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COMMISSION STAFF WORKING DOCUMENT

2023 Country Report - Estonia

Accompanying the document

Recommendation for a COUNCIL RECOMMENDATION

on the 2023 National Reform Programme of Estonia and delivering a Council opinion on the 2023 Stability Programme of Estonia

{COM(2023) 606 final}

European Commission

Estonia

2023 Country Report

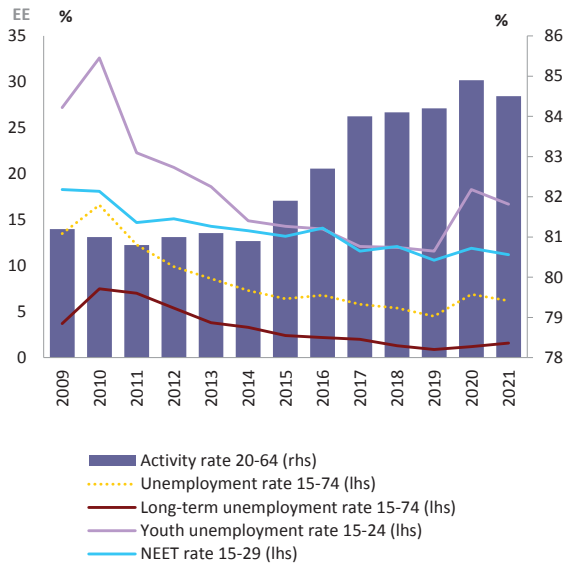
ECONOMIC AND EMPLOYMENT SNAPSHOT

Estonia's economy was significantly affected by high inflation and supply chain disruptions

Estonia's economy was hit early and strongly by the higher energy prices and supply disruptions; still, the labour market has remained strong. Economic activity slowed down considerably over 2022, when GDP contracted by 1.3%. Being a small and open economy, Estonia was hit early by the rapid rise in energy prices, the negative effects of the war in Ukraine, and the rise in interest rates (given the prevalence of flexible interest rates in Estonian household and corporate loan contracts). Estonia was the euro area's hotspot of inflation throughout 2022, when inflation reached 19.4%, mainly driven by rising energy and food costs. A pickup in EU-funded investments and a decline in inflation are set to give a boost to growth in the second half of 2023; this is expected to lead annual GDP to -0.4% in 2023 and about 3% in 2024.

The Estonian labour market continued to perform strongly in 2022 and 2023 but youth unemployment is high. Employment rose sharply by about 4% in 2022 and reached 81.9% of the working-age population in 2022. More than 10 thousand refugees from Ukraine had found a job by the end of March 2023. This illustrates the success of quickly integrating Ukrainian refugees into the labour market. The youth unemployment rate is much higher than the total unemployment rate (16.7% in 2021 and 18.6% in October 2022.

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



Source: Eurostat

Public expenditure has increased consistently over recent years, and has not been matched by tax increases. The general government recorded a relatively small deficit of 0.9% of GDP in 2022, when inflation automatically boosted revenues. However, the deficit is projected to rise to 3.1% of GDP in 2023, reflecting a significant budget expansion for the year. Nevertheless, Estonia's government debt is expected to stand at 19.5% of GDP by the end of 2023, the lowest rate in the EU. Besides additional defence and security spending, the state budget for 2023 provides salary increases for teachers, cultural workers, internal security personnel and IT specialists. It also includes education programmes, R&I expenditure, additional child benefit, and spending linked to Ukrainian refugees. As household budgets were greatly affected by increased energy prices in 2022, especially for low-income groups, Estonia took measures to mitigate the negative impact of these higher

energy prices. Measures included a fixed-price electricity scheme for private households and small enterprises, and direct compensation of energy prices for households (see Box 1).

The challenging macroeconomic context has contributed to the emergence of a number of vulnerabilities that are assessed in the In-depth Review for Estonia. ([1]) The very high rate of inflation – compared with the euro-area average – might risk a loss of price competitiveness. Fast growth in wages entails risks for second-round effects on inflation and high increases in unit labour costs. In particular, growth in nominal compensation per employee in 2021 and 2022 (9.8% and 8.3%) was well above pre-pandemic levels (7.2% in 2019). It is also expected to stay at a high level in 2023 (10.3%) according to the Commission spring 2023 forecast. Moreover, nominal house price growth is among the highest in the EU, amid an estimated moderate overvaluation of house prices. A correction is expected to slow down or halt house price growth this year in the face of the worse economic outlook and the tightening of financial conditions. Mitigating the risks, the Estonian economy is structurally resilient, with the current account close to balance, low debt levels, and a solid financial sector (see Annex 22).]

