1 449.0
EMFF/EMFAF (4)	101		97.4
Connecting Europe Facility (5)	611.7		435.0
Horizon 2020 / Horizon Europe (6)	273.7		168.6
LIFE programme (7)	46.1		36.8
EU guarantees			
	EU Guarantee (EUR million)		Volume of operations (EUR million)
European Fund for Strategic Investment 2015-2020 (8)	88.3		242.3
InvestEU 2021-2027 (9)	10.8		18.0
EU loans			
	Period	Total amount available (EUR million)	Disbursed amount (EUR million)
SURE (10)	2020-2022	230.0	230.0

(1) RRF implementation period is 2021-2026.
(2) The public sector loan facility's programming period is 2021-2025 and the amount reflects the national share in its grant component reserved until the end of the period.
(3) Common agricultural policy programming periods are 2014-2022 and 2023-2027.
(4) EMFF – European Maritime and Fisheries Fund, EMFAF – European Maritime, Fisheries and Aquaculture Fund.
(5) Data on the Connecting Europe Facility covers transport and energy and has a cut-off date of 15 May 2024.
(6) Data on Horizon Europe (2021-2027) has a cut-off date of 13 May 2024.
(7) 2021-2027 data on the LIFE programme has a cut-off date of 15 May 2024.
(8) The amount of the EU guarantee signed under the EFSI Infrastructure and Innovation Window was derived based on the signed amount of the operations and the average internal multiplier, as reported by the EIB (cut-off date is 31 December 2023).
(9) The amount of the EU guarantee and of the volume of operations signed under InvestEU includes the EU compartment as well as the Member State compartments (cut-off date is 31 December 2023).
(10) SURE - European instrument for temporary support to mitigate unemployment risks in an emergency.
Source: European Commission

Table A5.1: **Resilience indices across dimensions for Estonia and the EU-27**

Dimension		EE 2023 RDB	EE 2024 RDB	EU-27 2024 RDB
Overall resilience	Vulnerabilities			
	Capacities			
Social and economic	Vulnerabilities			
	Capacities			
Green	Vulnerabilities			
	Capacities			
Digital	Vulnerabilities			
	Capacities			
Geopolitical	Vulnerabilities			
	Capacities			



(1) The synthetic indices aggregate the relative resilience situation of countries across all considered indicators. For an indicator, each country's relative situation in the latest available year is compared with the collection of values of that indicator for all Member States and all years in the reference period.
Source: Resilience Dashboards - version spring 2024, data up to 2022

This Annex uses the Commission's resilience dashboards (RDB) ([26]) to show Estonia's relative resilience capacities and vulnerabilities ([27]) that may be of relevance for societal, economic, digital and green transformations, and dealing with future shocks and geopolitical challenges. ([28])

According to the set of resilience indicators in the RDB, Estonia's overall vulnerabilities have decreased from last year, improving Estonia's situation compared to the EU average, and are now medium-low, while its capacities have remained stable at medium-high, in line with the EU average. This situation is also reflected in the distribution of indicators across the resilience dimensions and areas: around 50% of vulnerability indicators fall into the medium-low or low category, almost 60% of capacities fall into the medium-high or high category.

With respect to the 2023 RDB, Estonia's vulnerabilities in the social and economic dimension continued to be below the EU average, while its capacities remained at medium level. Its medium-low vulnerability score is thanks to its good preparation for transitions: it has one of the lowest gender employment gaps and has made remarkable improvements with respect to employment in energy-intensive sectors and in manufacturing with a high risk of automation. Despite these improvements, Estonia is still the country with the highest proportion of individuals reporting unmet needs for medical care, and income inequality has increased. The country also has some low social and economic capacities, for instance with respect to the household saving rate, the impact of social transfers on poverty reduction, or the income stabilisation coefficient and the remaining low insurance sector solvency capital ratio.

In the green dimension, **Estonia's capacities have remained stable and are in line with the EU average but its vulnerabilities have deteriorated and are now medium-high**. This situation is mainly due to its high raw material consumption per capita, the harmonised risk indicator 1 for pesticides, and farm income variability. Estonia could also do with improving capacities such as resource or energy productivity and the CO_2 absorption of forests.

([26]) Https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en. Resilience is defined as the ability not only to withstand and cope with challenges but also to undergo transitions, in a sustainable, fair, and democratic manner. 2020 Strategic Foresight Report: *Charting the course towards a more resilient Europe* (COM(2020) 493).

([27]) Vulnerabilities describe features that can exacerbate the negative impact of crises and transitions, or obstacles that may hinder the achievement of long-term strategic goals, while capacities refer to enablers or abilities to cope with crises and structural changes and to manage transitions.

([28]) This Annex is linked to Annex 1 on SDGs, Annex 6 on the green deal, Annex 8 on the fair transition to climate neutrality, Annex 9 on resource productivity, efficiency and circularity, Annex 10 on the digital transition and Annex 14 on the European pillar of social rights.

With its medium-low vulnerabilities and medium-high capacities in the digital dimension, Estonia is in general well prepared for the digital transformation. However, its capacities have decreased from high overall to medium-high. The main reasons for this are fewer young people doing any online learning activity and the low level of investment per employee in high-technology sectors.

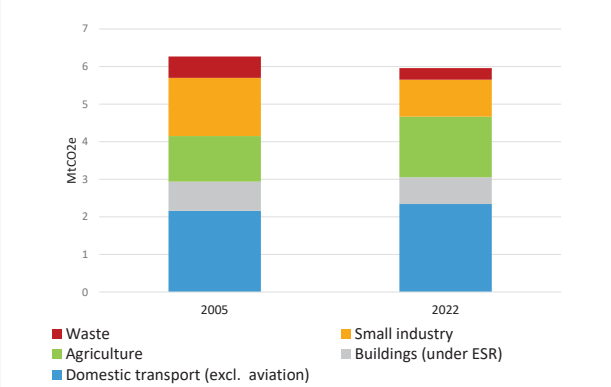
In the geopolitical dimension, Estonia's vulnerabilities and capacities have remained stable with respect to the 2023 RDB, putting them on a par with the EU average. However, the country still shows some high vulnerabilities such as its high supplier concentration in base metals and energy carriers, the high extra-EU import partner concentration, its decreased net international investment position (NIIP) and a big increase in its borrowing.

Estonia's green transition requires more action to specify the funding framework for the climate and energy transition and the policies needed to reach its 2030 target in the effort sharing sectors, to reduce emissions from road transport and buildings, to improve carbon sinks in the land-use sector, the institutional framework on climate adaptation and the circular economy, and in other areas besides. This Annex provides a snapshot of climate, energy and environmental aspects of the transition in Estonia ([29]).

Estonia's draft updated national energy and climate plan (NECP) lacks key information on the investment needs and the sources of funding to achieve its 2030 climate and energy targets. The plan only provides partial information on the investment needs for the planned policies and measures. It does not describe the main sources of financing for each planned policy and measure but gives an overview of EU funding programmes. It also lacks information on the financing sources of each policy or measure and the expected share of EU financing ([30]).

The policies and measures in Estonia's draft updated NECP are insufficient to reach its 2030 target for the effort sharing sectors ([31]). Estonia's 2022 greenhouse gas emissions from its effort sharing sectors are expected to come in at 3.9% below 2005 levels. Current policies are projected to reduce effort sharing emissions by 9.8% from 2005 levels by 2030. Additional policies set out in Estonia's draft updated NECP are projected to reduce emissions by a further 1.6 percentage points, achieving a 11.4% reduction compared to 2005 levels ([32]). Estonia is therefore projected to miss its effort sharing target, to reduce by 24% from 2005 levels, by 12.6 percentage points. This highlights the importance of planning and implementing more ambitious climate action. Estonia's draft updated NECP reiterates the target to reduce economy-wide greenhouse gases by 8 mt CO_2eq by 2035 (including the land-use sector).

Graph A6.1: **Greenhouse gas emissions from the effort sharing sectors in Mt CO2eq, 2005-2022**



Source: European Environment Agency

The greenhouse gas emissions generated from road transport and buildings are a particular concern for Estonia. In 2022, the greenhouse gas emissions from road transport increased by 8.3% compared to 2005 levels, and their share in the effort sharing emissions rose to 39.3%, from 34.5% in 2005. Between 2005 and 2022, Estonia's emissions from buildings fell by 8%, much less than the EU average of 27.6%. It is essential to identify policies and measures to curb greenhouse gas emissions in these sectors to close Estonia's gap to its target for 2030 in the effort sharing sectors. To prepare for the emissions trading system to include road transport and buildings as of 2027, it is most pressing to take measures to support vulnerable consumers.

([29]) This Annex is complemented by Annex 7 on energy transition and competitiveness, Annex 8 on the fair transition to climate neutrality, Annex 9 on resource efficiency, circularity, and productivity, and relevant topics in other annexes to this country report.

([30]) See the Commission's (2023) assessment of the draft national energy and climate plan of Estonia.

([31]) The national greenhouse gas emission reduction target is laid down in Regulation (EU) 2023/857 (the Effort Sharing Regulation). The aim is to align action in the sectors concerned with the objective to reach the EU-level economy-wide target of greenhouse gas reductions of at least 55% compared to 1990 levels. The target also applies to the sectors outside the current EU Emissions Trading System, notably buildings (heating and cooling), road transport, agriculture, waste, and small industry (known as the effort sharing sectors).

([32]) The effort sharing emissions for 2022 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 Estonia's draft updated NECP.

Estonia could consider increasing its target for energy efficiency in its final NECP ([33]). The energy efficiency contribution of 5.13 Mtoe in primary energy consumption and 2.59 Mtoe in final energy consumption for 2030 set in the draft updated NECP are less ambitious than the contribution required by the Energy Efficiency Directive. However, Estonia's renewable energy contribution of 65% by 2030 is significantly above the target contribution of 50%.

Sustainable transport has yet to take off in Estonia ([34])**.** At 0.4% in 2022, the share of battery electric vehicles in Estonia's passenger car fleet is still very low. So too is the number of publicly accessible charging points, at 290 in 2023, or one charging point for every 13 e-vehicles (against the EU average of 1:10). Passenger cars are used for 89% of distances travelled (EU average: 85%). Buses and coaches, the main form of public transport, are used for 9%. In the capital, Tallinn, public transport has been free of charge since 2013. The share of freight land transport by rail is high (at 40%, against the EU average of 16%). Only 19% of the rail network is electrified. In maritime transport, it is important to concentrate action on reducing the environmental impact of ferry traffic, including by deploying low and zero emission vessels and developing necessary port and bunkering infrastructure.

Better forest management and action to restore wetlands could help Estonia reverse the recent decline in net carbon removals from the atmosphere through its land use, land-use change and forestry (LULUCF) sector. The sector has recently gone from net removals of carbon to emissions. To reach the 2030 LULUCF target, additional removals of 434 kt CO_2eq are needed ([35]). The latest projections for 2030 indicate that net removals in Estonia risk falling short of the target ([36]).

In Estonia, effective climate adaptation is hampered by institutional weaknesses. The country is vulnerable to the impacts of climate change such as rises in temperature, rainfall and sea level, and extreme weather phenomena accompanied by coastal and inland floods, wildfires and new pathogens. Estonia's overall insurance coverage is low with only 5-20% of the economic losses from 1980-2020 being insured. Estonia's adaptation framework has weaknesses: its national adaptation strategy has not yet been updated such that it integrates climate adaptation into key vulnerable sectors and tackles the barriers to adaptation. Likewise, measures to protect densely populated areas and areas around inland water bodies and forests – issues of key importance – have not yet been taken ([37]).

The state of the environment remains a source of concern, particularly for freshwater quality and biodiversity protection. Although Estonia is far from water scarcity, freshwater quality remains a cause for concern. Between 2000 and 2020, on average, 6% of land in Estonia was affected by droughts, rising to 7.1% in 2022. Forests and woodlands tend to be the ecosystems most damaged by drought events. In 2021, Estonia generated EUR 29 per cubic meter of water abstracted, among the lowest rate of water productivity in the EU. According to the 2nd river basin management plan, 60% of all surface water bodies achieved at least a good ecological status and only 9.7% achieved a good chemical status. The figures tracking eutrophication of coastal areas indicate a substantial rise, reflecting a more widespread problem in the Baltic Sea.

Estonia has scope to improve nature conservation and biodiversity protection. By the end of 2021, Estonia had protected 20% of land and 18.7% of its marine areas. Anthropic

([33]) The EU target set out in the revised Renewable Energy Directive is to have 42.5% of gross final energy consumption coming from renewable energy sources by 2030, with the aspiration to reach 45%. The formula in Annex I to Directive (EU) 2023/1791 sets the indicative national contribution for Estonia at 3.93 Mtoe for primary energy consumption. The Commission communicated a corrected national contribution of 2.53 Mtoe in final energy consumption for 2030 in accordance with Article 4(5) of the Energy Efficiency Directive to increase the contribution towards the Union's binding energy efficiency target.

([34]) Unless otherwise indicated, data in this section refer to 2021. See European Commission, 2023, EU transport in figures, transport.ec.europa.eu.

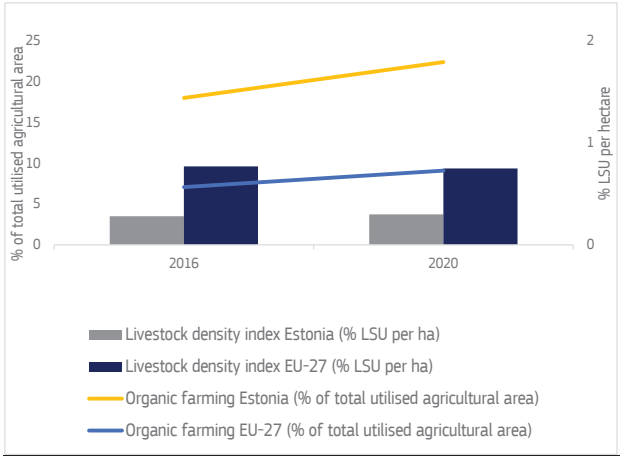
([35]) National LULUCF targets of the Member States in line with Regulation (EU) 2023/839.

([36]) Projections submitted in Estonia's draft updated national energy and climate plan, 2023.

([37]) See the Commission's 2023 assessment and recommendation on Estonia's progress on climate adaptation.

activities such as logging, agriculture, industry and changes in land use are having a heavy impact on biodiversity. The Common Farmland Bird Index dropped from 88.6 (above the EU average) to 68.9 (below the EU average) between 2011 and 2020. Estonia is under infringement for logging in Natura 2000 sites without a proper assessment and for not setting conservation objectives and measures in over 100 of its 541 Natura 2000 sites.

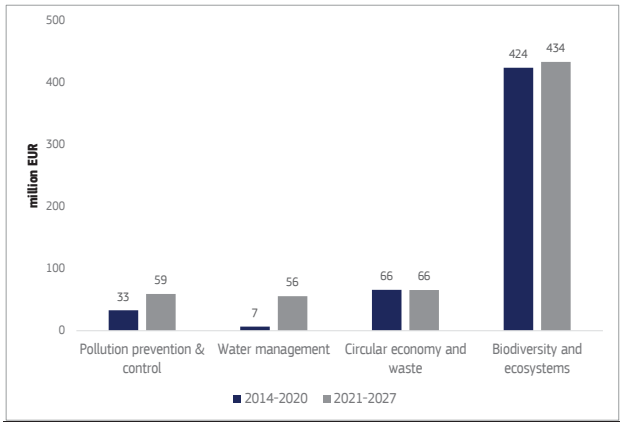
Graph A6.2: **Changes to livestock density and organic farming**



Livestock unit (LSU)/ha of UAA: it measures the stock of animals (cattle, sheep, goats, equidae, pigs, poultry and rabbits) converted in LSUs per hectare of UAA.
Source: Eurostat

The agri-food system has yet to move to sustainable water resource management methods and to optimise the use of agricultural residues. Estonia reuses 91.9% of wastewater sludge in agriculture and landfills the remaining 8.1%. There remains scope to reduce and prevent the eutrophication of inland and marine surface waters where agricultural pressure is significant. Estonia's composting and anaerobic digestion rate per person remained well below the EU average. Increasing the composting and anaerobic digestion rate and producing organic fertilisers and/or biomethane could improve Estonia's strategic autonomy. Estonia's recovery and resilience plan and the REPowerEU plan include measures designed to increase biomethane production.

Graph A6.3: **Environmental investment gap, annual average**



The numbers are computed by the European Commission based on the latest internal reports, Eurostat, EIB and national data sources.
Source: European Commission

Estonia would benefit from investing more in biodiversity, ecosystems and the transition to a circular economy, including waste management. The financing gap was estimated at EUR 39 million per year between 2014 and 2020. Between 2021 and 2027, the overall environmental investment needs are at least EUR 1.2 billion a year, against the financing baseline of EUR 558 million, leaving a wider gap than under the previous financing period of EUR 616 million. In particular, there is an estimated annual financing gap of EUR 434 million for biodiversity and ecosystems. Estonia would also benefit from investing in capacity building, innovative sustainable solutions and awareness-raising campaigns to accelerate the transition to a circular economy.

Table A6.1: **Indicators tracking progress on the European Green Deal from a macroeconomic perspective**

							Target	Distance	
		2005	2019	2020	2021	2022	2030	WEM	WAM
Progress to climate and energy policy targets									
Greenhouse gas emission reductions in effort sharing sectors [1]	Mt CO_{2eq}, %, pp	6,196.1	14%	9%	-7%	-4%	-24%	-14	-13
Net greenhouse gas removals from LULUCF [2]	Kt CO2eq	-2 927	3 279	1 243	812.000	339.000	-2,545	n/a	n/a
Share of energy from renewable sources (1) [3]	%	17%	32%	30%	37%	38%	50%	-	-
Energy efficiency: primary energy consumption [3]	Mtoe	5.3	4.8	4.3	4.5	4.7	3.9		
Energy efficiency: final energy consumption [3]	Mtoe	2.9	2.9	2.7	2.8	2.8	2.5		

							EU-27		Projected
		2018	2019	2020	2021	2022	2021	2022	2030
Green transition: mobility									
Greenhouse gas emissions: road transport	Mt CO2e	-	-	-	2.3	2.3	769.0	786.6	1.9
Share of zero-emission vehicles in new registrations [4]	%	0.4	0.3	1.9	2.3	3.3	9	12.1	n/a
Number of publicly accessible AC/DC charging points		-	-	191	193	275	299178	446956	n/a
Share of electrified railways	%	11.4%	11.8%	11.8%	19.3%	-	56.1%	-	n/a
Green transition: buildings									
Greenhouse gas emissions: buildings	Mt CO2e	-	-	-	0.6	0.7	537.0	486.7	0.8
Final energy consumption in buildings	2015=100	108.2%	106.9%	106.7%	111.7%	107.3%	104.0%	97.2%	
Climate adaptation									
Climate protection gap [5]	score 1-4	-	-	1.1	0.8	1.0	1.5	1.5	n/a

		2018	2019	2020	2021	2022	2020	2021	2022
State of the environment									
Water | Water exploitation index (WEI+) (1) [6]	% of renewable freshwater	8.5	5.4	-	-	-	3.6	-	-
Circular economy | Material footprint [7]	tonnes per person	29.7	27.7	28.9	29.9	27.4	14.2	14.8	14.9
Pollution | Years of life lost due to air pollution by PM2.5 [8]	per 100.000 inhabitants	202	71	51	84	-	545	584	-
Biodiversity | Habitats in good conservation status [9]	%	56.7					14.7		
Common farmland bird index [10]	2000=100	74	75	69	-	-	78	-	-
Green transition: agri-food sector									
Organic farming	% of total utilised agricultural area	20.98	22.33	22.41	22.97	-	9.1	-	-
Nitrates in groundwater	mg NO_3/litre	27.05	26.36	25.04	-	-	20.42	-	-
Food waste per capita	Kg per capita			125	128	-	130	131	-
Share of soil in poor health [11]	%					59			41
Soil organic matter in agricultural land [12]	Mt per ha	73	-	-	-	-	7,904	-	-

Sources: (1) Member States' emission data for 2019 and 2020 are in global warming potential (GWP) values from the 4th Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC). Member States' 2005 base year emissions under Regulation (EU) 2018/842, emissions data for 2021 and 2022, and 2030 projections are in GWP values from the 5th Assessment Report (AR5) of the IPCC. 2021 data are based on the final inventory reports, 2022 data are based on approximated inventory reports and European Environmental Agency's calculation of effort sharing emissions. The final data for 2021 and 2022 will be established after a comprehensive review in 2027. The 2030 target is in percentage change of the 2005 base year emissions. Distance to target is the gap between the 2030 target and projected effort sharing emissions with existing measures (WEM) and with additional measures (WAM), in percentage change from the 2005 base year emissions. The measures included for the 2030 emission projections reflect the state of play as reported in Member States' draft updated national energy and climate plans or, if unavailable, as reported by 15 March 2023 as per Regulation 2018/1999. (2) 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. (3) The 2030 national objectives for renewable energy and energy efficiency are indicative national contributions, in line with Regulation (EU) 2018/1999 (the Governance Regulation), the EU-level 2030 renewable energy target set out in Directive EU/2018/2001 amended by Directive EU/2023/2413 (the revised Renewable Energy Directive) – 42.5% of gross final energy consumption with the aspiration to reach 45% –, and the formula in Annex I to Directive (EU) 2023/1791 (the Energy Efficiency Directive). (4) Passenger battery electric vehicles (BEV) and fuel cell electric vehicles (FCEV). (5) The climate protection gap refers to the share of non-insured economic losses caused by climate-related disasters, based on modelling of the risk from floods, wildfires, windstorms, and the insurance penetration rate. Scale: 0 (no protection gap) –4 (very high gap) (European Insurance and Occupational Pensions Authority, 2022). (6) Total water consumption in renewable freshwater resources available for a territory and period. (7) Material extractions for consumption and investment. (8) Years of potential life lost through premature death due to exposure to particulate matter with a diameter of less than 2.5 micrometres. (9) Share of habitats in good conservation status according to the records submitted under Art. 17 of the Habitats Directive (Directive 92/43/EEC) for 2013-2018. (10) Multi-species index measuring changes in population abundances of farmland bird species. (11) Source: annex 12 of the Commission's proposal for a soil monitoring law, SWD (2023) 417 final. (12) Estimates of organic carbon content in arable land.