Estonia is an energy-intensive economy and has experienced significant energy price increases. Retail prices for electricity and gas increased in the first half of 2022 compared with the same period in 2021 (by 55% and 154% respectively). Estonia is one of the most carbon- and energy-intensive economies in the EU. In 2020, the economy's greenhouse gas emissions intensity was twice the EU average, although the trend is decreasing. While the share of renewable energy in the electricity mix has seen a strong increase (from 29% in 2019 to 41% in 2021), the share of fossil fuels in the energy mix was still high at 71% (See Annex 6).

([1]) European Commission (2023), In-Depth Review for Estonia, Commission staff working document, (COM(2023) 630 final).

Skills shortages and underinvestment in innovation hold back productivity growth

Labour productivity is improving but skills and labour shortages remain one of the main challenges to investment and productivity growth in the longer term. While Estonia's labour productivity is still substantially below the EU average, the gap is narrowing and the country is slowly catching up. The post-pandemic economic recovery allowed labour productivity in industry to grow by 7.4% in 2021, which was, however, followed by a decline of -8.4% in 2022, compared to an EU average growth of 1.4% (see Annex 12). One of the main long-term barriers to investment and a major challenge for businesses is the availability of skilled staff.

Estonian businesses continue to underinvest in research and innovation (R&I). Estonia maintained its public sector R&I spending at 0.75% of GDP in 2021, slightly below the EU average (0.76%). However, while business sector investments in R&I have risen from 87% of GDP in 2019 to 0.98% in 2021, their level is still below the EU average of 1.49%, and Estonia is far below the European Research Area's overall target of 3% of GDP. Hence, there is room for companies to increase their research-based innovation capacity and R&I functions (see Annex 11). As regards the use of digital technologies, while the share of small and medium-sized companies with at least basic digital intensity is close to the EU average, the use of some advanced technologies, such as big data and artificial intelligence, is lower than the EU average. However, in 2022, Estonia improved innovation funding and established a national innovation agency, which will support the collaboration between publicly funded research and innovation (concentrated at a few state-funded universities) and businesses. In addition, Estonia launched a large-scale grant scheme for applied research,

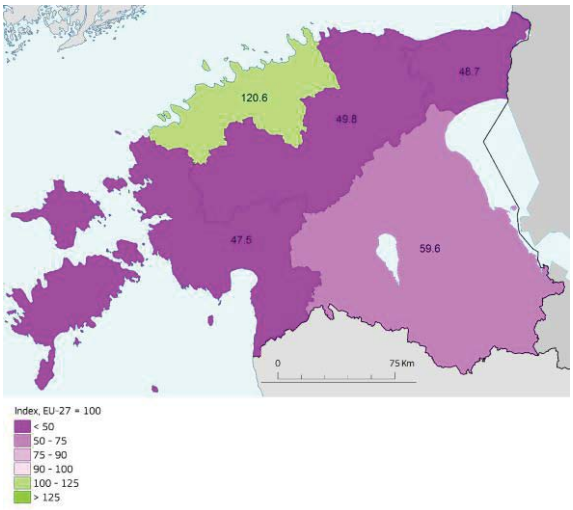
supporting R&D-intensive companies and fostering university-industry collaboration.

Addressing social challenges and regional disparities would bring more inclusive growth

While Estonia performs well on employment related indicators, the Social Scoreboard supporting the European Pillar of Social Rights points to some challenges, in particular regarding poverty and high self-reported unmet needs for medical care. While poverty has been gradually decreasing, it remains high for unemployed people, people with disabilities, and older people: 40.6% of people aged 65 and over were at risk of poverty in 2021, versus 16.8% in the EU-27. This is largely due to the average old-age pension, which is below the at-risk-of-poverty threshold. Pensions are among the lowest in the EU relative to work incomes. There is also a gender gap in old-age poverty (the rate for older women is 47.9% – almost 21 percentage points higher than for men). The low adequacy of the Estonian social safety net and low coverage of unemployment benefits contribute to income inequality, still slightly above the EU average, and poverty. While the ratio has decreased, Estonia still has one of the highest levels in the EU of self-reported unmet needs for medical care (8.1% vs 2% in the EU in 2021). Population ageing continues to put pressure on the long-term care system which is inadequate to meet demand due to deficiencies in the organisation and financing of long-term care.

Estonia continues to feature significant disparities between its capital region (Põhja-Eesti) and the rest of the country. In 2020, GDP per capita of Põhja-Eesti stood above the EU average at 120.6%, while it ranged from 48% in Lääne-Eesti to around 60% in Lõuna-Eesti (see Annex 17). Labour productivity is also higher in the capital region, though real productivity growth has been highest in Lõuna-Eesti and Kesk-Eesti. Depopulation between 2011-2019 was most striking in Kirde-Eesti (-14.8%), while the capital region's population grew by 8.9%. The urban-rural divide is also visible in terms of public transport, education and employment (including the digital divide), and for risk of poverty, which is higher in rural areas. In addition to the support from the Recovery and Resilience Facility (see Section 2), Estonia benefits from a significant volume of EU cohesion funds. Over 2021-2027, cohesion policy programmes will invest EUR 2.6 billion in the green transition and EUR 361 million in the digital transformation as part of Estonia's total allocation of EUR 5 billion (see Annex 4) ([2]).

Graph 1.2: **GDP per capita (percentage) in Estonia, NUTS 3, 2020**



Source: Eurostat

Estonia is improving or performs well on most of the Sustainable Development Goals (SDGs) indicators. Estonia performs well in 'education indicators' (SDG 4). For example, there are relatively few 15-year-olds who are low achievers in reading, and adult participation in learning is increasing. The country has made some progress on energy consumption indicators (SDG 7). For example, Estonia has managed to increase the 'share of

([2]) European Regional Development Fund (ERDF), Cohesion Fund (CF), European Social Fund Plus (ESF+), Just Transition Fund (JTF), excluding Interreg programmes. Total amount includes national and EU contributions. Data source: Cohesion Open Data.

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Box 1:

Box on energy policy response in Estonia

Estonia suffered the highest retail energy price increases in the EU. The country adopted various support measures to cushion the impact of energy price inflation on households and businesses. For 2023, their gross budgetary costs are projected at 0.3 % of GDP, which is relatively small in comparison with many other EU Member States. Most measures do not fully preserve the price signal and are not targeted at the most vulnerable. All the measures were planned to expire in spring 2023.

The most notable measures were:

- a partial compensation of energy bills for households earning less than the median income;
- reduced network charges for electricity and gas for households and corporates, and electricity and gas price caps for households, small companies, microbusinesses, NGOs, and local governments; and
- a one-time EUR 50 social transfer to pensioners and children.

Furthermore, the Estonian state-owned energy company was mandated by the government to sell electricity at a pre-determined fixed price to households and small enterprises, starting from October 2022, for four years.

In April 2022, Finland agreed to lease a floating storage regasification unit. This unit arrived in Finland, port of Inkoo, in December 2022. This terminal, crucial for the security of supply of Estonia, Finland and also the whole Baltic region, was identified in Annex 3 of the REPowerEU Communication as an additional gas infrastructure need.

Estonia applies a national measure in application of Council Regulation (EU) 2022/1854, namely an environmental charge payable by corporations engaged in the mining and refining of oil shale in Estonia. The charge is calculated per tonne of the resource and its rate is determined by the government every quarter between a minimum and maximum ceiling ([3]).

renewable energy in gross final energy consumption'. However, while improving, Estonia still needs to catch up with the EU average on the 'healthy life years at birth' indicator (SDG 3). The only SDG indicator where Estonia is moving away from the target and, at the same time, also needs to catch up with the EU average is the 'life below water' indicator (SDG 14). This is due to an increase in marine waters affected by excess nutrient accumulation originating in human activity. A more detailed overview is provided in Annex 1, which assesses Estonia's progress on the SDGs along the four dimensions of competitive sustainability.

([3]) Member States can keep national measures that are equivalent to the solidarity contribution regulated under Council Regulation (EU) 2022/1854 provided they are compatible with the objectives of the regulation and generate higher or comparable proceeds. These measures must also cover the extraordinary and unexpected profits of businesses active in the extraction of crude petroleum, natural gas, coal, and refinery sectors.

THE RECOVERY AND RESILIENCE PLAN IS UNDERWAY

Estonia's recovery and resilience plan (RRP) aims to address the key challenges related to the green transition, including energy efficiency and sustainable transport, the digital transition in the public and private sector, and health and social protection. It consists of 25 investments and 16 reforms, detailed in 124 milestones and targets that are supported by EUR 863.5 million in grants and about 2.8% of GDP (see Annex 3 for more details).