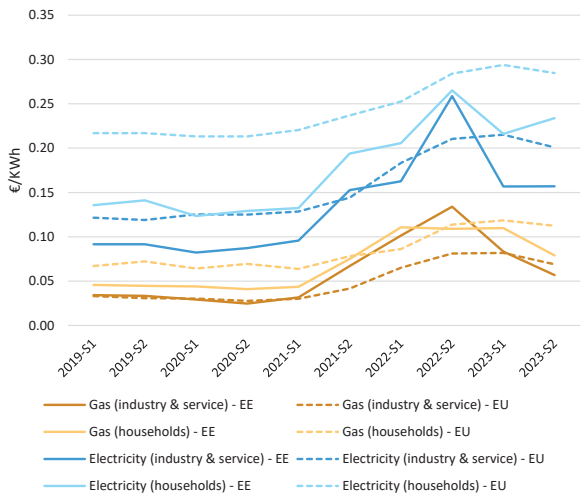
This Annex ([38]) sets out Estonia's progress and challenges in accelerating the net-zero energy transition while bolstering the EU's competitiveness in the clean energy sector ([39]). It considers measures and targets put forward in the draft updated National Energy and Climate Plan (NECP) ([40]).

Estonia's energy sector underwent notable changes in 2023. Estonia's strides towards energy transition were commendable, with an acceleration of renewables and ambitious goals for their expansion. Ongoing challenges in energy efficiency and grids highlight areas for improvement.

Like EU trends, retail energy prices in Estonia declined in 2023, but have not yet reached 2020 levels. Average household gas prices remained high and stable in 2022 and beginning of 2023, before decreasing by 28% in the second half of 2023, reached an average 30% below the EU average. Industry gas prices remained high in the first half of 2023, despite a clear decrease of 37% compated to the 2022 second semester peak. Prices decrease even more in the second half of 2023 to reach an average 18% below the EU average. Regarding electricity, prices for household remain high, despite a 20% decrease in the first half of 2023 compare to the height of the crisis, prices rose again in the second semester of 2023. Nonethless, estonian prices averages for households are 21% below EU average. Industry and services prices for electricity plummeted by 40% between the second half of 2022 and the first of 2023. Prices averages remained stable throughout 2023, between 27% and 21% below EU averages.

Estonia is one of the most energy self-sufficient Member States in the EU, and it managed to further decrease its energy dependency towards non-EU countries, from 13% in 2013 to 5% in 2022, the lowest in the EU. This is mainly thanks to domestic extraction of oil shale, production of shale oil and renewable energy generation. Estonia is fully dependent on imports for natural gas, but its role is relatively marginal in the Estonian energy system, as in 2022 it accounted only for 7% of the gross available energy and 0.6% of gross electricity production ([41]).

Graph A7.1: **Estonia's energy retail prices for households and industry & service**



(1) For industry, consumption bands are I3 for gas and IC for electricity, which refer to medium-sized consumers and provide an insight into affordability
(2) For households, the consumption bands are D2 for gas and DC for electricity
(3) Industry prices are shown without VAT and other recoverable taxes/levies/fees as non-household consumers are usually able to recover VAT and some other taxes
Source: Eurostat

In relative terms, electricity prices for non-household consumers have increased significantly compared to the US, Japan, and to a lesser extent, the UK. Although there has been a notable decline since the second half of 2022, Estonia's electricity prices have persisted above those of the US and Japan. This could potentially affect the international competitiveness of energy-intensive industries in the country.

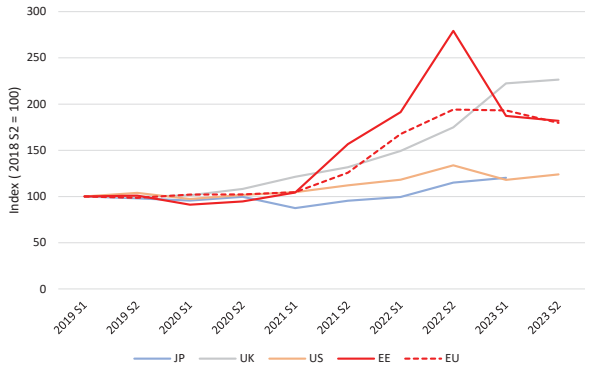
([38]) It is complemented by Annex 6 as the European Green Deal focuses on the clean energy transition and by Annex 8 on the action to protect the most vulnerable groups, complementing ongoing efforts under the European Green Deal, REPowerEU and European Green Deal Industrial Plan.

([39]) In line with the Green Deal Industrial Plan and the Net-Zero Industry Act

([40]) Estonia submitted its draft updated NECP in August 2023; the Commission issued an assessment and country-specific recommendations on 18 December 2023.

([41]) Eurostat

Graph A7.2: **Trends in electricity prices for non-household consumers (EU and foreign partners)**



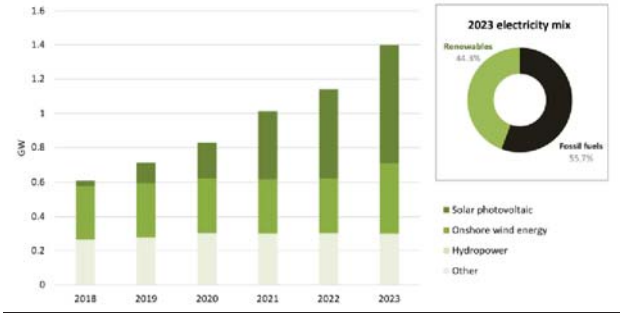
(1) For Eurostat (EU and EE), the band consumption is ID referring to large-sized consumers with an annual consumption of between 2 000 MWh and 20 000 MWh, such as in electricity intensive manufacturing sectors, and gives an insight into international competitiveness
(2) JP = Japan
Source: Eurostat, IEA

Estonia also managed to reduce its exposure to Russian gas imports, fully banning them since January 2023 while maintaining security of supply. This diversification has notably been allowed by the commissioning of the Balticconnector with Finland ([42]) and access to the Klaipeda LNG terminal in Lithuania (via Latvia). Further to this, the country has access to the Latvian Inčukalns storage facility, has commissioned an LNG terminal in Paldiski, and is jointly renting, with Finland, the Inkoo floating storage and regasification unit (FSRU). To continue to reduce its import dependence, the country is also aiming to boost domestic production of biomethane to 380 GWh per year by 2030 (against 161 GWh in 2022). Estonia can also count on a bilateral agreement for gas supply with both Finland and Latvia. Estonia managed to reduce its gas demand between August 2022 and December 2023 by 31% in comparison with the average of the previous five years. Annual consumption amounted to 0.4 bcm in 2022 (against 0.5 bcm in 2021). As for the security of electricity supply, there were no adequacy issues recorded in 2023, nor for winter 2023/2024, according to ENTSO-E. The country relies on electricity imports to cover its demand, with net imports of electricity representing 13.8% of the electricity available for final consumption in 2022 (-18pp compared to 2021) ([43]). In the electricity sector, one of Estonia's main goals is its synchronisation with the continental European electricity network along with the other two Baltic States, by February 2025. Several key infrastructure projects are currently being implemented.

Estonia's draft updated NECP does not refer to the commitment to phase out the use of shale oil made in its territorial just transition plan. Estonia's adopted plan states that the government will end additional investment in fossil fuels and electricity production from oil shale by 2035 at the latest and will phase out the use of shale oil by 2040 at the latest. This commitment is not reflected in the draft updated NECP, which brings into question the planned measures financed by the Just Transition Fund.

Renewable installed capacity in Estonia surged by 23% in 2023. The total renewable energy capacity in Estonia in 2023 stood at 1400MW. The total wind capacity in Estonia for 2022 was 408MW (+29%), all of which onshore ([44]). As regards the acceleration of solar deployment, the total installed capacity in 2022 was 690MW (+32%).

Graph A7.3: **Estonia's installed renewable capacity (left) and electricity generation mix (right)**



(1) "Other" includes renewable municipal waste, solid biofuels, liquid biofuels, and biogas.
Source: IRENA, Ember

According to the draft updated NECP, installed solar capacity in 2030 will exceed 1 GW. Estonia will also develop 1.3 GW of onshore wind and 1 GW of offshore wind by 2030. This goal aligns with Estonia's non-binding agreement, defined by

([42]) In Early October 2023, the balticconnector sustained damage putting it temporarily out of operation, with no immediate impact on the security of Estonia's gas supply. The Balticconnector was repaired and came back online as of the 22nd of April 2024.

([43]) Eurostat

([44]) IRENA Report 2023

the non-binding goals in the 2023 EU Sea Basins agreements.

Estonia made significant steps in implementing reforms to accelerate the deployment of renewables. Estonia included in its recovery and resilience plan an overview of the planned legislative changes related to permitting, in particular to speed up the development of wind farms, with some legislative amendment processes already ongoing. It introduced a consolidated permit-granting process for marine activities, combining separate licensing procedures, and launched an initiative to support local authorities and streamline the permit-granting process for wind energy projects.

Estonia is pursuing a joint offshore grid project with Latvia under the BEMIP grids offshore corridor, having secured its first offshore hybrid interconnector on the 1st PCI/PMI list. The ELWIND project combines both transmission and generation assets, consisting of an interconnector and a joint offshore wind park with a capacity which could go up to 2 GW. Commissioning is expected by 2035. In addition, Estonia, together with Germany is planning a joint hybrid submarine cable project called Baltic WindConnector, connecting the two countries in the Baltic sea.

Estonia's relatively high share of renewables in heating and cooling (65.4% in 2022) is mainly related to biomass use. Heat pumps cover slightly more than one tenth of this share, and heat pump sales increased by 4% in 2022, reaching a total national stock of around 240 000 units. Heating and cooling account for 83% of the country's residential final energy consumption.

Consumer empowerment in the electricity and gas markets has potential for further development. The full-scale deployment of electricity smart meters will give consumers the opportunity to better manage their energy and will enable new retail products to be developed and foester prosumers behaviours. Regarding energy communities, implementation of the framework and development of energy communities is still lagging behind.

Energy efficiency gains have slowed in Estonia although there is still untapped potential in this respect. In 2022, Estonia had a primary energy consumption of 4.7 Mtoe, a 6.1% increase compared to 2021, and a 9.2% decrease compared to 2012. It had a final energy consumption of 2.8 Mtoe, a 1.5% increase compared to 2021, and a 3.3% decrease compared to 2012. In 2022, the best results came from the service sector, which decreased its final energy consumption by 11.0%, and the worst from the transport sector which increased its final energy consumption by 3.6%.

Increasing investment in energy efficiency and renovation is critical for Estonia to achieve further energy security, while addressing energy poverty. Estonia has implemented a series of energy efficiency measures with the support of several EU funds. Most of the schemes cover buildings; schemes for SMEs and industries are proportionally rather limited. Support under the country's recovery and resilience plan has been scaled up in the framework of the REPowerEU Chapter, notably by upscaling investment in residential and services buildings. Under cohesion policy, 17% of the overall funding allocated to Estonia covers energy efficiency investment, targeting deep renovations in companies and public buildings. The key enabling measures to increase energy efficiency in buildings target residential housing, with a specific focus on deep renovation. Most of the schemes on energy efficiency are still grant-based and the use of financial instruments is still very limited. In term of existing funding schemes seeking to mobilise investment in energy efficiency, Estonia mainly relies on grant-based funding schemes.

Estonia's efforts to reduce energy consumption in the residential sector have not made a meaningful contribution to its 2030 reduction target for energy consumption by buildings. The residential final energy consumption was lower in 2022 than 2020 but has increased by 3.6% since 2015 ([45]). The Estonian building stock presents low levels of energy performance. The total number of buildings in use cover 76 million m^2. Buildings that are not completely renovated cover 70 million m2. The surface to be renovated per year in 2020 is 500 000 m2. As highlighted by the Long-Term Renovation Strategy assessment, it will be necessary to increase public funding and private

([45]) Eurostat and JRC

investment if the ambitious target of renovating the country's entire building stock (for all buildings built up to 2000) by 2050 (turning them into nearly zero-energy buildings) is to be achieved.

Estonia is not reporting any checks on products covered by ecodesign and energy labelling[13], which raises serious concerns A regards the compliance levels of the products in question, the conditions for fair competition among businesses, missed energy and CO2 savings and consumer trust.

Estonia remains highly dependent on non-EU countries for clean energy technologies but is poised to become an EU leader in rare earth manufacturing and is developing its hydrogen industry. Supported by Just Transition Fund grants, the industrial-scale rare earth plan in Sillamäe will produce rare earth magnets, a critical element for green transition technologies such as electric cars and wind turbines (also see Annex 12). The country holds a small PV modules production capacity of less than 100 MW. Estonia also has electrolyser manufacturing capacity as well as R&D infrastructure in this domain, notably supported by its status as an Important Project of Common European Interest and is aiming to develop further in that sector. Estonia also holds several elements of the on/offshore development ecosystem such as the main infrastructures, foundations and platforms.The country adopted its Hydrogen Roadmap in February 2023, but does not yet have an objective for 2030 in terms of target capacity for production of hydrogen.

Table A7.1: **Key Energy Indicators**

		Estonia				EU			
		2019	2020	2021	2022	2019	2020	2021	2022
ENERGY DEPENDNCE	**Import Dependency [%]**	**4.7%**	**10.5%**	**1.4%**	**6.2%**	**60.5%**	**57.5%**	**55.5%**	**62.5%**
	of Solid fossil fuels	107.2%	391.8%	95.2%	95.8%	43.3%	35.8%	37.3%	45.8%
	of Oil and petroleum products	129.6%	130.0%	54.9%	108.6%	96.7%	96.8%	91.7%	97.7%
	of Natural Gas	100.0%	100.0%	100.0%	100.0%	89.7%	83.6%	83.6%	97.6%
	Dependency from Russian Fossil Fuels [%]								
	of Natural Gas	99.0%	46.2%	11.5%	0.0%	39.7%	41.3%	41.1%	21.0%
	of Crude Oil	0.0%	0.0%	0.0%	0.0%	28.8%	26.7%	26.4%	19.5%
	of Hard Coal	100.0%	100.0%	83.0%	66.7%	43.5%	49.1%	47.4%	21.5%

		2016	2017	2018	2019	2020	2021	2022
DIVERSIFICATION OF GAS SUPPLIES	**Gas Consumption (in bcm)**	**0.5**	**0.5**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**
	Gas Consumption year-on-year change [%]	10.0%	-5.0%	2.9%	-8.2%	-8.2%	14.1%	-25.3%
	Gas Imports - by type (in bcm)	**0.5**	**0.5**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**
	Gas imports - pipeline	0.5	0.5	0.5	0.5	0.4	0.5	0.4
	Gas imports - LNG	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Gas Imports - by main source supplier (in bcm) (1)							
	Latvia	-	-	-	-	0.2	0.4	0.4
	Lithuania	-	-	0.0	0.0	0.0	0.0	0.1
	Russia	0.5	0.5	0.5	0.5	0.2	0.1	-

		2019	2020	2021	2022	2023
	LNG Terminals - storage capacity m3 LNG					
	Number of LNG Terminals	0	0	0	1	1
	LNG Storage capacity (m3 LNG)	0	0	0	68,000	68,000
	Underground Storage					
	Number of storage facilities	0	0	0	0	0
	Technical Capacity (bcm)	0.0	0.0	0.0	0.0	0.0

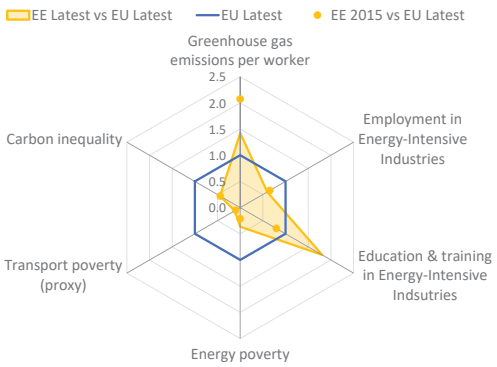
		2016	2017	2018	2019	2020	2021	2022	2023
ELECTRICITY/ENERGY	**Gross Electricity Production (GWh) (2)**	**12,170**	**13,160**	**12,364**	**7,616**	**6,078**	**7,204**	**8,937**	-
	Combustible Fuels	11,531	12,397	11,682	6,836	4,959	6,095	7,650	-
	Nuclear	-	-	-	-	-	-	-	-
	Hydro	35	26	15	19	30	23	23	-
	Wind	594	723	636	687	844	733	668	-
	Solar	10	14	31	74	245	354	596	
	Geothermal	-	-	-	-	-	-	-	-
	Other Sources	0	0	0	-	0	0	-	-
	Gross Electricity Production [%]								
	Combustible Fuels	94.8%	94.2%	94.5%	89.8%	81.6%	84.6%	85.6%	-
	Nuclear	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-
	Hydro	0.3%	0.2%	0.1%	0.2%	0.5%	0.3%	0.3%	-
	Wind	4.9%	5.5%	5.1%	9.0%	13.9%	10.2%	7.5%	-
	Solar	0.1%	0.1%	0.2%	1.0%	4.0%	4.9%	6.7%	-
	Geothermal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-
	Other Sources	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-
	Net Imports of Electricity (GWh)	**-2,037**	**-2,734**	**-1,897**	**2,157**	**3,644**	**2,629**	**1,011**	-
	As a % of electricity available for final consumption	-26.5%	-35.3%	-22.9%	26.1%	42.4%	32.5%	13.8%	-
	Electricity Interconnection [%]		**63.2%**	**69.0%**	**67.6%**	**67.6%**	**83.4%**	**85.8%**	**69.4%**
	Share of renewable energy consumption - by sector [%]								
	Electricity	16.2%	17.6%	19.7%	22.0%	28.3%	29.2%	29.1%	-
	Heating/cooling	51.8%	52.2%	53.7%	52.2%	58.8%	61.3%	65.4%	-
	Transport	0.4%	0.4%	3.3%	6.2%	12.2%	11.1%	8.5%	-
	Overall	29.2%	29.5%	30.0%	31.7%	30.1%	37.4%	38.5%	-

		2019	2020	2021	2022	2023
CLEAN ENERGY	**VC investments in climate tech start-ups and scale-ups (EUR Mln)**	**1.17**	**3.18**	**119.82**	**78.02**	**177.46**
	as a % of total VC investment (3) in Estonia start-ups and scale-ups	0.6%	3.0%	9.5%	5.1%	41.3%
	Research & Innovation spending in Energy Union R&i priorites					
	Public R&I (EUR mln)	3.9	3.1	1.5	-	-
	Public R&I (% GDP)	0.014%	0.011%	0.005%	-	-
	Private R&I (EUR mln)	2.7	4.2	-	-	-
	Private R&I (% GDP)	0.010%	0.015%	-	-	-

(1) The ranking of the main suppliers is based on the latest available figures (for 2022)
(2) Venture Capital investment includes Venture Capital deals (all stages), Small M&A deals and Private Equity (PE) growth deals (for companies that have previously been part of the portfolio of a VC investment firm or have received Angel or Seed funding)
Source: Eurostat, Gas Infrastructure Europe, JRC elaboration based on PitchBook data (03/2024), JRC SETIS (2024)

This Annex monitors Estonia's progress in ensuring a fair transition towards climate neutrality and environmental sustainability, particularly for workers and households in vulnerable situations. Estonia's green economy is expanding. Between 2015 and 2021, total jobs in the environmental goods and services sector grew by 6.5% (to 32 133) (EU: 18.2%), reaching 4.9% of total employment (EU: 2.7%). Also, between 2015 and 2022, the greenhouse gas emission intensity of Estonia's workforce (see Graph A8.1 and Table A8.1) declined from 29.6 to 20.4 tonnes per worker. Although this is still above the EU average (14.3 tonnes per worker in 2022) ([46]), it indicates a positive trend in the green transition. In line with the Council Recommendation on ensuring a fair transition towards climate neutrality ([47]), Estonia's recovery and resilience plan (RRP) outlines crucial reforms and investment for a fair green transition ([48]), complementing the REPowerEU chapter, the territorial just transition plan (TJTP) and projects supported by the European Social Fund Plus (ESF+).