The implementation of Estonia's recovery and resilience plan is underway. Estonia submitted a modification of its plan together with the REPowerEU chapter on 9 March 2023, which was adopted by the Commission on 12 May 2023 and is subject to the Council approval. Due to high inflation and disruptions in supply chains caused by the war in Ukraine, a few investments have been delayed or discontinued, which resulted in the revision of the initial plan. Estonia is the first Member State to have included the REPowerEU chapter in the modification of the plan and intends to submit the first and second payment request as soon as the modification has been approved by the Council.

The amendments to the RRP and the REPowerEU chapter are expected to address the challenges related to energy supply and security, energy efficiency, and to speed up the transition to renewable energy sources. The modified plan contains five new investments: the construction of a general hospital and health care centre "TERVIKUM" in Viljandi, boosting of offshore wind farms development, support to companies to increase energy security, construction of five Rail Baltic viaducts and a multifunctional work vessel to prevent pollution in the sea and improve maritime safety. The REPowerEU chapter includes one reform and two investments, aiming at accelerating the country's take-up of renewable energy and facilitating the development of sustainable biogas and biomethane.

At the same time, the revised lower allocation for Estonia and the strong increase in prices in combination with supply chain disruptions, has made it necessary to remove four investments from the RRP. This concerns the construction of the Northern Estonian Medical Campus and Rail Baltic Ülemiste terminal in Tallinn, the purchase of multi-purpose helicopters, and the electrification of a Westbound section of the country's railways. In addition, Estonia has requested to modify the milestones and targets of 13 measures of the RRP.

The following, more detailed review of measures being implemented under the RRP in no way implies formal Commission approval or rejection of any payment requests.

Supporting the green transition, including fostering sustainable transport

Supporting innovation and the green transition is under way. The Green Fund has been set up, supporting development and scaling up innovative green technologies in the private sector. The green transition will be further supported by investments and reforms strengthening the electricity grid capacity and incentivising production and uptake of renewable energy. For removing barriers to installation of renewable energy facilities, the relevant legislation will enter into force and guidance materials will be published.

To accelerate the transition to sustainable transport, the government has adopted the Transport and Mobility Development Plan 2021-2035. Two important projects aim to increase sustainable mobility in urban areas. The project design for the Tallinn Old Port tramline was completed and the construction contract concluded. In 2022, a notice was published for the call for proposals for grants to develop 24 km of bikeway and walkway infrastructure. Estonia will invest in developing both rail transport and the Tallinn capital public transport system.

Supporting the digital transition

Reforms and investments will support the digital transition by making data more accessible to Estonian policymakers and the public. To further strengthen e-governance, Estonia has created a centre of excellence for data governance and open data. This centre improves the quality of data collected and held by Estonian public authorities, increasing its use for decision-making and its availability as open data so that it may also be reused by other stakeholders.

To promote the digital transition of small and medium-sized companies, Estonia will set up a dedicated grant scheme. This tool will help companies to digitalise their business processes. The government has adopted secondary legislation to support the adoption of digital technologies, the development of cloud technologies, and the strengthening of digital skills in the labour force.

Further reforms and investments are envisaged in the digital area. They will further improve public digital services, strengthen the anti-money laundering framework, and support the roll-out of very high-capacity broadband network to 8 097 new sites (residential properties, companies, other establishments).

Strengthening social protection and healthcare

Measures have been taken to support young people and the unemployed. Legislation has entered into force to strengthen the 'My First Job' scheme, which foster youth employment. The Youth Guarantee Action Plan has also been adopted. In addition, the duration of unemployment benefit has been extended under amendments to the relevant legal act.

Reforms were adopted to improve access to long-term care and healthcare. As regards long-term care, in 2022, several amendments to the Social Welfare Act were adopted to ensure that a person must be able to live as long as possible in their home and to receive quality services. Furthermore, to strengthen primary care, legislative amendments entered into force to provide greater access to specialist care and to increase the level of support for general practitioners, making working in primary health centres in remote areas more attractive.

Future reforms and investments will aim to improve the provision of health and social services, and to reduce the gender pay gap. An integrated care model for health and social services is envisaged to be established, the e-health governance framework will be improved and the number of health workers increased. Investment in the health sector will improve health infrastructure. Measures will be taken to reduce the gender pay gap, including by rolling out a gender pay gap digital tool to help employers to take informed decisions.