Graph A8.1: **Fair transition challenges in Estonia**



Source: Eurostat, EU Labour Force Survey, EMPL-JRC GD-AMEDI/AMEDI+ and DISCO(H) projects (see Table A8.1).

Employment in Estonia's sectors that are most affected by the green transition remains stable. In 2023, employment in Estonia's energy-intensive industries ([49]) comprised 2.1% of total employment (3.5% in the EU). Employment in mining and quarrying rose to a maximum of 5 000 workers in 2018 and has fallen constantly since then, now below the 2015 employment data (approximately 2 700 workers in 2023). The transition away from oil shale for energy production poses a risk to the jobs of around 16 000 people. The core companies in the oil shale sector are the heart of Ida-Viru county's economy (40% of the largest employers registered in the county are oil shale companies), both in terms of their turnover and their impact on other companies. Therefore, the shrinking of the oil shale sector impacts the effective functioning of the whole region ([50]). The job vacancy rate in construction (see Graph A8.2), a key sector for the green transition, is much lower than the EU average (0.1% vs 3.6% in the EU in 2023). Nevertheless, 69% of small and medium-sized enterprises (SMEs) in the sector reported that skills shortages are holding them back in general business activities ([51]).

Upskilling and reskilling in energy-intensive industries is expected to grow due to a wide spectrum of measures for the green transition. In Estonia, 31% of SMEs think that the skills required for greening business activities are becoming more important (EU: 42%) ([51]). In energy-intensive industries, workers' participation in education and training increased from 8.68% in 2015 to 19.6% in 20232 (vs 10.94% in EU).If Estonia matches its projected contribution to the EU's 2030 renewable energy target, between 300 and 600 additional skilled workers will be needed for the deployment of wind and solar energy , which may require an investment in skills of EUR 1.4-1.7 million ([52]) (see Annex 15). Investment under the RRP and the TJTP includes measures to mitigate the social and employment impact of this

([46]) Workforce-related calculations are based on the EU Labour Force Survey. Note, in the 2023 country report for Estonia, such indicators were calculated based on employment statistics in the national accounts. This may result in limited comparability across the two reports.

([47]) Council Recommendation of 16 June 2022 on ensuring a fair transition towards climate neutrality (2022/C 243/04) covers employment, skills, tax-benefit and social protection systems, essential services and housing.

([48]) See the 2022 country report (Annex 6) and Annex 3 for an overview.

([49]) Mining and quarrying (NACE B), chemicals (C20), minerals (C23), metals (C24) and automotive (C29)

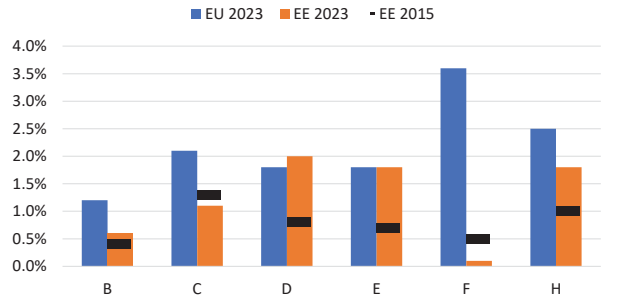
([50]) See report on oil shale industry from Praxis think tank: Adaptation of Ida-Virumaa county´s economy and labor market to the reduction of oil shale industry | Praxis.

([51]) Eurobarometer on skills shortages, recruitment, and retention strategies in small and medium-sized enterprises.

([52]) EMPL-JRC AMEDI+ project.

transition, including retraining and upskilling programmes for workers in the oil shale industry and effective job transition measures (see Annex 14). The ESF+ will integrate the development of green skills into the labour market, education and training measures, which helps increase the attractiveness and people's awareness of study fields related to green and digital change.

Graph A8.2: **Job vacancy rate in transforming sectors and mining and quarrying**



B - Mining and quarrying
C - Manufacturing
D - Electricity, gas, steam and air conditioning supply
E - Water supply; sewerage, waste management and remediation activities
F - Construction
H - Transportation and storage
Source: Eurostat jvs_a_rate_r2.

Energy poverty indicators have remained well below the EU average, but the spike in energy prices has worsened the situation. The share of the population unable to keep their homes adequately warm increased from 2.0% in 2015 to 3.4% in 2022, although this is still well below the EU average (9.3%) ([53]). The indicator increased by 1.4 percentage points between 2021 and 2022 on the back of energy price increases due to supply constraints caused by the COVID-19 pandemic and Russia's war of aggression against Ukraine, despite the emergency measures implemented in Estonia. In particular, 5.9% of the population at risk of poverty (AROP) (EU: 20.1%) and 3.5% of lower middle-income households (in deciles 4-5) (EU: 11.6%) were unable to keep their homes adequately warm in 2022. On the other hand, in January 2023, 4.4% of the population at risk of poverty spent a considerable proportion of their budget (more than 6%) on private transport fuels (EU: 37.1%) ([54]). Estonia adopted a definition on energy poverty in 2020. Measures addressing energy poverty are mainly linked to maintenance support under the Social Welfare Act and receipt of subsistence allowance for households that do not earn the minimum wage. In this context there is scope to focus more on effective and well-targeted structural measures to address root causes of energy poverty as per Commission Recommendation on energy poverty (2023/2407).

Despite being below the EU average, environmental inequalities remain an issue in Estonia. In 2021, the consumption footprint for 20% of the population with the highest income was 1.2 times higher than the footprint of the poorest 20% ([55]) (EU: 1.8). For both groups, the consumption footprint is highest for housing and food. The average levels of air pollution in 2021 stood below the EU average (5.8 vs 11.4 µg/m3 PM2.5), and all regions were below critical levels of air pollution ([56]). There are an estimated 100 premature deaths annually due to exposure to air pollution ([57]).

Estonia has taken important steps as regards achieving a fair transition towards climate neutrality. It has developed the new Green Reform action plan, which is expected to facilitate the transition to climate neutrality, with activities still at an early stage of implementation. There are existing reskilling measures in place for those people impacted by the green transition through the public employment services. However, measures targeting the most vulnerable groups in the green transition are less prominent. Support to workers affected in the shale oil industry is being provided through the Just Transition Fund, including a new measure for acquiring micro-

([53]) Energy poverty is a multi-dimensional concept. The indicator used focuses on an outcome of energy poverty. Further indicators are available at the Energy Poverty Advisory Hub.

([54]) Affordability of private transport fuels is one key dimension of transport poverty. The indicator has been developed in the context of the EMPL-JRC GD-AMEDI/AMEDI+ projects. Methodology explained in Economic and distributional effects of higher energy prices on households in the EU.

([55]) Developed in the context of the EMPL-JRC DISCO(H) project. Methodology explained in Joint Research Centre, 2024. Carbon and environmental footprint inequality of household consumption in the EU. JRC137520. The EU average refers to EU27 without Italy (household income data not available for IT in the HBS)

([56]) Two times higher than the recommendations in the WHO Air Quality Guidelines (annual exposure of 5µg/m^3).

([57]) EEA - Air Quality Health Risk Assessment

Table A8.1: **Key indicators for a fair transition in Estonia**

Indicator	Description	EE 2015	EE	EU
GHG per worker	Greenhouse gas emissions per worker – CO_2 equivalent tonnes	29.6	20.4 (2022)	14.3 (2022)
Employment EII	Employment share in energy-intensive industries, including mining and quarrying (NACE B), chemicals (C20), minerals (C23), metals (C24) and automotive (C29)	2.3%	2.1% (2023)	3.5% (2023)
Education & training EII	Adult participation in education and training (last 4 weeks) in energy-intensive industries	8.6%	19.6% (2023)	10.9% (2023)
Energy poverty	Share of the total population living in a household unable to keep its home adequately warm	2.0%	3.4% (2022)	9.3% (2022)
Transport poverty (proxy)	Estimated share of the AROP population that spends over 6% of expenditure on fuels for personal transport	3.8%	4.4% (2023)	37.1% (2023)
Carbon inequality	Ratio between the consumption footprint of the top 20% vs bottom 20% of the income distribution	1.2	1.2 (2021)	2.7 (2021)

Source: Eurostat (env_ac_ainah_r2, lfsa_egan2d, ilc_mdes01), EU Labour Force Survey (break in time series in 2021), EMPL-JRC GD-AMEDI/AMEDI+ and DISCO(H) projects.

credentials and an allowance for job-to-job transition to be introduced in 2024 ([58]).

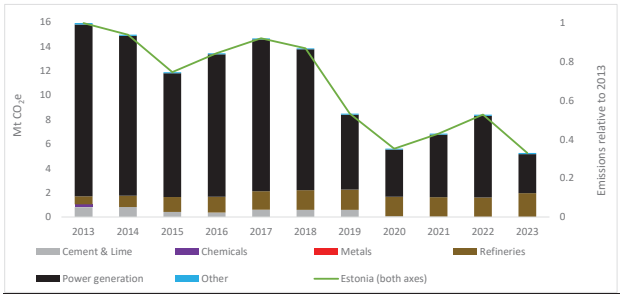
([58]) Based on the monitoring review of the Council Recommendation on ensuring a fair transition towards climate neutrality, which took place in October 2023.

ANNEX 9: RESOURCE PRODUCTIVITY, EFFICIENCY AND CIRCULARITY

The green transition of industry and the built environment, in particular decarbonisation, resource efficiency and circularity, is essential to boost Estonia's competitiveness ([59]). In this regard, priorities for Estonia are waste management and the use of circular materials in industry and construction.

Estonia is on track to achieve the EU's circular economy goals, although there are room for improvements in some areas. The EU's 2020 Circular Economy Action Plan aims to double the circular material use rate between 2020 and 2030. The plan also aims to significantly decrease the EU's material footprint. Estonia's material footprint is well above the EU average, with a tendency for the gap to increase further (see graph A9.1). With a circular use of material rate of 15.1%, Estonia was above the EU average of 11.7% in 2020. There is still room to make better use of the potential of the circular economy transition to drive the decarbonisation of Estonia's industry.

Graph A9.1: **ETS emissions by sector since 2013**

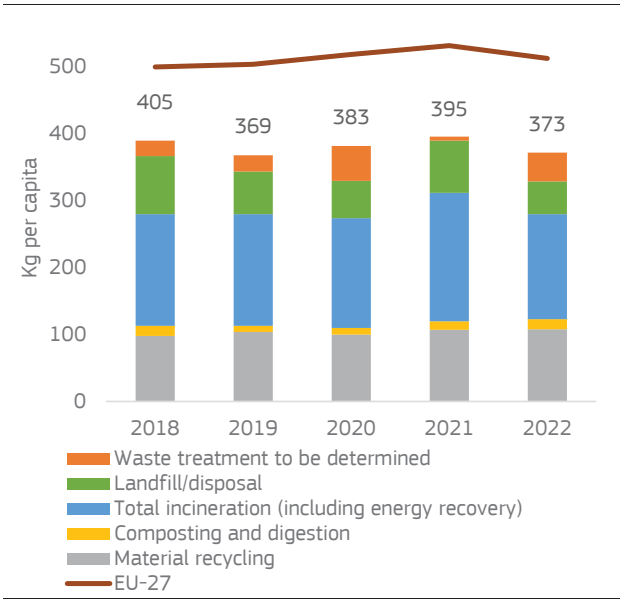


Source: European Commission

In 2023, the sectors covered by the EU emissions trading system (ETS) in Estonia ([60]) emitted 38% less greenhouse gases than in 2019, despite an increase in 2022. In 2023, 61% of emissions from ETS installations in Estonia came from power generation. The remainder came almost entirely from refineries (37%). Since 2019, the power sector has been the driver of ETS emissions reductions in the country, decreasing them by 48%. Emissions from cement and lime production still accounted for about 7% of industry emissions in 2019, down from 26% in the previous year, but vanished in 2022.

In the past decade, Estonia has made progress in waste management, but there is still room for improvement. The treatment of municipal waste needs considerable improvement. Estonia is at risk of falling short of the EU's recycling targets and continues to experience structural problems leading to slow progress in waste recycling. Municipalities have the responsibility to organise waste management locally. However, there is no incineration tax to shift waste management towards recycling. Although the municipal waste recycling rate increased from 28.2% to 30.3% between 2017 and 2021, it remained too low to meet the 2025 recycling target. In 2021, the recycling rate of plastic packaging was at 42.5%, above the EU average of 39.7%. Furthermore, Estonia performs well in e-waste recycling, with 81.6% of electrical and electronic equipment recycled in 2021. Estonia is on track to meet the 2035 landfilling target. However, innovation in waste treatment technologies has been slow, as no new patent on waste recycling has been registered since 2016.

Graph A9.2: **Treatment of municipal waste**



Source: Eurostat

([59]) See also Annexes 6, 7 and 12.

([60]) This analysis excludes air travel. For more details and the data sources, see Weitzel, M; van der Vorst, C. (2024), Uneven progress in reducing emissions in the EU ETS, JRC Science for policy brief, JRC138215, Joint Research Centre.

The industrial system is characterised by low resource productivity. With EUR 1 generated per kg of material consumed in 2021, resource productivity in Estonia is dragged down by resource-intensive industries. Furthermore, resource productivity is one of Estonia's relative weaknesses when it comes to the country's innovation capacity. Estonia ranked 13th on the 2022 Eco-Innovation Scoreboard (115.5 versus an EU average of 121.5, 2013 = 100). The resource-intensive energy production from oil shale also has an impact on resource productivity (see Annex 12). Oil shale combustion and processing account for 90% of the country's hazardous waste. As a result, Estonia is the second-biggest producer of hazardous waste in the EU with 1 198 kg/capita (Eurostat, 2020).

Additional measures are planned to support the circular transition of the built environment system. In 2021, Estonia adopted its 2035 vision for the construction sector. Through seven steps, it focuses on identifying the best developments for the sector, shaping a high--quality built environment. Estonia also launched the 'Pattern Buildings' project aiming to launch a modular buildings platform for a circular construction industry.

Estonia is on track to meet the Waste Framework Directive's targets for the construction sector, although there is room for improvement. Between 2018 and 2020, waste generated from construction and demolition activities per capita decreased, and was below the EU average. The proportion of backfilling has increased since 2018 and stood at 55.7% in 2020, above the EU average of 9.9%. Estonia's recovery rate decreased to 93%, still meeting the Waste Framework Directive's target for 2020. In 2021, 82% of the Estonian population was connected to at least secondary wastewater treatment.

Table A9.1: **Circularity indicators**

	2018	2019	2020	2021	2022	2023	EU-27	Latest year
Industry								
Resource productivity (purchasing power standard (PPS) per kilogram)	0.8	0.9	1.0	1.0	1.1	-	2.5	2022
Circular material use rate (%)	13.9	15.4	16.5	15.9	16.0	-	11.5	2022
Eco-innovation index (2013=100)	98.8	98.7	106.8	111.7	115.5	-	121.5	2022
Recycling of plastic packaging (%)	37.7	40.6	40.9	42.5	-	-	40.7	2021
Cost of air emissions from industry (EUR bn)	3.6	1.7	1.0	1.2	-	-	352.7	2021
Built environment								
Recovery rate from construction and demolition waste (%)	95.0	-	93.0	90.2	-	-	89.0	2020
Soil sealing index (base year = 2006)	102.4	-	-	-	-	-	103.4	2018
Non-residential floor area (m^2 per capita)	69.1	69.7	70.4	-	-	-	18.0	2020
Waste backfilled (%)	40.0	-	55.7	-	24.4	-	9.9	2020

Source: Eurostat, European Environment Agency

Digital transformation is key to ensuring a resilient and competitive economy. In line with the Digital Decade Policy Programme, and in particular with the targets in that Programme for digital transformation by 2030, this Annex describes Estonia's performance on digital skills, digital infrastructure/connectivity and the digitalisation of businesses and public services. Where relevant, it makes reference to progress on implementing Estonia's Recovery and Resilience Plan. Estonia allocates 24.1% of its total Recovery and Resilience Facility budget to digital (EUR 208 million) ([61]). Under Cohesion Policy, an additional EUR 0.4 billion (11% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation ([62]).

The Digital Decade policy programme sets out a pathway for EU's successful digital transformation by 2030. Estonia's national roadmap outlines the actions it intends to take to reach the objectives and targets at national level. The first report on the state of the Digital Decade highlighted the need to accelerate and deepen the collective efforts to reach the EU-wide targets and objectives ([63]). Among others, a digitally skilled population increases the development and adoption of digital technologies and leads to productivity gains and new business models. It also leads to higher inclusion and participation in an environment increasingly shaped by the digital transformation ([64]). Digital technologies, infrastructure and tools all play a role in addressing the current structural challenges, including strategic dependencies, cybersecurity and climate change.

Estonia has a large and growing pool of digital experts and a population with relatively good digital skills. Estonia performs slightly above the EU average as regards the percentage of the population with at least basic digital skills and has a very high share of ICT specialists. However, 67% of Estonian companies recruiting ICT specialists report difficulties, confirming that a skills gap still exists. With already the highest proportion of ICT graduates in the EU (9.6% compared to the EU average of 4.5%), Estonia is taking targeted measures to fill this gap, such as schemes to attract foreign ICT experts and upskilling and reskilling programmes ([65]). The Estonian RRP also includes skills reform for the ICT sector.

Estonia still suffers from relatively average digital infrastructure/connectivity, although this has improved significantly in recent years. Very high capacity network (VHCN) coverage (76.9%) is below the EU average (78.8%). The country still lags behind in terms of overall 5G coverage. The Estonian RRP includes a measure to roll out very high capacity broadband networks to new sites in rural areas.

Not all Estonian businesses make full use of the potential of digital technologies. The share of small and medium-sized companies with at least basic digital intensity is slightly below the EU average (55.9% compared to an EU average of 57.7%), but the use of some advanced technologies is more common among Estonian enterprises than in the EU on average. The Estonian business ecosystem includes many innovative and growing start-ups that are driving the country's growth and modernisation. The Estonian RRP includes some measures to support and encourage the digitalisation of companies, particularly SMEs, including a measure to provide financial support for adopting digital technologies, promoting industrial R&D and training staff. In 2022, 3.1% of enterprises in Estonia reported ICT service outage due to cyberattacks (e.g. ransomware attacks, denial of service attacks). Over the same year, 20.9% of enterprises developed or reviewed their ICT security policy within the previous 12 months.

([61]) The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

([62]) This amount includes all investment specifically aimed at or substantially contributing to digital transformation in the 2021-2027 cohesion policy programming period. The source funds are the European Regional Development Fund, the Cohesion Fund, the European Social Fund Plus, and the Just Transition Fund.

([63]) European Commission (2023): Report on the state of the Digital Decade 2023, 2023 Report on the state of the Digital Decade | Shaping Europe's digital future (europa.eu).

([64]) See for example OECD (2019): OECD Economic Outlook, Digitalisation and productivity: A story of complementarities, OECD Economic Outlook, Volume 2019 Issue 1 | OECD iLibrary (oecd-ilibrary.org) and OECD (2019): Going Digital: Shaping Policies, Improving Lives – Summary, https://www.oecd.org/digital/going-digital-synthesis-summary.pdf.