Box 1:

Key deliverables expected under the recovery and resilience plan in 2023/2024

- **Green skills:** New upskilling and retraining modules for green skills will be available.
- **Digital transition:** Transfer of the basic digital services to the national cloud infrastructure of the data embassy and roll-out of very high-capacity broadband networks, which offer a connection of at least 100 Mbps, for 4 000 new households and socio-economically important institutions, such as hospitals, schools, public services and businesses.
- **Energy efficiency:** Update of the Housing homepage to visualise the possible outcome of home renovation and calculation of the potential costs and renovation of at least 2 600 dwellings in apartment buildings and at least 80 private residences, with primary energy savings of at least 30%.
- **Modernising public administration:** Entry into force of the amendment to the Money Laundering and Terrorist Financing Prevention Act and of other legislative amendments needed for the Centre for Strategic Analysis to prevent money laundering.
- **Social protection:** Entry into force of the Decree of the Minister of Social Protection to support the independent living of older people with lower care needs and people with disabilities.

Key deliverables expected under the modified recovery and resilience plan in 2023/2024 subject to Council approval:

- **Energy and energy efficiency**: Selection of contractors for the radar and passive systems/sensors and signed contracts to boost offshore wind farms development.
- **Sustainable transport:** Signing of work contracts for the building of a multifunctional research vessel and the construction of the Rail Baltic viaducts, with the respective aims of ensuring the safety and conditions of waterways for maritime transport and connecting the three Baltic states via rail.
- **Healthcare:** Signing of the contract for the construction of the TERVIKUM health centre in Viljandi.
- **REPowerEU**: Signature of the co-financing agreement for electricity distribution network works under the programme to increase the access of renewable energy production to the electricity distribution network; entry into force of legal amendments streamline planning, permitting and environmental impact assessment processes for wind energy projects; establishment of wind priority development areas on the basis of a technical report identifying priority development areas.

FURTHER PRIORITIES AHEAD

Beyond those tackled by the RRP, Estonia faces additional challenges. There are bottlenecks that need to be addressed to ensure Estonia's long-term sustainable growth and competitiveness, notably to increase energy security while reducing the economy's energy intensity, increase resource productivity, improve healthcare and increase social protection, and close the skills gaps. These objectives are also identified in the 'Estonia 2035' national strategy. Addressing these challenges will also help to make further progress in achieving the SDGs where Estonia currently shows room for further improvement, namely 'Healthy life years at birth' indicator (SDG 3) and 'Life below water' (SDG 14).

Using resources more efficiently and diversifying fuel sources

Estonia is making efforts to reduce emissions. However, the policies in place are projected to reduce greenhouse gas emissions by 12% in 2030 relative to 2005 levels, far below the effort-sharing target of 24% contributing to the EU's 55% objective. With the revised recovery and resilience plan (RRP) and a dedicated REPowerEU chapter, Estonia will allocate 59% of the plan's resources to climate-related measures.

Energy efficiency is a central component of Estonia's energy transition. Energy efficiency is central to Estonia's recovery and resilience plan and the structural funds operational programme. However, the targets for primary and final energy consumption laid down in Estonia's national energy and climate plan are of modest (5.4 million tonnes of oil equivalent) and very low ambition (2.9 Mtoe), respectively, and are bound to be revised upwards (see Annex 6). Estonia's long-term renovation strategy estimates that 141 000 buildings, accounting for 54 million m², need renovation within 30 years. Estonia aims to renovate 3% of the floor area of public buildings per year, aided by funding from the RRF and EU structural funds. Estonia would benefit from increasing smaller municipalities' renovation capacity by better targeting support measures, by pursuing a strategy on sustainable shrinking in regions losing population and by continuing efforts to structurally reduce demand. More generally, new financing instruments and changes in fiscal policies to foster renovation would further support Estonia in its efforts to increase energy efficiency and eradicate energy poverty.

The share of oil shale in Estonia's energy mix remains still significant, even if Estonia is making progress in the deployment of renewable energy. The share of renewable energy in gross final energy consumption grew from 30.1% in 2020 to 37.6% in 2021 (see Annex 6). The share of oil shale accounted for 58% of the energy mix in 2021, a decrease of 5 percentage points since 2018, but an increase of 2 percentage points since 2020 (see Annexes 6 and 7). Estonia has introduced measures in the REPowerEU chapter to streamline permitting procedures and supporting permitting authorities. Several issues seem to be hampering progress towards the use of more renewable energy, includingthe insufficient capacity in the electricity grid. Reducing the reliance on fossil fuels is crucial for the decarbonisation of the Estonian economy and will also contribute to ensuring security of supply.