([65]) See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=ICT_specialists_-_statistics_on_hard-to-fill_vacancies_in_enterprises and https://digital-strategy.ec.europa.eu/en/policies/desi-estonia.

Table A10.1:**Key Digital Decade targets monitored by the Digital Economy and Society Index indicators**

	Estonia			EU	Digital Decade target by 2030 (EU)
	2022	2023	2024	2024	
Digital skills					
At least basic digital skills	**56%**	**56%**	**63%**	**56%**	**80%**
% individuals	2021	2021	2023	2023	2030
ICT specialists ([1])	**6.2%**	**6.6%**	**6.7%**	**4.8%**	**20 million**
% individuals in employment aged 15-74	2021	2022	2023	2023	2030
Digital infrastructure/connectivity					
Fixed very high capacity network (VHCN) coverage	**73%**	**76%**	**77%**	**79%**	**100%**
% households	2021	2022	2023	2023	2030
Fibre to the premises (FTTP) coverage ([2])	**73%**	**76%**	**77%**	**64%**	**-**
% households	2021	2022	2023	2023	
Overall 5G coverage	**18%**	**43%**	**87%**	**89%**	**100%**
% populated areas	2021	2022	2023	2023	2030
Digitalisation of businesses					
SMEs with at least a basic level of digital intensity	**54%**	**NA**	**56%**	**58%**	**90%**
% SMEs	2021		2023	2023	2030
Data analytics	**NA**	**NA**	**26%**	**33%**	**-**
% enterprises			2023	2023	
Cloud	**51%**	**51%**	**53%**	**39%**	**-**
% enterprises	2021	2021	2023	2023	
Artificial intelligence	**3%**	**3%**	**5%**	**8%**	**-**
% enterprises	2021	2021	2023	2023	
AI or cloud or data analytics ([3])	**NA**	**NA**	**61%**	**55%**	**75%**
% enterprises			2023	2023	2030
Digitalisation of public services					
Digital public services for citizens	**92**	**94**	**96**	**79**	**100**
Score (0 to 100)	2021	2022	2023	2023	2030
Digital public services for businesses	**98**	**99**	**99**	**85**	**100**
Score (0 to 100)	2021	2022	2023	2023	2030
Access to e-health records	**NA**	**89**	**98**	**79**	**100**
Score (0 to 100)		2022	2023	2023	2030

(1) The 20 million target represents about 10% of total employment.
(2) The fibre to the premises coverage indicator is included separately as its evolution will also be monitored separately and taken into consideration when interpreting VHCN coverage data in the Digital Decade.
(3) At least 75% of EU enterprises have taken up one or more of the following, in line with their business operations: (i) cloud computing services; (ii) big data; (iii) artificial intelligence.

Source: Digital Economy and Society Index

Estonia's digital public services (e-Estonia) are very advanced. With very high scores from the Digital Economy and Society Index for digital public services for citizens and businesses, Estonia is one of the most advanced countries in the EU in this respect (with scores of 95.8 for citizens and 98.8 for businesses). In the context of its RRP, the country plans to make these services even more user-focused and proactive (anticipating user needs and making the first move). Electronic identification (eID) is widely used in Estonia. Estonia currently has six eID means notified under the Estonian eID scheme. The ID card, the RP card, the Digi-ID, the e-Residency, the Digi-ID, the Mobiil-ID, and the Diplomatic identity card are all notified at level of assurance 'high'. On access to e-health records, Estonia (98) performs way above the EU average (79).

This Annex provides a general overview of the performance of Estonia's research and innovation system, which is essential for delivering the twin transition and ensuring long-term competitiveness.

Estonia is a 'moderate innovator' according to the 2023 edition of the European Innovation Scoreboard (EIS). Its overall performance remains slightly below the EU average (98.6% of the EU performance). A dynamic R&D base and good framework conditions for tech start-ups support the innovativeness of Estonia's economy. Estonia's research and development (R&D) intensity (gross domestic expenditure on R&D as a percentage of GDP) increased over the 2015-2022 period: R&D intensity was 1.78% of GDP in 2022, compared to 1.75% in 2020 and 1.47% in 2015. According to 'The State of European Tech 2023' ([66]), Estonia retains its leadership position in the number of start-ups per capita. In 2023, Estonia had over 400 start-ups per million inhabitants, the highest rate in Europe.

The business sector's research-based innovation activities have expanded but are still too limited. Many Estonian businesses have increased R&D investments in recent years, particularly by hiring researchers, as reflected in the researchers employed by business per thousand active population. In 2021 the figure reached 3.5, up from 3.2 a year earlier. Business enterprise expenditure on R&D reached 1.0% of GDP in 2022 as compared to 0.68% in 2015. However, this is well below the EU average of 1.47% and only half of the expected 2% level required to meet the 3% national R&D intensity target, by complementing the 1% public part.

While the level of direct public support to business R&D has increased, the policy mixes beyond grant schemes are less developed. Support for business research and innovation has been strengthened in recent years, notably under the Estonian recovery and resilience plan (RRP). For instance, the RRP includes the launch of the green technologies development programme, which supports the development of green technologies by start-ups; the programme targets the development of services and products related to R&D of materials, resource efficiency and reduction of the use of chemicals. Direct public support to business R&D increased from 0.056% of GDP in 2019 to 0.097% in 2022 in line with the EU average, but the policies beyond grant schemes are less developed. The corporate income tax system has no special provisions to favour investment in R&D and Estonia does not apply other relevant tax exemptions, being an exception in the OECD in this regard. There have been first talks to introduce a tax-related measure that would facilitate the achievement of the 2% R&D investment level compared to the GDP by business sector. There are opportunities to better address the need of enterprises with minimal absorptive capacity (e.g. through soft support services).

Cooperation between public research and businesses remains limited, but the new Applied Research Centre (ARC) will help companies to better exploit research results. In 2021, R&D activities commissioned by business enterprises to universities and public research organisations represented 5.2% of public R&D, less than the EU average of 7.1%). ARC was formed in 2023 as part of the Central Office of Metrology in Estonia to support industrial innovation. ARC specialises in biorefining, drone technologies, autonomous vehicles, hydrogen technologies, and use of health data. Companies with limited R&D capacity are expected to better exploit research results.

Investments in the research and innovation system will enable greater valorisation of wood, Estonia's most important natural resource, into advanced materials. The peer review of the Estonian research and innovation system ([67]) conducted under the Horizon 2020 Policy Support Facility highlighted the importance of setting thematic priorities for public research and innovation funding. In line with this recommendation, five focus areas and national roadmaps were drawn up under the Estonian research and development, innovation and entrepreneurship strategy 2021-2035'. 'Wood' is among the national roadmaps of the R&D focus area 'Adding Value to Local Resources'. While the Estonian wood industry is still dominated by low and medium-low technology enterprises, the development of new technology is expected to

([66]) Available at https://stateofeuropeantech.com/

([67]) 'Final Report – Peer Review of the Estonian R&I System' 2019, p. 8.

Table A11.1:**Key innovation indicators**

Estonia	2010	2015	2020	2021	2022	EU average (1)
Key indicators						
R&D intensity (GERD as % of GDP)	1.58	1.47	1.75	1.77	1.78	2.24
Public expenditure on R&D as % of GDP	0.77	0.77	0.76	0.75	0.77	0.73
Business enterprise expenditure on R&D (BERD) as % of GDP	0.79	0.68	0.96	0.99	1.00	1.48
Quality of the R&I system						
Scientific publications within the top 10% most cited publications worldwide as % of publications of the country	7.4	7.3	8.79	:	:	9.6
Patent Cooperation Treaty (PCT) patent applications per billion GDP (in PPS)	2.3	1.0	1.21	:	:	3.4
Academia-business cooperation						
Public-private scientific co-publications as % of total publications	6.6	6.0	8.5	8.7	8.2	7.6
Public expenditure on R&D financed by business enterprise as % of GDP	0.029	0.035	0.05	0.039	:	0.054
Human capital and skills availability						
New graduates in science & engineering per thousand pop. aged 25-34	12.5	11.8	9.5	9.7	:	16.9
Public support for business enterprise expenditure on R&D (BERD)						
Total public sector support for BERD as % of GDP	0.092	0.065	0.091	0.097	:	0.204
R&D tax incentives: foregone revenues as % of GDP	0	0	0	0	0	0.104
Green innovation						
Share of environment-related patents in applications filed under PCT (%)	18.7	11.1	17.5	:	:	14.7
Finance for innovation and economic renewal						
Venture capital (market statistics) as % of GDP	0.034	0.032	0.098	0.246	0.359	0.085
Employment share of high growth enterprises measured in employment (%)	:	11.07	12.71	:	:	12.51

(1) EU average for the last available year or the year with the largest number of country data.
Source: Eurostat, OECD, DG JRC, Science-Metrix (Scopus database and EPO's Patent Statistical Database), Invest EU

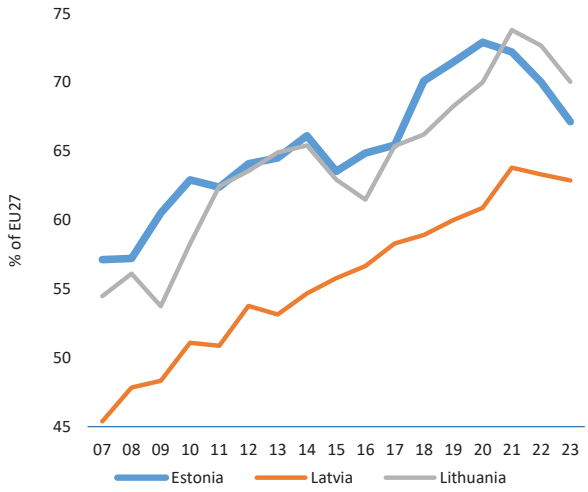
move its focus to biomaterials and biochemicals, increasing the efficiency of wood utilisation, as well as substituting fossil fuels. The most successful business R&D project is in the field of forest-based innovative materials, receiving the most support from EU R&I funding programmes.

Estonia generally scores well and outranks its Baltic peers when it comes to competitiveness. The country ranks 26th in the IMD World Competitiveness Ranking, a slight drop from 22nd the previous year. This is mostly due to a significant decline in the economic performance indicators ([68]). The economic effects of Russia's war of aggression against Ukraine have had a considerable impact and triggered a sharp rise in inflation. The lingering recession in this energy-intensive economy has led to Estonian companies operating in an environment where their cost bases have been rising faster than that of some competitors, with nominal unit labour costs in industry having seen the sharpest increase across the EU in 2022 and the third sharpest in 2023. This issue has worsened due to weak demand in main export target markets as well as broken supply chains with Russia. Estonian companies have indicated that they have been losing competitiveness domestically as well as abroad to companies from other countries since the middle of 2022 ([69]). This follows remarkable progress and steady convergence towards some western European economies. In addition to comparatively high input prices, support measures to companies have also been much smaller in size.

Competitiveness-wise, Estonia's strengths are its business-friendly environment and high business and government efficiency ([68]). The country has an enabling start-up and scale-up environment, and the high digitalisation level of public administration significantly reduces the administrative burden for businesses (see also Annex 13). The percentage of firms reporting regulation as a major obstacle to doing business (15.0%) remains well below the EU average (22.2%), despite an increase compared to 2021 and 2022 (Table A12.1). However, a 2022 Flash Eurobarometer indicated that 46% of Estonian companies were concerned about frequent legislative changes that can create confusion and uncertainty and add administrative burden for business operations in this challenging economic climate ([70]).

A deceleration of productivity is adding to Estonia's competitiveness pressures. The productivity gap between Estonia and the EU average has been narrowing for the past decade. The overall considerable increase in labour productivity is largely attributed to capital deepening, but also to sustained growth in total factor productivity. However, in 2021, 2022 and 2023, Estonia recorded a decline in its productivity, having been surpassed by Lithuania, with all three Baltic countries performing considerably below the EU average (Graph A12.1). In 2023, Estonia's hourly productivity in purchasing power standards (PPS) per hour worked stood at 67.1% of the EU average, which is lower than in each of the preceding five years. Generally, there are also quite substantial regional differences in productivity (see Annex 17). The post-pandemic economic recovery allowed labour productivity in industry to grow by 2.8% in 2021. However, this was followed by a sharp decline of 10.1% in 2022 and 8.7% in 2023 (Graph A12.2), the second highest fall among all EU Member States.

Graph A12.1: **Hourly productivity in PPS (% of EU-27)**



GDP in current purchasing power standards per hour worked and in percentage of the EU
Source: AMECO database, European Commission

The comparatively high energy and raw material prices are affecting the competitiveness of Estonian industrial ecosystems overall (see also Annex 7). They particularly affect some sectors such as construction, forest-based industries and the metalworking industry, which tends to export 90% of the goods produced. In addition, the ICT and real estate sectors are also affected. While the share of industrial companies reporting constraints due

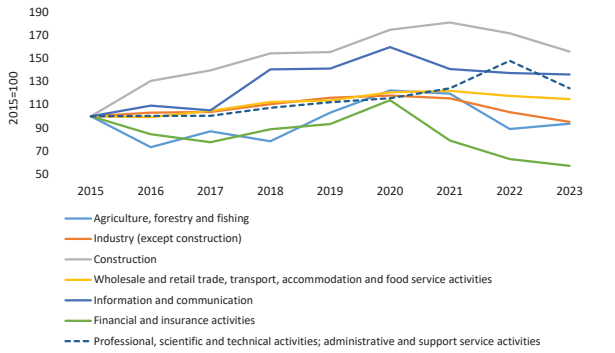
([68]) IMB World Competitiveness Ranking 2023

([69]) Estonian Competitiveness Report 2023

([70]) Flash Eurobarometer 504 – Perceived independence of the national justice systems in the EU among companies, January-February 2022

to material shortages decreased considerably between 2022 and 2023 and is now one of the lowest, well below the EU average (see Table A.12.1), the accessibility of raw materials is still affected by geopolitical developments.

Graph A12.2: **Labour productivity and unit labour costs at industry level**



Source: Eurostat, NAMA_10_LP_A21__custom_9251004

High producer prices for industrial output, declining exports and high consumer prices are putting considerable pressure on Estonian industries. The share of industry in terms of value added to GDP is slightly above the EU average (24% in 2022 vs 23.5%) ([71]). While the producer price index fell moderately in 2023 compared with 2022, with the biggest decrease registered for electricity, petroleum products, and paper and paper products, prices increased the most for wood products, in mining and quarrying, and for motor vehicles ([72]). 59% of Estonian businesses see their enterprises as being weaker than 12 months before, compared to a European average of 48% ([73]). Additional long-term barriers to investment and major challenges include the availability of skilled staff and uncertainty about the future ([74]).

Industrial companies facing constraints in terms of labour shortages may also hamper exporting industries in the long run. These shortages are particularly severe in the machinery, metal and electronics industries, where companies report a lack of engineers and other highly educated specialists. Furthermore, the number of ICT graduates is not enough to meet the needs in the field due to a high drop-out rate ([75]) (see also Annex 14). Overall, however, the share of industrial companies reporting labour shortages has decreased considerably from 2022 to 2023 and is now well below the EU average (see Table A12.1). The Estonian recovery and resilience plan (RRP) seeks to tackle the challenge of access to skills through measures to facilitate access to transversal skills.

The production value of firms in the construction sector, both in Estonia and abroad, has decreased. The Estonian construction market has been on a downward trend since Q2-2022 ([76]) and the sector continues to be affected by rising construction prices, high interest rates and declining consumer confidence. Related to this, the recession and contracting construction market also affect forest-based industries. While the price of roundwood has decreased, prices in Estonia remain higher than in neighbouring countries, hampering the competitiveness of this sector.

When it comes to innovation, one of the country's relative weaknesses is resource productivity. Despite continually modest improvement since 2017 ([77]) (see Annexes 9 and 11), Estonia has one of the lowest resource productivity rates among EU Member States ([78]). This can be partially explained by the country's resource-intensive oil shale industry. In addition to causing environmental damage, it accounts for 90% of Estonia's hazardous waste (see Annex 9).

Estonia is taking a leading role in rare earth separation and magnet manufacturing. These critical raw materials are of high economic importance and needed for a wide set of technologies in strategic sectors such as renewable energy, digital, space and defence. This endeavour is supported by the Just Transition Fund (see also Annex 7). However, the share of heavy rare earth metals in Estonia's own raw material reserves is very small, although the country is

([71]) World Bank – industry value added (% of GDP)

([72]) Statistics Estonia

([73]) Intrum European Payment Report 2023.

([74]) European Investment Bank Investment Survey 2023

([75]) Enterprise Estonia.

([76]) Statistics Estonia

([77]) European Innovation Scoreboard

([78]) Eurostat, Resource Productivity by country, env_ac_rp.

home to what is probably the largest phosphorite deposit in Europe ([79]).

As an open economy firmly geared to exports, Estonia continues to be well integrated into the Single Market. Intra-EU trade accounts for 58.6% of GDP, the fifth highest share among EU Member States in 2023. Furthermore, Estonia has a comparatively low level of services trade restrictiveness compared to the EU average (Table A12.1. The launch of the unitary patent system on 1 June 2023 was a step in the completion of the EU Single Market for technology, with Estonia one of the 17 Member States to become part of the system from the very beginning. So far around 11 000 unitary patents have been issued by the European Patent Office, mostly owned by EU-based entities. However, as of May 2024, Estonia had submitted only 14 unitary patent requests, with 13 of them registered ([80]).

Estonia has reached the intermediate stage of implementing the Once-Only Technical System (OOTS) ([81]), with most components ready or approaching readiness. As part of the Single Digital Gateway Regulation ([82]), the system will enable the automated cross-border exchange of evidence between competent authorities, improving online access to information, administrative procedures and assistance within the EU. The onboarding of Estonian competent authorities is crucial for the system to function smoothly and to reduce administrative burden.

Estonia remains one of the Member States with the lowest number of pending infringements (10 compared to the EU average of 26). This confirms its good record in the Single Market. However, the country's transposition deficit increased slightly above the EU average (Table A12.1. When it comes to SOLVIT, Estonia solved the cases (3) it handled as lead centre in 2023, which is above the EU average of 88.3% ([83]).

Overall, the country is an average performer on public procurement, with 26% of contracts awarded after receiving only single bids in 2023. This constitutes a slight decrease compared with 2022 (32%) ([84]). However, Estonia has the fifth highest share of direct awards (12%) among Member States, above the EU average of 6% ([85]). It widely recognises public procurement as a strategic tool to support the green and digital transition and contribute to social sustainability. However, the uptake of strategic public procurement is still limited. Estonia launched a project in 2023 to increase the uptake by professionalising the public procurement workforce. The aim is to deliver comprehensive strategies and hands-on technical guidance to the government, Estonian contracting authorities and economic operators on how they can strengthen their administrative capacity to promote strategic use of public procurement ([86]).

In terms of professions, regulatory restrictiveness in Estonia is generally lower than the EU average except for patent/trademark agents ([87]), for which reassessing the scope of reserved activities could increase competitiveness. In 2023, one restriction – the requirement for professional insurance for patent/trademark agents – was removed. Furthermore, lawyers in Estonia are subject to incompatibility rules and multidisciplinary restrictions. These could affect their potential to innovate and roll out digital solutions and new business models in this sector ([88]).

Tackling process-related barriers to the deployment of renewable energy sources is important for the energy transition and for ensuring energy security in the country. As reviewed by the Single Market Enforcement Taskforce, barriers relate to the length of administrative authorisation procedures and lack of consistency in the approaches of national and municipal authorities. These issues are being

([79]) Geological Survey of the Republic of Estonia

([80]) European Patent Office

([81]) Implementing Regulation (EU) 2022/1463.

([82]) Regulation EU 2018/1724.

([83]) Single Market Scoreboard

([84]) The currently available data is preliminary. Due to the technical preparation of a new public procurement platform, only the regular data available in Tenders Electronic Daily (TED) has been taken into account.

([85]) Single Market Scoreboard – Public Procurement

([86]) Ministry of Finance of the Republic of Estonia

([87]) SWD 2021(185).

([88]) COM(2021)385.

tackled in the recovery and resilience plan and as well as in Estonia's REPowerEU chapter (see Annexes 3 and 7).

The country is one of the top nine performers in the EU on access to equity finance for companies, despite dropping down in the EIF SME Access to Finance Index compared to 2021. On access to loans, the country scores slightly below the EU average, which also constitutes a drop in its ranking against the EU average compared with 2021 (Table A12.1. However, Estonia has a very high share of venture capital investment per GDP (see Annex 11) as well as a low level of regulatory obstacles to investment. The share of private as well as public net investment in the country is above the EU average. However, in 2023 net private investment as a percentage of GDP dropped from 9.2% in 2022 to 6.4%, which is also a considerable decrease when compared with the share in 2021 (10.9%). However, net public investment increased from 2.2% in 2022 to 3.2% in 2023, which is above the 2019 to 2021 levels and also above the EU average (Table A12.1).