Estonia needs to continue its efforts to reduce the dependency of its electricity network. The Estonian electricity network,

like that of other Baltic Member States, remains exposed as it is synchronised with the BRELL power grid (controlled by Russia, see Annex 7). The regional synchronisation of the electricity grid with the rest of the European Union is making progress but remains to be completed. To that end, cooperation with Latvia and Lithuania is necessary.

Estonia's land use, land-use change and forestry (LULUCF) sector has shifted to net emissions and action to restore its absorption capacity is of high importance. This degradation from net removals of 4 835 kt CO_2-equivalent in 2010 to net emissions of 1 297 kt CO_2-equivalent in 2020 (see Annex 6) is mostly explained by the significant decline in the capacity for carbon removals in forests. Therefore, improving forest management is key and adoption of an appropriate national forest development plan is crucial.

Estonia recently adopted new policies, such as a white paper and action plan, to address circular economy challenges, but the country would benefit from targeted measures, in particular to improve circularity of municipal waste. The municipal waste recycling rate was 30.5% in 2021, while the EU average stood at 48.5%. Estonia's industrial system is characterised by low resource productivity and resource productivity is one of Estonia's relative weaknesses when it comes to the country's innovation capacity. Estonia ranked 18th on the 2021 Eco-Innovation Index in the EU. Innovation in valorisation of natural resources and the circular economy would also help increase resource productivity and increase value added in industrial production.

Accelerating the shift towards sustainable mobility

Achieving the shift to sustainable mobility requires accelerating the adoption of appropriate measures such as increasing multimodality in national and urban transport networks. Estonia has one of the lowest rates of railway electrification in the EU. Although electrification investments are a key priority in national transport policy, results are yet to be seen. The greening of transport has also slowed down in the area of private vehicles due to the lack of incentives. The rate of new registrations of alternative fuel vehicles still lags significantly below the EU average, while the availability of electric charging points is sufficient in relation to the existing number of registered electric vehicles. Additionally, in terms of public transport, the uptake in urban and suburban areas could be increased by providing wider multimodal mobility options in different areas of Estonia.

Although Estonia aims to shift freight transport to more environmentally friendly alternatives, the shift of freight transport to rail on the North-South axis is yet to take off. In addition, Estonia is lacking appropriate measures, such as differentiated railway infrastructure charges, that could initiate the shift to green freight transport.

Environmental taxes on transport in Estonia are the lowest in the EU, as a share of GDP (0.04% vs 0.42% as EU average) ([4]). The country is one of the few Member States without an annual road vehicle tax, but it levies relatively high excise duties on road fuels.

Addressing poverty by increasing social protection

The adequacy of social safety has improved, but the risk of poverty or social exclusion remains high among some groups, including older people. While the impact of social transfers (excluding pensions) on poverty reduction has improved and the share of people at

([4]) https://ec.europa.eu/eurostat/documents/15216629/15589759/KS-07-22-523-EN-N.pdf/3ef323b2-703a-9905-f24d-91db92a2931c?version=3.0&t=1673612473356.

risk of poverty or social exclusion continued to decrease, the level of minimum income benefits is low and stands at 50% of the poverty threshold. The at-risk-of-poverty-or-social-exclusion rate for older persons is still among the highest in the EU. Furthermore, old-age poverty is more than two times higher for women than for men; this is also related to the high gender pay gap (see Annex 14). The main driver for old-age poverty is low pensions. The 2019 pension reform, which introduced an opt-out from the statutory pillar II funded pension scheme, risks to reduce the future adequacy of pensions and puts people at a higher risk of poverty in the long term. At the same time, demographic trends put further pressure on the pension system. The number of employees is decreasing and the number of pensioners increasing; social tax contribution to the pillar I (state) pensions is therefore decreasing. In 2022, Estonia carried out an analysis of the sustainability and adequacy of its pension system and identified gaps. One is that, currently, approximately one in ten pensioners receive a pension lower than the requirement of the social charter, and this proportion is increasing. Furthermore, Estonia does not meet the average pension goal as the pillar I and II pension of the median wage earner is less than 60% of the median wage.