Small and medium-sized enterprises (SMEs) represent 99.8% of the firms in the country and created 79% of the value added in 2022 ([89]). Late payments remain a major barrier to their resilience and growth. Estonia has an above-average share of SMEs in the EU experiencing late payments (53.6% in 2023), which constitutes an increase compared to 2022 and surpasses the pre-pandemic 2019 level. In 2023, Estonia recorded a payment gap of 18 days for payments from the public sector – higher than the EU average. This was a slight increase compared to 2022 but a significant one if compared to the average of 11 days in 2021. The gap for payments in the private sector, namely business-to-business, is exactly the same as the EU average (15 days), which also follows an increase of 2 days compared to 2022 (see Table A12.1). The current geopolitical situation and global economic situation can be seen as a contributing factor in this. Compared with other Member States, a larger share of Estonian businesses found it difficult to pay their suppliers on time due to inflation ([73]).

([89]) SME Performance Review 2022/2023 – Estonia country sheet

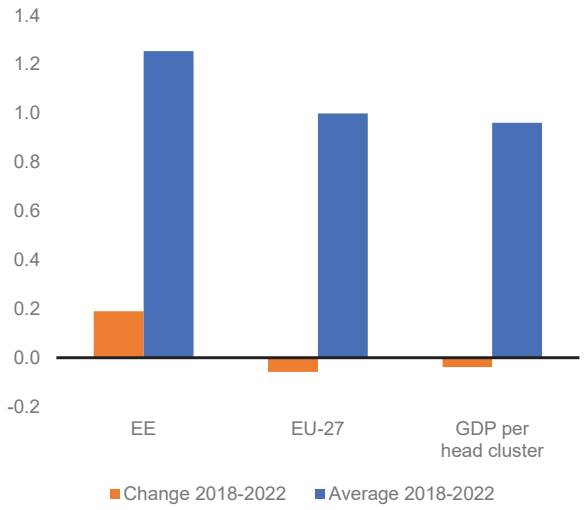
Table A12.1:**Industry and the Single Market**

Estonia							
POLICY AREA	**INDICATOR NAME**	**2019**	**2020**	**2021**	**2022**	**2023**	**EU27 average***
HEADLINE INDICATORS							
Economic Structure	Net Private investment, level of private capital stock, net of depreciation, % GDP[1]	9,3	10,6	10,9	9,2	6,4	**3,8**
	Net Public investment, level of public capital stock, net of depreciation, % GDP[1]	1,8	2,6	2,6	2,2	3,2	**1,2**
	Real labour productivity per person in industry (% yoy)[2]	4,6	-2,1	7,6	-10,1	-8,7	**-1,24**
Cost competitiveness	Nominal unit labour cost in industry (% yoy)[2]	4,4	2,9	0,5	19,7	20,7	**9,83**
SINGLE MARKET							
Single Market integration	EU Trade integration, % (Average intra-EU imports + average intra EU exports)/GDP[2]	52,0	51,0	58,6	64,3	58,6	**42,9**
Compliance	Transposition deficit, % of all directives not transposed[3]	0,5	0,5	1,2	0,4	0,9	**0,7**
	Conformity deficit, % of all directives transposed incorrectly[3]	1,4	1,4	0,9	0,9	1,1	**1,1**
	SOLVIT, % resolution rate per country[3]	100,0	100,0	100,0	100,0	100,0	**88,3**
	Number of pending infringement proceedings[3]	9	12	12	8	10	**25,9**
Restrictions	EEA Services Trade Restrictiveness Index[4]	0,04	0,04	0,04	0,04	0,04	**0,05**
Public procurement	Single bids, % of total contractors[3]	34	27	25	32	26	**28,6**
	Direct Awards, %[3]	9	12	9	11	12	**8,1**
ECONOMIC STRUCTURE							
Shortages	Material Shortage (industry), firms facing constraints, %[5]	3,5	7,1	21,7	20,4	4,4	**17,2**
	Labour Shortage using survey data (industry), firms facing constraints, %[5]	20,8	7,9	27,2	23,3	9,2	**23,3**
	Vacancy rate, % of vacant posts to all available ones (vacant + occupied)[2]	1,825	1,1	1,5	1,8	1,5	**2,5**
Strategic dependencies	Concentration in selected raw materials, Import concentration index based on a basket of critical raw materials[6]	0,18	0,16	0,17	0,18	0,22	**0,22**
	Installed renewables electricity capacity, % of total electricity produced[2]	0,1	0,1	0,3	0,3		**50**
BUSINESS ENVIRONMENT - SMEs							
Investment obstacles	Impact of regulation on long-term investment, % of firms reporting business regulation as major obstacle[7]	13,0	8,9	5,6	9,0	15,0	**22,2**
Business demography	Bankruptcies, Index (2015=100)[2]	101,0	107,4	72,9	66,5	102,1	**105,6**
	Business registrations, Index (2015=100)[2]	129,3	131,4	148,7	124,9	131,2	**120,2**
Late payments	Payment gap - corporates B2B, difference in days between offered and actual payment[8]	-	15	14	13	15	**15**
	Payment gap - public sector, difference in days between offered and actual payment[8]	-	14	11	16	18	**16**
	Share of SMEs experiencing late payments in past 6 months, %[9]	52,3	37,8	48,4	45,2	53,7	**48,7**
Access to finance	EIF Access to finance index - Loan, Composite: SME external financing over last 6 months, index values between 0 and 1[10]	0,24	0,48	0,47	0,36	-	**0,49**
	EIF Access to finance index - Equity, Composite: VC/GDP, IPO/GDP, SMEs using equity, index values between 0 and 1[10]	0,27	0,20	0,41	0,19	-	**0,17**

Source: (1) AMECO, (2) Eurostat, (3) Single Market Scoreboard, (4) OECD, (5) ECFIN BCS, (6) COMEXT and Commission calculations, (7) EIB Investment Survey, (8) Intrum Payment Report, (9) SAFE survey, (10) EIF SME Access to Finance Index.
* Own Commission calculations for the EU27 average

Estonia's public administration is essential for the economy's competitiveness by, in particular, shaping the conditions for the twin transitions and creating a favourable business environment. The level of perceived government effectiveness is improving (Graph A13.1). It rose to 1.34 in 2022, up from 1.4 in 2019, and is above the EU average. The national development strategy, 'Estonia 2035' ([90]), identifies governance as a strategic goal next to people, society, economy and the environment. It focuses on digitalising the public administration, increasing the quality of public services, ensuring fundamental rights and making country more research-intensive.

Graph A13.1: **Government effectiveness**



Average value over 2018-2022 and change over 2018-2022. The GDP per head bar shows the mean value of the government effectiveness indicator for the group of EU countries belonging to the same GDP per head cluster as Estonia (EU countries are ranked in terms of their GDP per head and grouped into three equally sized clusters).
Source: Worldwide Governance Indicators.
Source:

The recovery and resilience plan (RRP) focuses mainly on the green and digital transitions. While Estonia is a front runner in e-government, it continues to modernise its digital public services and to strengthen its digital capacity to fight money laundering. Particularly good progress has been made on the digital transformation of businesses.

Estonia's civil service is relatively young and well-skilled and outperforms the private sector in terms of job satisfaction ([91]). The ratio of staff aged 25-49 compared to those aged 50-64 is above the EU average and has remained stable in the last 3 years. The share of public administration employees with higher education and their participation rate in adult learning indicate a relatively high-skilled workforce compared to the EU average. Gender parity in senior civil service positions is above the EU average (Table A13.1).

Estonia's e-government maturity and the share of people using these services are well above the EU average. This can be attributed to the extent to which key technologies have been put in place to deliver digital public services and the ease with which people are able to access and use them. Estonia significantly surpasses the EU average across all four dimensions of the e-government benchmark indicators (namely user centricity, transparency, key enablers and cross-border digital public services) ([92]). Further improvements to digital public services remain one of the priorities under Estonia's national digital agenda for 2030 (see also Annex 12). Ongoing challenges include ensuring the accessibility of health data to everyone (including people with disabilities) and making all relevant portals accessible on mobile devices ([93]).

Estonia has a well-established regulatory governance. The impact assessments have improved over time. There is regular oversight and reporting on their quality ([94]). However, the publication of *ex post* evaluations remains at the discretion of the relevant minister. Accessibility and transparency of regulatory policy is ensured through an online information system known as EIS. EIS tracks legislative developments and makes regulatory impact assessments available on a

([90]) Strategic goals | Eesti Vabariigi Valitsus.

([91]) Roles and Attitudes in the Public Service 2023.

([92]) European Commission, eGovernment benchmark 2023, eGovernment Benchmark 2023 | Shaping Europe's digital future (europa.eu).

([93]) 2023 Report on the state of the Digital Decade, 2023 Report on the state of the Digital Decade | Shaping Europe's digital future (europa.eu).

([94]) OECD, Regulatory Policy Outlook 2021, Country profile for Estonia, 2021, https://www.oecd.org/gov/regulatory-policy/country-profiles-oecd-regulatory-policy-outlook-2021-2018-2015.htm.

Table A13.1:**Public administration indicators**

EE	Indicator ([1])	2019	2020	2021	2022	2023	EU-27([2])
E-government and open government data							
1	Share of internet users within the last year that used a public authority website or app	n/a	n/a	n/a	93.0	94.7	75.0
2	E-government benchmark overall score ([3])	n/a	91.6	90.0	91.8	92.0	75.8
3	Open data and portal maturity index	0.7	0.9	0.9	0.9	1.0	0.8
Educational attainment level, adult learning, gender parity and ageing							
4	Share of public administration employees with higher education (levels 5-8, %)	68.9	70.3	66.4 (b)	69.7	71.1	52.9
5	Participation rate of public administration employees in adult learning (%)	42.0	29.3	36.9 (b)	41.4	42.4	17.9
6	Gender parity in senior civil service positions ([4])	4.4	1.0	3.0	3.4	3.8	9.2
7	Ratio of 25-49 to 50-64 year olds in NACE sector O	2.4	2.6	2.4 (b)	2.6	2.3	1.5
Public financial management							
8	Medium-term budgetary framework index	0.7	0.7	0.7	0.7	n/a	0.7
9	Strength of fiscal rules index	1.3	1.3	1.3	1.3	n/a	1.4
Evidence-based policy making							
10	Regulatory governance	n/a	n/a	2.17	n/a	n/a	1.7

([1]) High values denote a good performance, except for indicator # 6. ([2]) 2023 value. If unavailable, the latest value available is shown. ([3]) Measures the user centricity (including for cross-border services) and transparency of digital public services as well as the existence of key enablers for the provision of those services. ([4]) Defined as the absolute value of the difference between the percentage of men and women in senior civil service positions.
Flags: (b) break in time series; (d) definition differs; (u) low reliability.
Source: E-government activities of individuals via websites, Eurostat (# 1); E-government benchmark report (# 2); Open data maturity report (# 3); Labour Force Survey, Eurostat (# 4, 5, 7); European Institute for Gender Equality (# 6); Fiscal Governance Database (# 8, 9); OECD Indicators of Regulatory Policy and Governance (# 10).

central portal. In addition, for public consultations, other channels are used to ensure information on them is available.

To help address fiscal challenges, the independent fiscal institution could be strengthened. The Estonian Fiscal Council is a relatively small independent fiscal institution, with only two staff members. It endorses the government's macroeconomic and fiscal forecasts and assesses compliance with the budget balance rule. Independence could be further strengthened, as the Fiscal Council's budget is part of the central bank budget.

The justice system performs efficiently. The length of court proceedings in civil, commercial and administrative cases is one of the shortest in the EU (28 days at first instance in 2022). The quality of the justice system is good overall. The level of digitalisation is very advanced and keeps improving. On judicial independence, no systemic deficiencies have been reported ([95]).

([95]) For more detailed analysis of the performance of the Estonian justice system, see the 2024 EU Justice Scoreboard (forthcoming) and the 2024 country-specific chapter on Estonia in the Rule of Law Report (forthcoming).

ANNEX 14: EMPLOYMENT, SKILLS AND SOCIAL POLICY CHALLENGES IN LIGHT OF THE EUROPEAN PILLAR OF SOCIAL RIGHTS

The European Pillar of Social Rights is the compass for upward convergence towards better working and living conditions in the EU. This Annex provides an overview of Estonia's progress in implementing the Pillar's 20 principles and the EU's headline and national targets for 2030 on employment, skills and poverty reduction.

Estonia's labour market performed strongly in 2022 and 2023, but the recession that started in Q2-2022 had a negative impact on the trend. While the employment rate was still high in 2023 at 82.1% (EU: 75.3%), the unemployment rate increased from 5.6% in 2022 to 6.4.% in 2023 (EU: 6.1%) and is expected to rise further in 2024. The recession has especially affected employment in manufacturing, such as jobs connected with wood processing. Estonia's youth unemployment rate slightly decreased from 18.6% in 2022 to 17.3% in 2023 and is much higher than the EU average (14.5%). To tackle youth unemployment and assist those who are not in employment, education or training the Estonian government adopted the reinforced Youth Guarantee action plan in 2022 as part of the recovery and resilience plan (RRP). In 2022, the disability employment gap rose significantly, by 7.5 percentage points (pps), interrupting a steady decline since 2016 and exceeding the EU average for the first time in 2022 (26.2% vs 21.4% in the EU) ([96]). The latest data points to a significantly lower disability employment gap in Estonia for 2023 (at 20.2 pps). Estonia is among the best performers as regards the gender employment gap, yet it continues to have one of the largest gender pay gaps in the EU (21.3% vs an EU average of 12.7% in 2022). That rate was on a downward trend until 2021, partly because of reforms undertaken in recent years.

In-work poverty in Estonia is high (10.5% in 2022 vs an EU average of 8.5%). The minimum wage (EUR 820 as of January 2024) increased in nominal terms by 10% between January 2022 and July 2023, but decreased in real terms by 9.9%. Collective bargaining covers a relatively low proportion of workers (19% in 2021), and membership of trade union and employers' organisations is relatively low (6% and 25% ([97]) in 2019) ([98]).

Table A14.1:**Social scoreboard for Estonia**

Policy area	Headline indicator	
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)	41.8
	Early leavers from education and training (% of the population aged 18-24, 2023)	9.7
	Share of individuals who have basic or above basic overall digital skills (% of the population aged 16-74, 2023)	62.6
	Young people not in employment, education or training (% of the population aged 15-29, 2023)	9.6
	Gender employment gap (percentage points, population aged 20-64, 2023)	2.4
	Income quintile ratio (S80/S20, 2022)	5.4
Dynamic labour markets and fair working conditions	Employment rate (% of the population aged 20-64, 2023)	82.1
	Unemployment rate (% of the active population aged 15-74, 2023)	6.4
	Long term unemployment (% of the active population aged 15-74, 2023)	1.3
	Gross disposable household income (GDHI) per capita growth (index, 2008=100, 2022)	125.6
Social protection and inclusion	At risk of poverty or social exclusion (AROPE) rate (% of the total population, 2022)	25.2
	At risk of poverty or social exclusion (AROPE) rate for children (% of the population aged 0-17, 2022)	16.6
	Impact of social transfers (other than pensions) on poverty reduction (% reduction of AROP, 2022)	28.08
	Disability employment gap (percentage points, population aged 20-64, 2022)	26.2
	Housing cost overburden (% of the total population, 2022)	4.9
	Children aged less than 3 years in formal childcare (% of the under 3-years-old population, 2022)	33.7
	Self-reported unmet need for medical care (% of the population aged 16+, 2022)	9.1

Critical situation | To watch | Weak but improving | Good but to monitor | On average | Better than average | Best performers

Update of 25 April 2024. 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 2024 for details on the methodology.
Source: Eurostat.

Skills and labour shortages persist, particularly in the healthcare and education sectors. The most significant labour and skills shortages are in specialist education, IT, healthcare and social work, industry and construction ([99]). Teacher shortages are severe across the education system and have been getting worse in recent years ([100]). The existing skills shortages in Estonia are also linked to early

([96]) The steep increase in the disability employment gap in 2022 was affected by the increase in the overall employment rate, whilst the uptake of employment for persons with disability has been slower.

([97]) OECD: Negotiating Our Way Up : Collective Bargaining in a Changing World of Work | OECD iLibrary (oecd-ilibrary.org).

([98]) Collective bargaining coverage (oecd.org)

([99]) OSKA research report 'An overview of the state of the Estonian labour market, labour demands and resulting training demands': OSKA general forecast 2022-2031 - OSKA (kutsekoda.ee).

([100])ETM 2023.

school leaving, and to the insufficient number of higher education and vocational education and training (VET) graduates in certain fields (particularly technology, production and construction, science and education). Tackling challenges related to the skills mismatch could help Estonia reach the national employment rate target of 81% and make progress towards the adult learning target of 52.3% by 2030.

Most social indicators, including the risk of poverty or social exclusion, worsened in 2022 among vulnerable groups. The rate of older people (65 and over) at risk of poverty or social exclusion (AROPE) increased significantly, from 41.6% in 2021 to 53.1% in 2022, which was one of the highest in the EU (EU: 20.2 %). The monetary poverty rate of older people also increased (to 52.3% vs an EU average of 17.3%) and was even higher for women (57.1%, 13.5 pps more than for men), compared to only 16% for the Estonian working age population. The AROPE rate of persons with disabilities also increased in 2022, reaching 47.8%, the second highest in the EU, with the biggest gap with persons without disabilities in the EU (28 pps, up from 19.9 pps in 2021, and compared to EU average 10.5 pps in 2022). Some categories face a high risk of poverty in 2023, such as part-timers (20.9%) and the self-employed (29.6%). Income inequality measured by the income quintile share ratio is high 5.37 in 2023 (slightly decreasing from 5.39 in 2022 after increasing from 5.03 in 2021 vs an EU average of 4.74 in 2022) Higher living costs (inflation in Estonia was 19.4% in 2022 and 9.1% in 2023 vs 9.2% and 6.4% in the EU) put additional pressure on households' ability to make their ends meet. However, social benefits have not increased to the same extent, resulting in an average real loss for households of about 3.64% ([101]). The situation is expected to further deteriorate due to the currently high inflation environment and planned tax increases ([102]). Ensuring adequate mitigation measures for those at risk of poverty will therefore remain a key challenge.

The adequacy of the Estonian pension and social safety net is low. Pensions are low relative to work incomes (the aggregate replacement ratio decreased to 46% in 2023 compared to 49% in 2022 vs an EU average of 58% in 2022,). The limited coverage of unemployment benefits, especially for those in non-standard forms of work or with spells of short work, contributes to increasing income inequality, despite some policy developments ([103]) in previous years. In 2023, only 27.9% of the newly registered unemployed received unemployment insurance benefits and 28.2% received the fixed unemployment allowance, although the total coverage of unemployment benefits, including the redundancy benefit, is 63.5%. Estonia is planning to propose legislation in 2025 to extend the coverage of the unemployment insurance benefit system for people in non-standard forms of work ([104]). The impact of social transfers, excluding pensions (already below the EU average), fell by 2.5pps. The 2021 pension reform making the statutory funded scheme possible to opt-out anytime, risks reducing the future adequacy of pensions and puts people at a higher risk of poverty in the long term.

Table A14.2:**Situation of Estonia on 2030 employment, skills and poverty reduction targets**

Indicators	Latest data	Trend (2016-2023)	2030 target	EU target
Employment (%)	82.1 (2023)		81.3	78
Adult learning[1] (%)	41.8 (2022)		52.3	60
Poverty reduction[2] (thousands)	16 (2023)		-39	-15 000

(1) Adult Education Survey, adults in learning in the past 12 months, special extraction excluding guided on-the-job training.
(2) Change in the number of persons at risk of poverty of social exclusion (AROPE), reference year 2019.
Source: Eurostat, DG EMPL.

Access to healthcare and good quality social services, in particular long-term care (LTC), remain a major challenge. Estonia has one of the highest levels of self-reported unmet needs

([101])EUROMOD analysis (2023-2024): an assessment of the role of inflation in eroding the real value of social benefit between 2021 and 2022.

([102])Increase of VAT from 20% to 22%, increase of income tax from 20-22% as of 2025, elimination of the regressivity of the basic tax allowance, car tax as of 2025.

([103])Estonia has continued to raise pensions and subsistence allowance, amended the unemployment insurance benefit act, and compensated energy price increases. However, social transfers had a limited impact in 2022 given Estonia's very high inflation and its negative impact on the cost of living.

([104])Estonian Government coalition agreement 2023: Koalitsioonilepe 2023-2027 | Eesti Vabariigi Valitsus

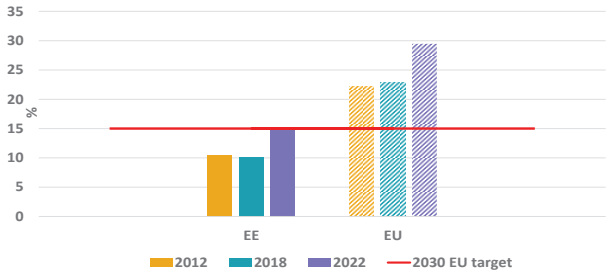
for medical care in the EU increasing to 12.9% in 2023 (9.1% vs 2% in the EU in 2022. As both the share of the population aged 65 and over and the old-age dependency ratio are expected to increase significantly by 2050, the demand for LTC becomes even more acute. Public spending on LTC is among the lowest in the EU (0.4% of GDP vs an EU average of 1.7% in 2022) ([105]). Public spending in healthcare is also well below the EU average and has been decreasing since 2021 (after a temporary increase in response to COVID-19). Out-of-pocket payments for LTC have fallen slightly but remain high, accounting to 43.8% of all LTC health-related expenditure in 2020 (EU: 18.1%). The local governments' capacity to provide social benefits and services depends to a large extent on the budgetary resources available and is highly unequal. Estonia has planned several measures to tackle challenges in LTC. In 2023, the care reform entered into force, to reduce out-of-pocket payments in general care provision and thus improve accessibility to LTC, however the implementation of the reform remains to be seen. This is the first major step in changing the provision of LTC in Estonia. As part of the RRP, Estonia adopted an action plan on the coordination model for integrated care in 2023 but full implementation across the country depends on legal and budget decisions. In Estonia, the ESF+ will finance measures on LTC, on integration and action to tackle material deprivation. This should help Estonia achieve the 2030 EU headline target on poverty reduction of 39 000 fewer people at risk of poverty or social exclusion compared to 2019. The available quantitative and qualitative evidence and the policy response undertaken and planned analysed in the second-stage analysis of the Social Convergence Framework of May 2024 (SWD(2024)132) point to challenges related to social protection and inclusion, and education, but do not point to major social convergence challenges for Estonia overall, in light of the positive developments recorded, especially in the area of employment.

([105])European Commission, 2024 Ageing Report (April 2024), Public LTC expenditure as a share of GDP.

This Annex outlines the main challenges of Estonia's education and training system based on the 2023 Education and Training Monitor and the 2022 OECD Programme for International Student Assessment (PISA) results.

While Estonia performs very strongly in basic skills, reaching the EU-level targets, a moderate worsening is observable over the last decade. The 2022 PISA results ([106]) show that the share of low-achieving students has increased, but remains low. Estonia is the only country meeting the EU-level targets of 15%: 15% vs EU 29.5% in mathematics, 13.8% vs EU 26.2% in reading and 10.1% vs EU 24.2% in science. Boys are more likely to underachieve in reading and science. Underachievement in mathematics is more frequent among foreign-born students, but the gap between their performance and that of students without a migrant background is one of the smallest within the EU (at 13.2 pps).

Graph A15.1: **Underachievement rates in mathematics, PISA 2012, 2018 and 2022**



Source: OECD (2023).

The socio-economic gap in underachievement in mathematics remains comparatively low, but is widening. This can largely be explained by the worsening results among disadvantaged students. While students from disadvantaged backgrounds are much less likely to underachieve in mathematics (24.5%) than in other EU countries (48%), the rate has increased significantly since 2018 (16.1%). Still, the socio-economic gap in underperformance remains the lowest in the EU (18.4 pps vs EU 37.2 pps).

Although the share of top performers remains well above the EU average for all three basic skills, its decline risks limiting innovation capacity. Since 2018, the rate has decreased by 2.4 pps in mathematics and by 3.3 pps in science, in line with EU trends. Boys are over-represented among top-achieving students in mathematics, just as across the EU, whereas, in reading, girls outperform boys. Among disadvantaged students, the share of top performers in mathematics is also relatively high (4.1% vs 1.8% at EU level).

Teacher and support specialist shortages concern all levels of the education system. The share of qualified teachers also indicates shortages in general education, especially for teachers under 30. The teacher population is ageing, with 34% of teachers expected to retire in the coming 10 years. This will require around 770 new staff in education every year, which the education system is unable to supply. Additionally, around 50% of new teachers leave the profession within the first 5 years ([107]). To address those shortages, a teacher action plan was adopted in 2022 to improve the working conditions, training and career progression of teachers, support specialists, school leaders and managers. In 2023, over 400 additional study places for teacher and support specialist students were opened and new students will receive a EUR 400 monthly scholarship. In addition, pursuing its objective of raising teacher salaries to 120% of the national average wage by 2027, the government granted a substantial pay rise of 23.9% in 2023, in a context of high inflation (+ 19.4%), and an additional increase of 6.6% follows in 2024. Nevertheless, teachers generally still earn less than other tertiary-educated workers (-14.3% vs EU -10.5%).

While participation in early childhood education and care (ECEC) is increasing for under-3-year-olds, it is still below the EU average. In 2022, the participation rate in formal childcare for under-3-year-olds reached 33.7% (vs EU 35.7%), below the national Barcelona target of 40.5%. The enrolment rates for children between 3 and primary school age remained stable (91.5% vs EU 92.5% in 2021, both below the EU-level target of 96% by 2030). To address capacity shortages a draft reform act is planned to be adopted in 2024 to ensure that all children aged between 18 months and 3 years have access to childcare at

([106])OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education.

([107])Ministry of Education and Research. (2021). Õpetajate järelkasvu tegevuskava (Action Plan for the Next Generation of Teachers).

Table A15.1:**EU-level targets and other contextual indicators under the European Education Area strategic framework**

				2012		2018		2023	
Indicator			Target	Estonia	EU-27	Estonia	EU-27	Estonia	EU-27
[1]Participation in early childhood education (age 3+)			96%	89.6% 2013	91.8% 2013	91.6%	92.2%	91.5% 2021	92.5% 2021,d
[2]Low-achieving 15-year-olds in:		Reading	< 15%	9.1%	18.0%	11.1%	22.5%	13.8% 2022	26.2% 2022
		Mathematics	< 15%	10.5%	22.1%	10.2%	22.9%	15.0% 2022	29.5% 2022
		Science	< 15%	5.0%	16.8%	8.8%	22.3%	10.1% 2022	24.2% 2022
Early leavers from education and training (age 18-24)	[3]Total		< 9 %	10.3%	12.6%	12.0%	10.5%	9.7%	9.5%
	[3] By gender	Men		13.3%	14.5%	16.1%	12.1%	11.4%	11.3%
		Women		7.3%	10.6%	7.8%	8.7%	8.0%	7.7%
	[4] By degree of urbanisation	Cities		7.6% b	11.2%	7.6%	9.4%	8.0%	8.6%
		Rural areas		13.5% b	14.0%	14.9%	11.0%	12.1%	9.9%
	[5] By country of birth	Native		10.4%	11.3%	12.2%	9.2%	9.7%	8.2%
		EU-born		: u	26.2%	: u	22.4%	: u	21.0%
		Non EU-born		: u	30.1%	: u	23.0%	: u	21.6%
[6]Socio-economic gap (percentage points)				11.3	:	11.5	29.5	18.4 2022	37.2 2022
[7]Exposure of VET graduates to work-based learning			≥ 60% (2025)	:	:	:	:	83.7%	64.5%
Tertiary educational attainment (age 25-34)	[8]Total		45%	40.1%	34.1%	41.1%	38.7%	43.5%	43.1%
	[8] By gender	Men		29.5%	29.1%	31.3%	33.3%	31.8%	37.6%
		Women		51.2%	39.2%	51.7%	44.2%	56.0%	48.8%
	[9] By degree of urbanisation	Cities		48.9% b	43.5%	50.1%	49.0%	51.2%	53.3%
		Rural areas		29.0% b	24.8%	32.0%	27.7%	35.9%	31.7%
	[10] By country of birth	Native		39.6%	35.4%	40.2%	39.7%	40.8%	44.2%
		EU-born		: u	29.3%	: u	36.7%	: u	40.2%
		Non EU-born		47.9%	24.2%	63.3%	31.0%	73.1%	37.1%
[11]Participation in adult learning (age 25-64)			≥ 47% (2025)	:	:	33.9% 2016	37.4% 2016	41.8% 2022	39.5% 2022
[12]Share of school teachers (ISCED 1-3) who are 55 years or over				28.8% 2013	22.7% 2013	32.9%	23.8%	36.7% 2021	24.5% 2021

Notes: b = break in time series; d = definition differs; e = estimated; p = provisional; u = low reliability; : = data not available.
Source: 1,3,4,5,7,8,9,10,12=Eurostat; 11= Eurostat, Adult Education Survey; 2,6=OECD, PISA.

the request of their parents, additionally establishing an integrated ECEC system with common quality standards, including a common curriculum.

Early school leaving and related gender gaps are of major concern, leading to severe skills shortages. Almost 1 in 10 young people leave the education and training system with very low or no qualifications, of which more boys than girls (11.4% vs 8% in 2023). To reduce early leaving, the Education Ministry's approach includes the integration of formal and non-formal education, as well as supporting students with special educational needs and improving the school climate. In 2023, the government updated the national curriculum for primary and secondary education, focusing on transversal competences and the autonomy of teachers and learners, and intends to raise the mandatory school age from 17 to 18 years.

Estonia aims to complete already by 2030 the transition to Estonian language education, accelerating the planned reform. Starting from 2024-2025 with the first and fourth grades, schools will gradually use Estonian as the sole language of instruction. The government supports the language transition, by covering continuous training, educational materials and salary top-ups for teaching in certain regions.

To help students acquire green competencies, Estonia adopted in early 2023 a renewed action plan to integrate sustainability topics in all levels of education and subjects. It encourages cooperation between educational institutions, environmental education centres and communities, and it plans to develop a comprehensive formal quality system for environmental education centres.

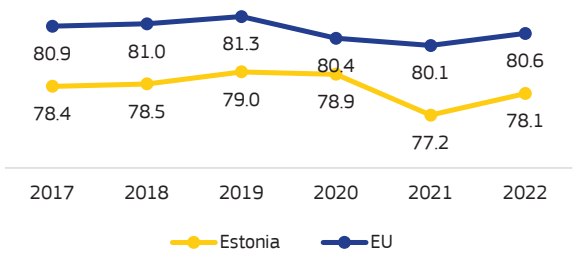
Though relatively high, tertiary educational attainment could be increased by reducing the dropout rate and the gender gap, to improve the skills supply on the labour market. In 2023, 43.5% of Estonians between 25 and 34 held a university degree (EU: 43.1%), but the dropout rate from higher education is relatively high, as is the gender gap (24.2 pps vs

EU 11.2°pps difference in favour of women in 2023).

A healthy population and an effective, accessible and resilient health system are prerequisites for a sustainable economy and society. This Annex provides a snapshot of population health and the health system in Estonia.

Life expectancy in Estonia remains among the lowest in the EU. The increase in life expectancy in 2022 can be partially explained by a decrease in COVID-19 mortality in 2022 ([108]). The rates of mortality from preventable and treatable causes are much higher than the EU average. In 2021, the leading causes of death were diseases of the circulatory system ('cardiovascular diseases') and cancer, followed by COVID-19. Estonia's suicide rate is one of the highest in the EU. A suicide prevention plan is expected to be adopted by the end of 2024.

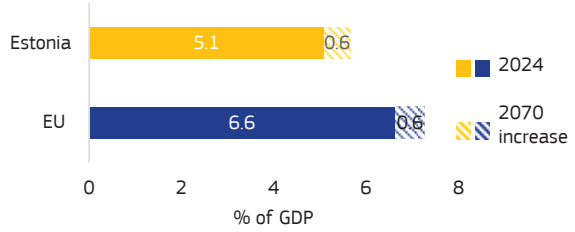
Graph A16.1: **Life expectancy at birth, years**



Source: Eurostat

Health expenditure in Estonia is among the lowest in the EU. Only 76.4% of health expenditure was publicly funded in 2021 – below the EU average of 81.1%. Spending per capita is below the EU averages for outpatient care, inpatient care, pharmaceuticals and medical devices and disease prevention. In 2021, total healthcare spending amounted to 7.6% of GDP, up from 6.8% in 2019, but provisional data suggest that it went down to 7.1% in 2022. The increased spending in 2021 reflects the allocation of additional resources to the health system in response to the COVID-19 pandemic. Nevertheless, healthcare spending in Estonia remained one of the lowest in the EU and below the EU average of 10.9% of GDP in 2021. In 2021, out-of-pocket spending healthcare accounted for 22.1% of total spending, compared to 14.5% for the EU overall. Based on the age profile of the Estonian population, public expenditure on health is projected to increase by 0.6 percentage points of GDP by 2070, the same as for the EU overall (see Graph A16.2 and Annex 21).

Graph A16.2: **Projected increase in public expenditure on healthcare over 2024-2070**



Baseline scenario
Source: European Commission / EPC (2024)

In 2021, spending on prevention in Estonia amounted to 8.3% of total spending on healthcare, compared to 6.0% for the EU overall. Between 2019 and 2021, spending on preventive care in Estonia more than doubled, exceeding the average increase across the EU. Proportionally, budget shares for prevention across the EU increased most for emergency response, disease detection and immunisation programmes. , In Estonia, the main factors explaining the big increase in the spending on preventive care in 2021 are disease detection programmes that increased in spending by 610% and immunisation programmes that increased in spending by 957%.

Estonia faces a shortage and an uneven distribution of health workers, both of which are implicated in the long waiting times for publicly funded services. Overall, reported unmet needs for medical care are the highest in the EU (see Annex 14); 9.1% of the Estonian population reported unmet needs in 2022 (compared to an EU average of 2.2%), with long waiting times being the main reason The level of unmet needs decreased from 15.5% in 2019 to 9.1% in 2022.

([108])Based on data provided directly by Member States to the European Centre for Disease Prevention and Control, under the European Surveillance System.

Table A16.1:**Key health indicators**

	2018	2019	2020	2021	2022	EU average (latest year)
Treatable mortality per 100 000 population (mortality avoidable through optimal quality healthcare)	133,5	129,4	123,9	135,6	NA	93.3 (2021)
Cancer mortality per 100 000 population	292,4	279,5	265,0	265,8	NA	235.4 (2021)
Current expenditure on health, % GDP	6,7	6,8	7,6	7,6	7,1	10.9 (2021)
Public share of health expenditure, % of current health expenditure	73,7	74,5	77,1	76,4	NA	81.1 (2021)
Spending on prevention, % of current health expenditure	3,5	3,6	4,8	8,3	NA	6.0 (2021)
Available hospital beds per 100 000 population	454	453	446	439	NA	525 (2021)
Doctors per 1 000 population	3,5	3,5	3,5	3,4	NA	4.1 (2021)*
Nurses per 1 000 population	6,3	6,2	6,4	6,5	NA	7.9 (2021)
Total consumption of antibacterials for systemic use, daily defined dose per 1 000 inhabitants per day ***	11,8	11,8	10,5	10,1	12,4	19.4 (2022)

Note: 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. Doctors' density data refer to practising doctors in all countries except Greece, Portugal (licensed to practise) and Slovakia (professionally active). Nurses' density data refer to practising nurses in all countries except Ireland, France, Portugal, Slovakia (professionally active) and Greece (hospital only).

Source: Eurostat Database; except: * OECD, ** Joint Questionnaire on non-monetary healthcare statistics, *** ECDC, **** Council Recommendation on stepping up EU actions to combat antimicrobial resistance in a One Health approach.

This has been driven by improvements for the high-income population group, where unmet medical needs decreased from 16.5% in 2019 to 7.7% in 2022, although this has widened inequalities further. A national booking system for medical appointments was introduced in March 2022, which has resulted in a reduction in waiting times for elective procedures. A considerable proportion (24%) of Estonians reported unmet healthcare needs during the pandemic, of which nearly one quarter were for mental healthcare ([109]). Long waiting lists have been reported as the most frequent barrier to accessing mental health services. Estonia is actively developing policies to strengthen mental health. In early 2022, a Mental Health Department was created within the Ministry of Social Affairs to centralise efforts to improve mental health outcomes. A mental health action plan for 2023-2026 has been drawn up, identifying concrete action for the coming years. Estonia experiences persistent shortages in health workforce. In 2021, Estonia had fewer doctors (3.4 per 1 000 population) and nurses (6.5 per 1 000 population) than the EU overall (with averages of 4.1 and 7.9 respectively). The number of new medical graduates in Estonia remained rather static between 2010 and 2022, and below the EU average. A significant proportion of doctors (46.4%) and nurses (26.1%) are aged 55 or above, raising concerns about the long-term accessibility of health services. There are acute workforce shortages in family medicine – especially outside the biggest cities (Tallinn and Tartu) – and in psychiatry. Working conditions are a major issue, with low pay a deterrent, particularly for nurses. According to OECD data, pay for doctors and nurses, as a percentage of the national average wage, is among the lowest in EU countries (1.71 times the national average wage for general practitioners, 2.28 for specialists, and 1.13 for hospital nurses) ([110]).

EU funds support substantial investment in healthcare in Estonia. Through its recovery and resilience plan (RRP), Estonia is investing EUR 72 million to address health-related challenges. Investments are used to improve health infrastructure (construction of a county hospital and health centre in Vijandi), implement organisational reforms, strengthen primary healthcare, support the health workforce, and update the e-health institutional framework. Capital investment in the Estonian health system has relied on EU cohesion policy funds. These have established long-term primary, secondary and tertiary care facilities and supported primary care digitalisation and disease prevention programmes. Under the cohesion policy funds for 2021-2027, Estonia will invest EUR 1.4 million to improve the accessibility, effectiveness and resilience of the health system ([111]).

([109])Eurofound (2021), Living, working and COVID-19 survey, rounds one, two and three (spring 2020, summer 2020 and spring 2021). Dublin & Eurofound (2022), Living, working and COVID-19 survey, rounds four and five (November 2021 and May 2022). Dublin.

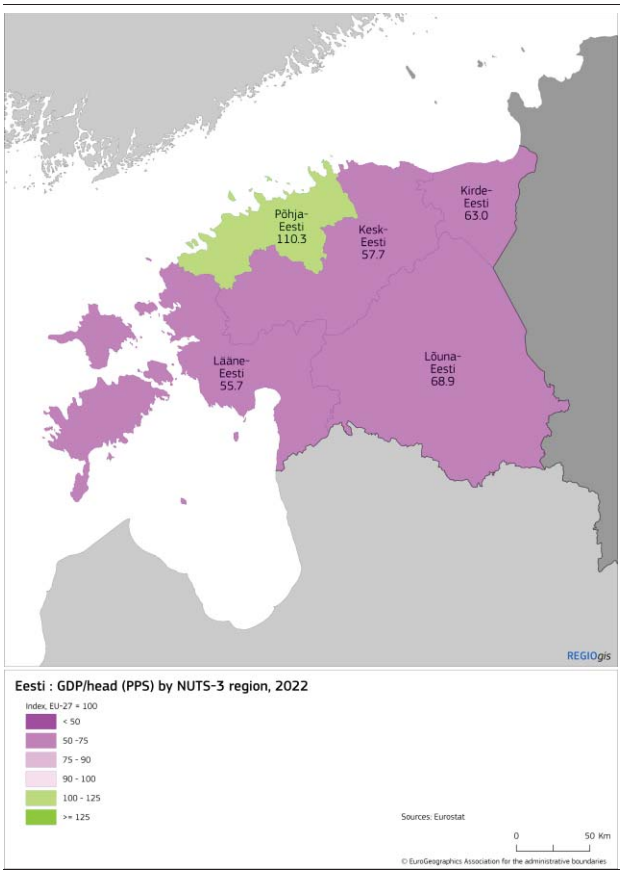
([110])OECD Health Statistics 2023

([111])The EU cohesion policy data reflect the status as of 13 May 2024.

Annex 17 showcases the economic and social regional dynamics in Estonia. It provides an analysis of economic, social and territorial cohesion in the Estonian regions and assesses emerging investment and subnational reform needs to foster economic growth, social development and competitiveness in the country.