The low coverage of unemployment benefits continues to contribute to income inequality and increased poverty. As provided for under the RRP, Estonia has put in place a mechanism to trigger extending the duration of unemployment benefit in times of economic crisis. However, the access to and coverage of the unemployment benefit scheme remains unchanged, including that people with short work spells and in non-standard forms of work are not covered (see Annex 14). To reach the 2030 national poverty reduction target, it is crucial to accelerate efforts to alleviate poverty among vulnerable groups.

Increasing access to long-term care and healthcare

Estonia has taken steps to improve the accessibility and affordability of long-term care, but challenges remain. A high proportion of the 65+ population in need of long-term care lacks assistance in personal care or household activities. The need for home care services is the highest in the EU and services are not equally accessible throughout the country as the capacity of local governments to provide them varies. The reliance on informal carers is considerable; however, financial support to carers is very limited. In addition, the lack of common national standards for services and workforce shortages make it difficult to ensure good care quality. To address the increasing need for long-term care, high out-of-pocket payments, and the impact of a decreasing and ageing population on future public expenditure (European Commission 2022 Country Report), Estonia adopted the care reform and other legislative changes in 2022. Further measures are planned to improve care coordination, to support municipalities to deliver care services, and to support informal carers. These are important steps towards improving the provision of long-term care. However, the impact of the planned measures remains to be seen.

Estonia is characterised by high self-reported unmet needs for medical care and by health workforce shortages. Life expectancy in Estonia is one of the lowest in the EU. The rate of self-reported unmet needs for medical care is one of the highest in the EU, although it has fallen compared with previous years. Out-of-pocket payments remain high (see Annex 16). Estonia faces health workforce shortages, especially nurses. The numbers of graduating doctors and nurses have fallen in recent years and uneven regional distribution of the health workforce raises concerns about the long-term accessibility of health services. Working conditions are important factors in choosing the profession. While salaries have increased, they are not sufficiently attractive (see

Annex 16). Estonia is addressing health workforce shortages to some extent in its RRP and also has put some incentives in place to increase the health workforce.

Low public financing of health remains the key bottleneck to address the challenges in healthcare and long-term care. Estonia's total health expenditure in 2020 was low compared with the EU (7.8% versus 10.9% EU). While out-of-pocket payments slightly decreased in 2021 to 21.4%, it is still far above the EU average of 14.4%. Furthermore, public spending on long-term care remains one of the lowest in the EU (0.4% of GDP vs 1.7% of GDP EU in 2019) (see Annex 14). While measures are being taken by Estonia, adequate financing of health and long-term care has not yet been ensured.

Bridging labour and skills gaps to foster productivity

Availability of (skilled) labour is one of the main long-term challenges to investment and productivity growth. Labour shortages are particularly hampering export industries, putting challenges on further export growth. Labour shortages have started to decrease in industry, construction and services sectors and reaching pre-COVID levels, but they remain high (11% in industry and 20% in services in 2022). Teacher and health workforce shortages (see section on healthcare) continue to be a challenge.

Early school leaving and gender gaps throughout the education system remain a stumbling block to solving skills shortages. The education system delivers very good outcomes, high equality and advanced digitalisation of schools. However, the insufficient numbers of graduates from vocational and higher education, coupled with increasing early school leaving and gender gaps throughout the education system, present challenges in filling current and future jobs (see Annexes 14 and 15).

In the context of the green transition, labour shortages in key sectors have increased in recent years, also linked to a lack of relevant skills and creating bottlenecks in the transition to a net-zero economy. In 2022, labour shortages were reported in Estonia for 68 occupations that required specific skills or knowledge for the green transition, including refuse sorters, civil engineering technicians and civil engineers ([5]). The job vacancy rate increased across key sectors, such as construction (from 0.5% in 2015 to 1.4% in 2022), but still below the EU average of 4%, in 2022. ([6]). In 2022, labour shortages were reported as a factor limiting production in industry (for 23.3% of firms) and construction (for 32.5% of firms) ([7]). Upskilling and reskilling for the green transition, including for people most affected, and promoting inclusive labour markets are essential policy levers to accelerate the transition to net-zero and ensure its fairness (see Annex 8).