Overview of economic and social performance at regional level

Map A17.1: **Estonia, NUTS3: GDP per capita (in PPS), 2022**



Source: Eurostat, DG REGIO elaboration

Estonia's regional outlook continues to be characterised by stable, but significant disparities between its capital region (Põhja-Eesti) and the rest of the country. In 2022, GDP per capita (PPS) of Põhja-Eesti stood above the EU average at 110%. In the remaining 4 NUTS 3 regions, GDP per capita ranged between 55.7% in Lääne-Eesti and 69% in Lõuna-Eesti (Map A17.1). In 2022, labour productivity was much higher in the capital region of Põhja-Eesti, at 90.5% of the EU average, whereas the other regions ranged between 57.3% (in Lääne-Eesti) and 74.5% (in Kirde-Eesti). However, real productivity growth between 2013 and 2022 was highest in the two regions of Kirde-Eesti (4.5%) and Kesk-Eesti (3.8%) while the region of Lääne-Eesti experienced a rate of only 1.6%. Annual average growth of GDP per capita in 2013-2022 was highest in the region of Lõuna-Eesti (at 4.6%) while a growth rate of 1.4% was observed in Põhja-Eesti.

Estonia is experiencing depopulation in several regions outside the capital. In 2013-2021, the capital region's population grew by a staggering 9.8% while Lääne-Eesti and Lõuna-Eesti experienced a population decline of -5.9% and -2.4%, respectively. The population in Estonia grew by 0.8% between 2013 and 2021, but population projections indicate that the country could experience a population decline of 5.5% between 2020 and 2050.

Table A17.1:**Selected indicators at regional level - Estonia**

NUTS 3 Region	GDP per head (PPS)	GDP per head growth, average % change on the preceding year	Productivity (GVA (PPS) per person employed)	Real productivity growth, average % change on the preceding year
	EU27=100, 2022	2013-2022	EU27=100, 2022	2013-2022
European Union	100	1.44	100	0.7
Eesti	85	2.67	79.3	1.7
Põhja-Eesti	110	1.41	90.5	0.7
Lääne-Eesti	56	2.57	57.3	1.6
Lõuna-Eesti	69	4.61	68.3	2.5
Kesk-Eesti	58	3.82	67.1	3.8
Kirde-Eesti	63	4.35	74.5	4.5

Source: Eurostat

The lack of appeal of regions outside the capital region is accentuated by poor transport accessibility. For example, whereas 83% of the population living in a radius of 120km can be reached by car in less than 90 minutes in Põhja-Eesti, this ratio drops to less than 50% in Lääne-Eesti. The best performing region outside the capital region is Kesk-Eesti, where this figure stands at 68%. 5G services are mainly focused on providing the service in urban areas by mid-2021, and only 1.5% of Estonian households in rural regions were covered by this mobile technology.

The strong urban-rural divide also manifests itself in other statistics, such as the percentage of NEETs ([112]), as well as of individuals with high educational attainment. In rural areas, the percentage of NEETs stood at 12.1% in 2022 (but this was 5.2 percentage points (pps) down compared to 2020) while the EU average in rural areas stood at 13.6%. In cities, the figure was 9.4%, reflecting a remarkable performance gap. Young people not in education or training face more difficulties in finding a job in rural areas. There is also a much higher level of educational attainment in cities, with 51% of the population aged 25-64 having a tertiary education degree, compared to only 36% in towns and suburbs, and 33% in rural areas. In rural areas, 24.9% of people are at-risk-of-poverty or social exclusion, which is only just above the rate in cities (24.3%). In towns and suburbs, the rate is somewhat higher at 27.7%. In all three territories, but particularly in towns and suburbs, the rate is higher than the EU average, which ranges between 21 and 22%.

Russia's war of aggression against Ukraine has had an effect on the Estonian economy, in particular in the border regions of Kirde-Eesti and Lõuna-Eesti. However, the impact of the war in the regions concerned is not yet visible in the main regional indicators used in the European semester. That said, some data shows that raw material imports from Russia have stopped, and that the transit of goods and the number of foreign tourists has declined.

Investment and subnational reform needs ahead

Investment priorities outlined in the cohesion policy programme remain relevant, but there are increasing investment needs in the regions bordering Russia. This is the case especially in the county of Ida-Viru, where the GDP per capita is only 58% of the Estonian average and south-east Estonia, where the GDP is higher, but where this can be attributed to Tartu, the region's biggest employer and university centre. Overall, with the GDP growth rates in the border regions well below the capital region and the Russian war of aggression against Ukraine leading to economic sanctions and curtailed cross-border activities, these regions are faced with additional challenges further diminishing their growth potential. These regions, as well as Estonia in general, could also benefit from facilitating investments in net-zero technologies manufacturing and from the opportunities of the Strategic Technologies for Europe Platform.

Estonia would benefit from speeding up investments in boosting the energy efficiency of public and private buildings. Many public buildings are not energy efficient, or their condition is unknown because many of them do not have an energy performance certificate. According to the updated NECP (2023) the total cost of a full renovation of the public building stock would cost at least EUR 2 billion (2019 prices).

The financial capacity and autonomy of Estonian municipalities could be strengthened further. The local governments' capacity to provide social benefits and services depends, to a large extent, on the budgetary resources available. Local governments have broad power and autonomy to define their policies, and their capacities to fund and provide services are very uneven. The share of Estonian municipalities' own tax revenues is one of the lowest in the EU. The average dependence of local governments on intergovernmental transfers for the OECD-European countries is 49.8% ([113]). According to the OECD fiscal decentralisation database (2021), Estonian municipalities have one of the highest shares of intergovernmental transfers (85.8%). Cooperation between municipalities and counties could be strengthened to optimise use of resources. While several good initiatives exist, improving general knowledge and best-practice transfer between municipalities and better planning of services, infrastructure and financing between counties would avoid duplication and contribute to a more optimal use of resources. Reforms providing municipalities with more own-source revenues could be considered to strengthen their capacity to invest. These reforms would be most effective, if accompanied by sufficient administrative capacity-building of municipalities to plan, develop and implement strategic and qualitative investment projects,

([112])Young people (15-34) neither in employment nor in education and training.

([113])OECD (2023), "Revenues by level of government", in Government at a Glance 2023, OECD Publishing, Paris.

including increasing co-financing capacities of structural funds projects. The Commission acknowledges the differentiated regional support rates and regional budget allocations for some of the structural funds and Recovery and Resilience Fund measures, e.g. those concerning energy-efficient renovations.

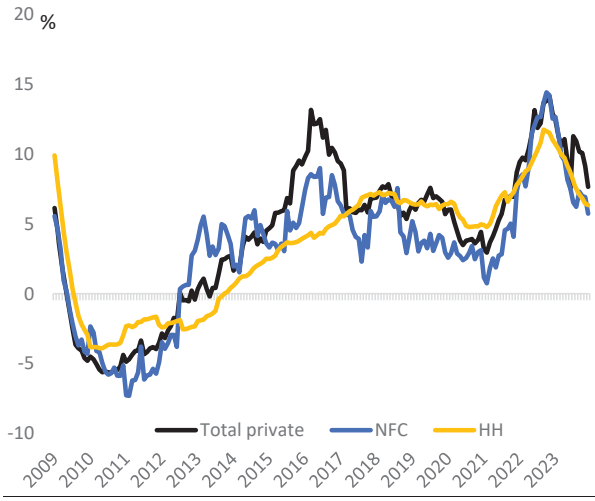
ANNEX 18: KEY FINANCIAL SECTOR DEVELOPMENTS

Rising interest rates have widened net interest margins and boosted the profits of Estonian banks from lending operations. Their profitability has been among the strongest of all banking sectors in the EU, with return on equity of 29.6% in the first 9 months of 2023 (vs 9.9% for the EU). The return on assets climbed from 0.5% in Q2-2022 to 1.7% at the end of Q3-2023. The main driver of the profitability surge in 2023 has been the relatively large spreads between interest income and interest expenses. Tighter monetary policy is feeding through both to higher bank lending rates and greater net interest income, with net interest income increasing by a record-high 81.5% in Q3-2023 compared to Q3-2022. This has boosted profits, most notably of the systemically important, or larger, banks. Moreover, the Estonian banking sector is relatively cost-efficient, which is partly due to the fact that the expenses of the local units of foreign banking groups can be reflected at group level rather than local level. Profitability is also aided by smaller loan losses than in other countries. Credit quality is strong, with a record-low non-performing-loan ratio of 1% in Q3-2023 (vs 1.8% in the EU). In July 2023, the Parliament of Estonia adopted several amendments to the tax law, providing for an increase in the tax rate applicable to advance payments made by credit institutions from 14% at present to 18% from 2025. At the same time, the income tax paid on dividends by all companies will increase to 22% in 2025. These changes may encourage the distribution of earnings before they come into force, and they may have implications for capital buffers.

Banks operating in Estonia are among the best capitalised in the EU. They have built up buffers from strong profits in good earlier years. Capital ratios are above regulatory requirements (their Q3-2023 capital-adequacy ratio stood at 22.9% vs 19.6% in the EU), especially for systemically important banks, but less so for banks that have not been in operation for long and are still rapidly expanding. Some banks have taken advantage of the preferential tax rate that since 2018 has applied to dividends paid out regularly, so their capital buffers have been gradually reduced. Therefore, the Estonian Central Bank and the Estonian Financial Supervisory Authority have both set additional requirements for banks' own funds to ensure their resilience and continued operation. More specifically, banks have to maintain a capital conservation buffer of 2.5% of risk-weighted assets on top of the base requirements for own funds.

Although household indebtedness in Estonia is not excessive so far, banks' exposure to mortgage debt is one of the largest in the EU. Mortgage debt accounts for 44% of banks' total loan portfolio. Moreover, over 90% of loans made by the banking sector are issued with a floating interest rate, which is one of the highest proportions in the EU. This means that borrowers bear the interest rate risk related to their loans. The Estonian Central Bank has set limits on the conditions placed on loans issued by the banks to help keep balance in the housing loan market and limit excessive growth in lending.

Graph A18.1: **Evolution of credit activity**



Source: ECB.

The tighter lending environment is cooling down the real-estate market, where prices expanded rapidly in recent years. From 2010 to late-2023, house prices increased by more than 210% – the highest rate of house-price growth in the EU in this period. In parallel, lending for house purchases has also grown and has accelerated since 2020. More recently, house price growth has started to decelerate, and the share of loans that are close to regulatory limits has increased, suggesting lower affordability. Although the stock of loans issued by banks increased more slowly in 2023 than a year earlier, the amounts borrowed by companies and households at the end of Q3-2023 were still 8.6% and 7.5% greater respectively than in Q3-2022. Together, housing

Table A18.1:**Financial Soundness Indicators**

	2017	2018	2019	2020	2021	2022	2023	EU	Median
Total assets of the banking sector (% of GDP)	106.8	101.1	103.0	125.3	122.5	105.9	109.0	257.0	184.6
Share (total assets) of the five largest banks (%)	90.3	91.0	93.0	93.7	93.0	90.8	-	-	69.6
Share (total assets) of domestic credit institutions (%)[1]	25.9	27.3	49.5	49.6	49.0	52.2	53.5	-	62.9
NFC credit growth (year-on-year % change)	5.5	4.0	3.0	3.1	7.4	12.5	5.7	-	2.4
HH credit growth (year-on-year % change)	7.0	6.6	6.4	5.0	7.8	11.0	6.3	-	1.4
Financial soundness indicators:[1]									
- non-performing loans (% of total loans)	1.9	1.3	1.6	1.6	1.1	0.8	1.0	1.8	1.8
- capital adequacy ratio (%)	30.6	31.0	26.3	27.8	24.3	22.0	22.9	19.6	20.1
- return on equity (%)[2]	9.2	9.8	8.3	7.4	9.5	10.9	19.6	9.9	13.2
Cost-to-income ratio (%)[1]	46.3	45.3	52.5	52.6	53.8	48.3	38.1	52.8	44.9
Loan-to-deposit ratio (%)[1]	89.8	93.5	90.0	76.7	77.3	90.6	90.2	93.3	80.2
Central bank liquidity as % of liabilities	0.5	0.3	0.1	6.4	5.7	0.5	0.0	-	0.7
Private sector debt (% of GDP)	106.2	101.2	98.3	101.5	96.9	94.3	-	133.0	118.4
Long-term interest rate spread versus Bund (basis points)	-	-	-	-	43.7	114.3	146.7	107.7	104.2
Market funding ratio (%)	23.1	24.5	24.1	22.2	22.3	20.4	-	50.8	39.8
Green bonds outstanding to all bonds (%)[3]	-	-	-	-	-	-	-	4.0	2.7

1-3 **4-10** **11-17** **18-24** **24-27** Colours indicate performance ranking among 27 EU Member States.

1Last data: Q3 2023.
2Data are annualised.
3Data available for EA countries only, EU average refers to EA area.
Source: ECB, Eurostat.

and real-estate loan volumes currently make up over 60% of banks' loan portfolios.

Banks' loan portfolios have become more exposed to risks from the highly cyclical market for commercial real estate. According to the European Banking Authority's Risk Dashboard, the share of commercial real-estate loans as a proportion of total bank loans is almost 20% in Estonia, the highest percentage of all EU countries. At 60%, the share of commercial real estate in total bank loans to non-financial corporations is also very high. Moreover, commercial real-estate loans represent a relatively high (40%) and sharply increasing share of total banking non-performing loans. The strong growth in real-estate lending in recent years has occurred primarily at smaller banks. As a result, real-estate loans now make up a larger share of the loan portfolios of some smaller banks than they do at the bigger banks. Part of the bank loans taken by real-estate companies has been used for leveraging the investments of institutional investors (insurers, pension funds and real-estate investment funds), implying higher interlinkages between these groups. Estonian insurers have the greatest exposure in the EU to the banking sector, according to the EIOPA. Although the financial leverage of the investor's funds generally remains at around 40-60%, this could potentially become a channel of risk transmission and contagion. In response to rapid credit growth, the countercyclical capital buffer was further tightened to 1.5%, effective since December 2023.

On banks' liability side, changes have occurred in the composition and cost of funding. The loan-to-deposit ratio of Estonian banks has remained relatively stable compared with a year earlier, reaching 90.2% at the end of Q3-2023 (vs 93% in the EU). Although the loan portfolio has still been expanding quite rapidly (though moderating more recently), growth in deposits was modest. Nevertheless, there were major changes in the structure of these deposits, as demand deposits have been replaced by term deposits. As a result, the cost of funding for banks has increased substantially. Since the share of parent funding has increased somewhat alongside the growth in term deposits, the performance of Swedish banks remains important for the fortunes of their Estonian subsidiaries. Estonian banks have also become more exposed to both the prevailing conditions in money/capital markets and investor sentiment, as they have had to make large issuances of bonds outside of Estonia (where both the stock and bond markets are still very thin). While reliance on wholesale funding is high for some banks, systemic liquidity remains ample. Liquid assets, most of which are claims on the central bank, were 26% of total assets at the end of September 2023. The strong resilience is confirmed by the liquidity coverage ratio of 176.7% at the end of Q3-2023.

This annex provides an indicator-based overview of Estonia's tax system. It includes information on the tax structure (the types of tax that Estonia derives most of its revenue from), the tax burden on workers, and the progressivity and redistributive effect of the tax system. It also provides information on tax collection and compliance.

Estonia's tax revenues are relatively low in relation to its GDP. Table A19.1 shows that Estonia's tax revenues were 32.9% of GDP in 2022, considerably below the EU average (40.2%). They increased slightly to 34.0% in 2023. Labour and capital taxes generated revenue below the EU aggregate, while consumption taxes generated revenue above the EU aggregate. As regards environmental taxation, Estonia levies relatively high excise duties on road fuels and has introduced a new vehicle tax (see below). Regarding further pollution and resources taxes, Estonia has already implemented four of the six main types of pollution and resources taxes (i.e. taxes on NOx emissions, waste landfilling, discharge of waste into water, and plastic products). There may be scope to expand waste disposal taxes, including incineration. Estonia does not have taxes on fertilisers and pesticides (for more on policies related to environmental sustainability, see Annex 6). Very little revenue is generated from property taxes, including from recurrent taxes on immovable property (0.3% and 0.2% of GDP in 2022 respectively compared with the EU aggregates of 2.1% and 1.0%). These are among the taxes least detrimental to growth. The average forward-looking effective corporate income tax rate was below the EU average in 2022.

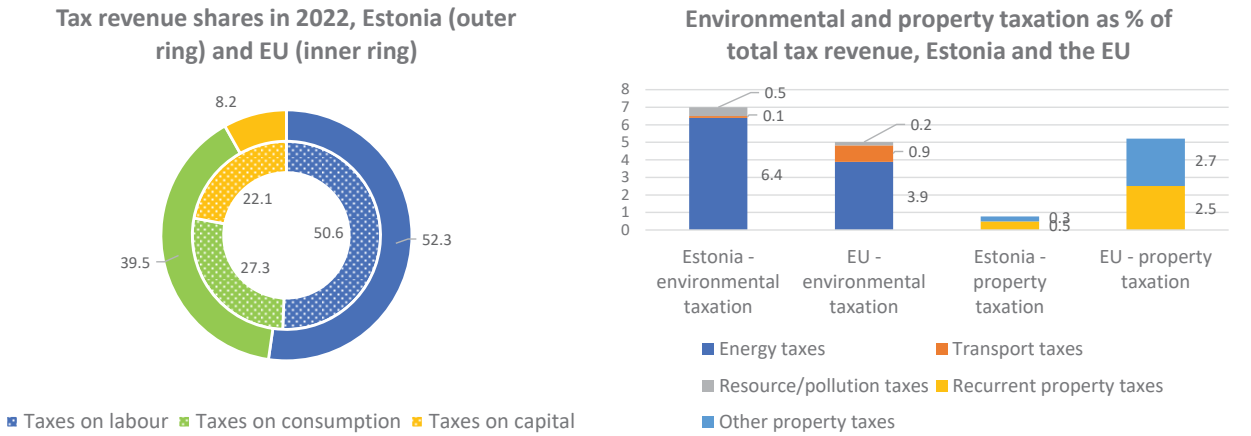
The new Estonian parliament has adopted several amendments to the tax law, which will come into effect in 2024 or 2025. The standard VAT rate increased from 20% to 22% in January 2024, while the reduced VAT rates for accommodation services (9%) and press publications (5%) will be increased to 13% and 9% respectively in 2025. Also in 2025, income tax will increase for both corporations and natural persons from 20% to 22%, with a projected impact on tax revenues of between 0.1 and 0.3% of GDP. A new tax on motor vehicles, which was adopted in January 2024 and includes a registration fee and an annual tax component (both of which will depend on the car's emissions), will enter into force from 2025. The tax is intended to restrain motorisation (especially in cities), and promote sustainable mobility and the adoption of more environmentally-friendly vehicles.

Table A19.1:**Taxation indicators**

		Estonia					EU-27				
		2010	2020	2021	2022	2023	2010	2020	2021	2022	2023
Tax structure	Total taxes (including compulsory actual social contributions) (% of GDP)	33.2	33.3	33.8	32.9	34.0	37.9	40.0	40.4	40.2	
	Labour taxes (as % of GDP)	17.7	17.7	17.5	17.2		20.0	21.3	20.7	20.3	
	Consumption taxes (as % of GDP)	13.2	13.0	13.2	13.0		10.8	10.7	11.2	11.0	
	Capital taxes (as % of GDP)	2.3	2.6	3.2	2.7		7.1	8.0	8.6	8.9	
	Of which, on income of corporations (as % of GDP)	1.3	1.6	1.5	1.7		2.4	2.5	3.0	3.4	
	Total property taxes (as % of GDP)	0.4	0.3	0.3	0.3		1.9	2.3	2.2	2.1	
	Recurrent taxes on immovable property (as % of GDP)	0.3	0.2	0.2	0.2		1.1	1.2	1.1	1.0	
	Environmental taxes as % of GDP	2.9	2.4	2.3	2.3		2.4	2.2	2.3	2.0	
Progressivity & fairness	Tax wedge at 50% of average wage (Single person) (*)	37.3	30.8	31.5	32.3	30.3	33.9	31.7	32.1	31.8	31.7
	Tax wedge at 100% of average wage (Single person) (*)	40.1	37.3	38.2	39.1	39.4	41.0	40.1	39.9	40.0	40.2
	Corporate income tax - effective average tax rates (1) (*)		17.0	17.0	17.0			19.5	19.0	19.0	
	Difference in Gini coefficient before and after taxes and cash social transfers (pensions excluded from social transfers) (2) (*)	6.4	8.0	7.9	6.7		8.6	8.1	8.2	7.9	
Tax administration & compliance	Outstanding tax arrears: total year-end tax debt (including debt considered not collectable) / total revenue (in %) (*)		6.8	5.5				40.9	35.5		
	VAT Gap (% of VAT total tax liability, VTTL)(**)	12.2	5.0	1.4	1.0			9.7	5.4		

(1) Forward-looking effective tax rate (OECD).
(2) A higher value indicates a stronger redistributive impact of taxation.
(*) EU-27 simple average.
(**) Forecast value for 2022, if available. For more details on the VAT gap, see European Commission, Directorate-General for Taxation and Customs Union, 2023, *VAT gap in the EU*, https://data.europa.eu/doi/10.2778/911698.
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 and OECD

Graph A19.1: **Tax revenues from different tax types, % of total revenue**

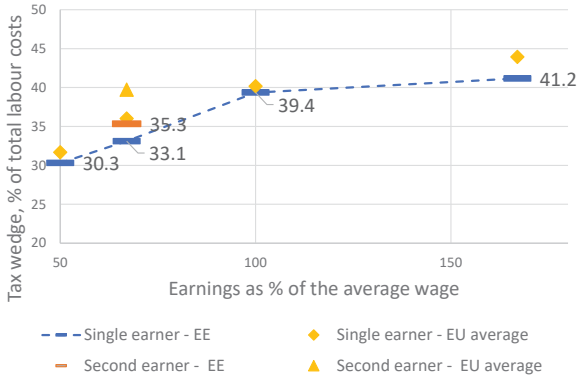


Source: European Commission

Estonia's labour tax burden is close to the EU average. Graph A19.2 shows that the labour tax wedge for Estonia in 2023 was close to but below the EU average for single people at various earnings levels. Second earners at a wage level of 67% of the average wage, whose spouses earn the average wage, are subject to a higher tax wedge than single earners at the same wage level. The tax wedge for workers earning 50% of the average wage was reduced from 37.3% in 2010 to 30. 3% in 2023. The ability of the tax and benefit system to reduce income inequality (measured by its ability to reduce the GINI coefficient) was somewhat below the EU average in 2022 (see Table A19.1).

Estonia performs well on tax compliance and tax administration, including digitalising the tax administration. Outstanding tax arrears decreased slightly in 2021 by 0.7 pps to 5.5% of total net revenue (by comparison with the previous year) and were significantly below the EU average of 35.5%. The 2023 Annual Report on Taxation shows that the rate of tax return e-filing in Estonia was 100% for corporate income taxation and close to 100% for personal taxation ([1]). The potential to ensure better services for taxpayers could nevertheless be explored (e.g. by harnessing behavioural insights to increase tax collection). The VAT gap (an indicator of the effectiveness of VAT enforcement and compliance) further decreased to 1.4% in 2021 (partly due to COVID-19 effects) but remained significantly below the EU-wide gap of 5.4% and is forecast to have decreased further to 1% in 2022.

Graph A19.2: **Tax wedge for single and second earners, % of total labour costs, 2023**



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

Source: European Commission

ANNEX 20: TABLE WITH ECONOMIC AND FINANCIAL INDICATORS

Table A20.1:**Key economic and financial indicators**

	2004-07	2008-12	2013-20	2021	2022	2023	forecast 2024	forecast 2025
Real GDP (y-o-y)	8.4	-1.7	2.9	7.2	-0.5	-3.0	-0.5	3.1
Potential growth (y-o-y)	.	0.6	3.2	2.7	1.5	1.3	0.7	1.0
Private consumption (y-o-y)	9.8	-2.7	3.3	9.1	2.0	-1.3	1.6	2.8
Public consumption (y-o-y)	4.1	1.2	2.3	3.8	0.1	0.9	2.0	1.5
Gross fixed capital formation (y-o-y)	13.3	-4.1	5.6	7.3	-3.7	-3.4	-1.7	4.0
Exports of goods and services (y-o-y)	14.8	5.4	1.8	22.1	3.0	-6.9	-2.0	4.7
Imports of goods and services (y-o-y)	16.6	2.0	3.2	23.2	3.2	-5.2	-0.2	4.4
Contribution to GDP growth:								
Domestic demand (y-o-y)	10.5	-2.9	3.6	7.5	-0.1	-1.4	0.8	2.8
Inventories (y-o-y)	0.5	-0.5	0.1	2.2	1.0	-1.6	0.0	0.0
Net exports (y-o-y)	-2.5	2.3	-0.9	-0.9	-0.2	-1.4	-1.4	0.3
Contribution to potential GDP growth:								
Total Labour (hours) (y-o-y)	.	-0.7	0.4	1.2	1.3	1.7	0.9	0.7
Capital accumulation (y-o-y)	.	1.4	1.4	2.0	1.6	1.3	1.1	1.2
Total factor productivity (y-o-y)	.	0.0	1.3	-0.4	-1.4	-1.7	-1.3	-0.9
Output gap	7.2	-3.9	0.4	1.9	-0.1	-4.4	-5.6	-3.5
Unemployment rate	7.2	11.6	6.2	6.2	5.6	6.4	7.4	6.9
GDP deflator (y-o-y)	7.9	3.5	2.5	6.0	16.1	7.9	3.8	2.3
Harmonised index of consumer prices (HICP, y-o-y)	4.6	4.5	1.4	4.5	19.4	9.1	3.4	2.1
HICP excluding energy and unprocessed food (y-o-y)	3.8	3.7	1.8	2.4	11.8	10.1	4.5	3.3
Nominal compensation per employee (y-o-y)	15.7	3.3	6.4	9.3	8.1	7.6	5.5	3.8
Labour productivity (real, hours worked, y-o-y)	6.3	1.1	3.3	-0.8	-5.0	-5.9	0.0	2.6
Unit labour costs (ULC, whole economy, y-o-y)	8.5	3.4	4.3	2.1	13.6	14.5	5.5	1.4
Real unit labour costs (y-o-y)	0.5	-0.1	1.8	-3.6	-2.1	6.1	1.6	-0.9
Real effective exchange rate (ULC, y-o-y)	6.5	1.0	2.8	1.3	9.0	7.3	1.0	-1.0
Real effective exchange rate (HICP, y-o-y)	2.8	1.5	1.0	1.5	8.2	4.9	.	.
Net savings rate of households (net saving as percentage of net disposable income)	-8.9	3.8	7.2	3.6	-4.7	.	.	.
Private credit flow, consolidated (% of GDP)	25.1	1.9	4.3	6.8	9.2	.	.	.
Private sector debt, consolidated (% of GDP)	104.4	130.7	107.0	96.9	94.3	.	.	.
of which household debt, consolidated (% of GDP)	36.1	49.7	39.3	38.4	36.8	.	.	.
of which non-financial corporate debt, consolidated (% of GDP)	68.3	81.0	67.7	58.5	57.5	.	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances) (1)	.	5.6	1.7	1.0	0.8	.	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	-6.5	1.9	1.5	9.5	2.0	3.2	2.1	2.4
Corporations, gross operating surplus (% of GDP)	32.9	30.3	30.0	30.5	31.2	28.2	25.9	26.7
Households, net lending (+) or net borrowing (-) (% of GDP)	-6.4	1.0	1.9	-0.5	-5.2	-2.7	-2.2	-1.4
Deflated house price index (y-o-y)	.	-10.5	5.4	10.4	4.5	-3.0	.	.
Residential investment (% of GDP)	5.3	3.1	4.5	4.9	5.1	5.8	.	.
Current account balance (% of GDP), balance of payments	-12.6	-1.0	1.1	-2.6	-3.2	-2.1	-2.7	-2.6
Trade balance (% of GDP), balance of payments	-7.9	3.0	3.0	-1.0	-0.5	0.6	.	.
Terms of trade of goods and services (y-o-y)	1.8	-0.3	0.8	0.5	0.8	3.2	0.9	-0.2
Capital account balance (% of GDP)	1.2	3.1	1.5	9.0	0.4	1.3	.	.
Net international investment position (% of GDP)	-78.4	-65.8	-33.3	-13.4	-20.2	-21.6	.	.
NENDI - NIIP excluding non-defaultable instruments (% of GDP) (2)	-16.8	-16.2	23.5	41.8	28.7	30.9	.	.
IIP liabilities excluding non-defaultable instruments (% of GDP) (2)	79.4	93.1	69.7	66.9	68.2	71.7	.	.
Export performance vs. advanced countries (% change over 5 years)	.	.	6.8	23.5	21.0	15.0	.	.
Export market share, goods and services (y-o-y)	7.9	1.3	1.1	9.1	-1.5	-7.9	-5.3	1.0
Net FDI flows (% of GDP)	-6.4	-5.0	-3.9	-2.4	-0.2	-7.5	.	.
General government balance (% of GDP)	2.3	-0.8	-0.8	-2.5	-1.0	-3.4	-3.4	-4.3
Structural budget balance (% of GDP)	.	.	-1.0	-4.4	-1.1	-1.3	-0.7	-2.6
General government gross debt (% of GDP)	4.6	6.9	10.7	17.8	18.5	19.6	21.4	24.6

(1) domestic banking groups and stand-alone banks, EU and non-EU foreign-controlled subsidiaries and EU and non-EU foreign-controlled branches.
(2) NIIP excluding direct investment and portfolio equity shares.
Source: Eurostat and ECB as of 2024-5-17, where available; European Commission for forecast figures (Spring forecast 2024).

This annex assesses fiscal sustainability risks for Estonia over the short, medium and long term. It follows the multi-dimensional approach of the European Commission's 2023 Debt Sustainability Monitor, updated based on the Commission 2024 spring forecast.

1 – Short-term risks to fiscal sustainability are low. The Commission's early-detection indicator (S0) does not point to any major short-term fiscal risks (Table A21.2) ([114]). Government gross financing needs are estimated at around 4% of GDP in 2024-2025 (Table A21.1, Table 1). Financial markets' perceptions of sovereign risk are positive, as confirmed by the ratings of the main agencies in 2024.

2 – Medium-term fiscal sustainability risks appear medium.

The baseline DSA shows that the government debt ratio is projected to remain at a low level over the medium term, with debt rising to around 27% of GDP in 2034 (Graph 1, Table 1) ([115]). The assumed structural primary balance (a deficit of 0.3% of GDP prior to changes in ageing costs) contributes to these developments. Compared to historical data, the deficit appears plausible, indicating that the country has considerable room for corrective action. Indeed, most of past fiscal positions were more stringent than the one assumed in the baseline (Table A21.2) ([116]). The debt dynamics benefit from a moderately favourable snowball effect in 2025-2034.

The baseline projections are stress-tested against four alternative deterministic scenarios to assess the impact of changes in key assumptions relative to the baseline (Graph 1). Under the *historical structural primary balance (SPB)* scenario (i.e. the SPB returns to its historical 15-year average of -0.5% of GDP) the debt ratio would be about 4 pps. higher than under the baseline in 2034. Under the *adverse interest-growth rate differential* scenario (i.e. the interest-growth rate differential deteriorates by 1 pp. compared with the baseline), the debt ratio would be about 2 pps. of GDP higher in 2034 than under the baseline. Under the *financial stress* scenario (i.e. interest rates temporarily increase by 1 pp. compared with the baseline) the government debt ratio would be similar in 2034. The *lower structural primary balance* scenario (i.e. the projected improvement in the SPB in 2024 is halved) raises the projected debt-to-GDP ratio by about 4 pps.

The stochastic projections indicate medium risk, pointing to some sensitivity of the baseline projections to plausible unforeseen events ([117]). These stochastic simulations indicate a 71% probability that the debt ratio will be higher in 2028 than in 2023, implying medium risks given the low debt level. There is some uncertainty surrounding the baseline debt projections, as measured by the difference between the 10th and 90th debt distribution percentiles of 29 pps. of GDP in five years' time (Graph 2).

3 – Long-term fiscal sustainability risks appear overall low. This assessment is based on the combination of two fiscal gap indicators, capturing the required fiscal effort to stabilise

([114]) The S0 is a composite indicator of short-term risk of fiscal stress. It is based on a wide range of fiscal and financial-competitiveness indicators that have proven to be a good predictor of emerging fiscal stress in the past.

([115]) The assumptions underlying the Commission's 'no-fiscal policy change' baseline include in particular: (i) a structural primary deficit, before ageing costs, of 0.3% of GDP from 2024 onwards; (ii) inflation converging linearly towards the 10-year forward inflation-linked swap rate 10 years ahead (which refers to the 10-year inflation expectations 10 years ahead); (iii) the nominal short- and long-term interest rates on new and rolled over debt converging linearly from current values to market-based forward nominal rates by T+10; (iv) real GDP growth rates from the Commission 2024 spring forecast, followed by the EPC/OGWG 'T+10 methodology projections between T+3 and T+10 (average of 1.3%); (v) ageing costs in line with the 2024 Ageing Report (European Commission, Institutional Paper 279, April 2024). For information on the methodology, see the 2023 Debt Sustainability Monitor (European Commission, Institutional Paper 271, March 2024).

([116]) This assessment is based on the fiscal consolidation space indicator, which measures the frequency with which a tighter fiscal position than assumed in a given scenario has been observed in the past. Technically, this consists in looking at the percentile rank of the projected SPB within the distribution of SPBs observed in the past in the country, taking into account all available data from 1980 to 2023.

([117]) The stochastic projections show the joint impact on debt of 10,000 different shocks affecting the government's budgetary position, economic growth, interest rates and exchange rates. This covers 80% of all the simulated debt paths and therefore excludes tail events.

debt (S2 indicator) and bring it to 60% of GDP (S1 indicator) in the long term ([118]).

The S2 indicator points to low fiscal sustainability risks. The indicator shows that, relative to the baseline, maintaining the SPB at its current level would ensure debt stabilisation over the long term. This result is driven by the projected decrease in ageing-related spending (contribution of -0.5 pp.), which compensates for the initial budgetary position (0.4 pp.). The decline in ageing costs is mainly driven by public pension expenditure (-1.1 pps.) (Table A21.1, Table 2).

The S1 indicator also points to low fiscal sustainability risks. The indicator shows that the fiscal position could permanently deteriorate by 0.6 pp. of GDP in 2025, without debt exceeding the 60% of GDP reference value by 2070. This mainly reflects the government debt-to-GDP ratio that is currently much lower than 60% (Table A21.1, Table 2).

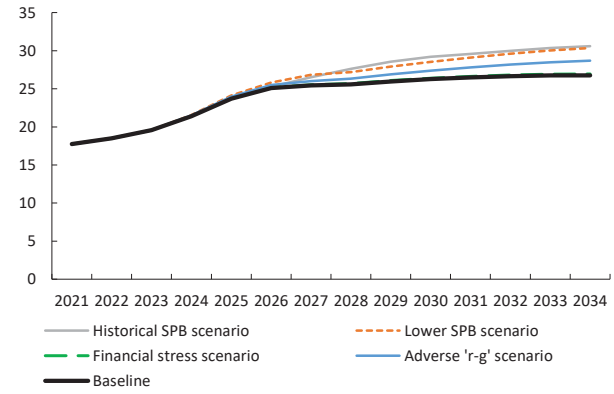
4 – Finally, several additional risk factors need to be considered in the assessment. On the one hand, risk-increasing factors relate to the recent increase in interest rates, the share of short-term debt and the large share of government debt held by non-residents. On the other hand, risk-mitigating factors include the low gross financing needs and the fact that the, overall still low, government debt is fully denominated in euro.

([118])The S2 fiscal sustainability indicator measures the permanent SPB adjustment in 2025 that would be required to stabilise public debt over an infinite horizon. It is complemented by the S1 indicator, which measures the permanent SPB adjustment in 2025 to bring the debt ratio to 60% by 2070. The impact of the drivers of S1 and S2 may differ due to the infinite horizon component considered in the S2 indicator. For both the S1 and S2 indicators, the risk assessment depends on the amount of fiscal consolidation needed: 'high risk' if the required effort exceeds 6% of GDP, 'medium risk' if it is between 2% and 6% of GDP, and 'low risk' if the effort is negative or below 2% of GDP. The overall long-term risk classification combines the risk categories derived from S1 and S2. S1 may notch up the risk category derived from S2 if it signals a higher risk than S2. See the 2023 Debt Sustainability Monitor for further details..

Table A21.1:**Debt sustainability analysis – Estonia**

Table 1. Baseline debt projections	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Gross debt ratio (% of GDP)	**17.8**	**18.5**	**19.6**	**21.4**	**23.7**	**25.1**	**25.4**	**25.6**	**26.0**	**26.3**	**26.5**	**26.7**	**26.8**	**26.8**
Changes in the ratio	-0.8	0.7	1.1	1.8	2.3	1.4	0.3	0.1	0.4	0.3	0.2	0.2	0.1	0.0
of which														
Primary deficit	2.4	0.9	3.0	3.0	2.6	1.9	0.9	0.4	0.4	0.3	0.3	0.2	0.2	0.1
Snowball effect	-2.2	-2.3	-0.5	-0.2	-0.3	-0.5	-0.5	-0.2	0.0	0.0	0.0	-0.1	-0.1	-0.1
Stock-flow adjustments	-1.1	2.2	-1.5	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross financing needs (% of GDP)	2.6	4.1	3.2	3.9	4.7	4.2	3.4	3.0	3.1	3.1	3.1	3.1	3.1	3.0

Graph 1. Deterministic debt projections



Graph 2. Stochastic debt projections 2024-2028

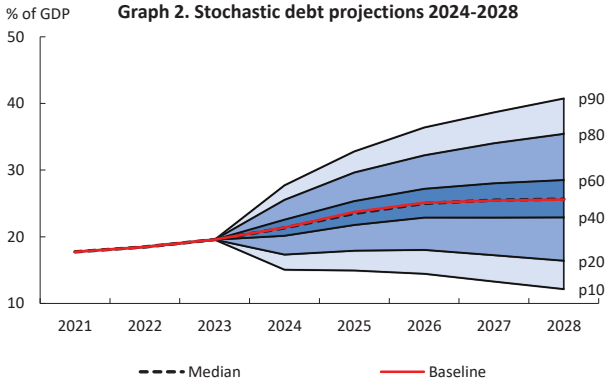


Table 2. Breakdown of the S1 and S2 sustainability gap indicators

		S1	**S2**
Overall index (pps. of GDP)		**-0.6**	**-0.1**
of which			
Initial budgetary position		0.3	0.4
Debt requirement		-0.8	
Ageing costs		-0.1	-0.5
of which	*Pensions*	-0.4	-1.1
	Health care	0.4	0.5
	Long-term care	0.3	0.5
	Education	-0.4	-0.5

Source: Commission services.

Table A21.2:**Heat map of fiscal sustainability risks – Estonia**

Short term	**Medium term - Debt sustainability analysis (DSA)**								**Long term**		
Overall (S0)	**Overall**		**Deterministic scenarios**					**Stochastic projections**	**S2**	**S1**	**Overall (S1 + S2)**
			Baseline	Historical SPB	Lower SPB	Adverse 'r-g'	Financial stress				
LOW	**MEDIUM**	Overall	**LOW**	**LOW**	**LOW**	**LOW**	**LOW**	**MEDIUM**	**LOW**	**LOW**	**LOW**
		Debt level (2034), % GDP	26.8	30.6	30.4	28.7	26.9				
		Debt peak year	2033	2034	2034	2034	2034				
		Fiscal consolidation space	57%	61%	63%	57%	57%				
		Probability of debt ratio exceeding in 2028 its 2023 level						71%			
		Difference between 90th and 10th percentiles (pps. GDP)						28.6			

(1) Debt level in 2034. Green: below 60% of GDP. Yellow: between 60% and 90%. Red: above 90%. (2) The debt peak year indicates whether debt is projected to increase overall over the next decade. Green: debt peaks early. Yellow: peak towards the middle of the projection period. Red: late peak. (3) Fiscal consolidation space measures the share of past fiscal positions in the country that were more stringent than the one assumed in the baseline. Green: high value, i.e. the assumed fiscal position is plausible by historical standards and leaves room for corrective measures if needed. Yellow: intermediate. Red: low. (4) Probability of debt ratio exceeding in 2028 its 2023 level. Green: low probability. Yellow: intermediate. Red: high (also reflecting the initial debt level). (5) the difference between the 90th and 10th percentiles measures uncertainty, based on the debt distribution under 10000 different shocks. Green, yellow and red cells indicate increasing uncertainty. (For further details on the Commission's multidimensional approach, see the 2023 Debt Sustainability Monitor)

Source: Commission services.