Teacher shortages exacerbate skills shortages. Estonia's teaching force remains one of the oldest in the EU. Even though the number of education support specialists is slowly rising (which also contributes to lowering the pressure on teachers), the demand for support specialists is high. The lack and ageing of teachers is especially acute in mathematics and sciences, which are also subjects with particularly high dropout rates in higher education. This might exacerbate skills shortages in the STEM fields, crucial for the green and digital transition, and have a

([5]) Data on shortages is based on European Labour Authority (2023), *EURES Report on labour shortages and surpluses 2022*. National authorities report through a questionnaire, based on administrative data and other sources as submitted by the EURES National Coordination Offices (definitions of shortages differ, thus data is not comparable across countries and covers a wide variety of sectors). Skills and knowledge requirements are based on the ESCO (European Skills Competences and Occupations) taxonomy on skills for the green transition (for occupations at ISCO 4-digit level of which there are 436 in total). Examples are identified based on their ESCO 'greenness' score and relevant sectors.

([6]) Eurostat (JVS_A_RATE_R2).

([7]) European Business and Consumer Survey.

negative impact on labour productivity and innovation. Teachers' salaries went up in 2023, but working conditions (workload and well-being) could still be improved to attract more candidates and prevent dropout from the profession. While the adoption in 2022 of a teacher action plan to improve the working conditions, training and career progression of teachers is a step in the right direction, the close monitoring of its implementation remains key. At the same time, the integration of Ukrainian refugees into the education system, dealing with learning gaps after the COVID pandemic, and accelerating the transition to Estonian-language education also imposes further challenges on teachers.

Productivity growth in Estonia is slowed down by the low levels of investment in research and innovation by business sectors, and the slow adoption of some advanced technologies. Business sector investments in R&I are below the EU average. Furthermore, Estonian businesses are slower than the EU average in adopting advanced technologies such as big data and artificial intelligence. This is also related to the insufficient number of skilled specialists. Furthermore, while public sector R&I spending is close to the EU average,.total R&I spending is still below the European Research Area's (ERA) overall target of 3%. An increase in public sector spending would create synergy with R&I undertaken in the private sector. Training more specialists, particularly at doctoral and postdoctoral levels would incentivise Estonian businesses to engage in more R&I and to adopt advanced technologies.

KEY FINDINGS

Estonia's recovery and resilience plan includes measures to address a series of structural challenges.

- Removing administrative barriers, strengthening the productivity and innovation capability of the business sector, and setting up a Green Fund.
- Upgrading digital government services, improving digital skills and reducing the administrative burden for people and businesses.
- Reducing the economy's energy intensity by improving energy efficiency of buildings, further developing renewable energy production capacity, streamlining permitting, supporting permitting authorities* and developing workers' green skills.
- Improving the circular economy through valorisation of natural resources, in particular by incentivising the production of local sustainable biomethane*.
- Addressing sustainable transport*, including through a reform on a common pricing and ticketing system in Tallinn area, advancing the Rail Baltic project, and the construction of Tallinn Old Port tramline.
- Improving the accessibility and resilience of the health system*, including by increasing the number of health workers and strengthening primary care.
- Enhancing social protection by extending the duration of the unemployment benefit, reducing the gender pay gap, improving long-term care and youth employment.

Estonia should proceed with the steady implementation of its recovery and resilience plan including its REPowerEU chapter.

Beyond the reforms and investments in the RRP, Estonia would benefit from the following.

- Strengthening social protection, including to address old-age poverty and by extending the coverage of unemployment benefits, in particular to those with short work spells and in non-standard forms of work. Improving access to health and long-term care, in particular by ensuring sustainable funding.
- Addressing skills shortages, including by reducing early school leaving and easing teacher shortages. Increasing investments in research and innovation (R&I) to improve economic performance and competitiveness.
- Designing and implementing new measures to reach the 2030 climate targets for the sectors outside the Emissions Trading System and to strengthen the capacity of the land-use sector for carbon removals, setting more ambitious targets for energy efficiency, and improving municipal waste management. Continuing to incentivise the deployment of renewable energy, including by increasing the capacity of the electricity grid.
- Continuing efforts to increase the share of sustainable transport modes by electrifying the rail network and through incentives for the uptake of low-carbon vehicles.
- Continuing the timely implementation of the synchronisation with the EU electricity grid. Stepping up efforts to deploy buildings renovation, by ensuring sufficient funding resources and

associated investments to achieve the renovation targets.

*The modifications to the RRP are marked with *.*

ANNEXES

LIST OF ANNEXES

LIST OF TABLES

LIST OF GRAPHS

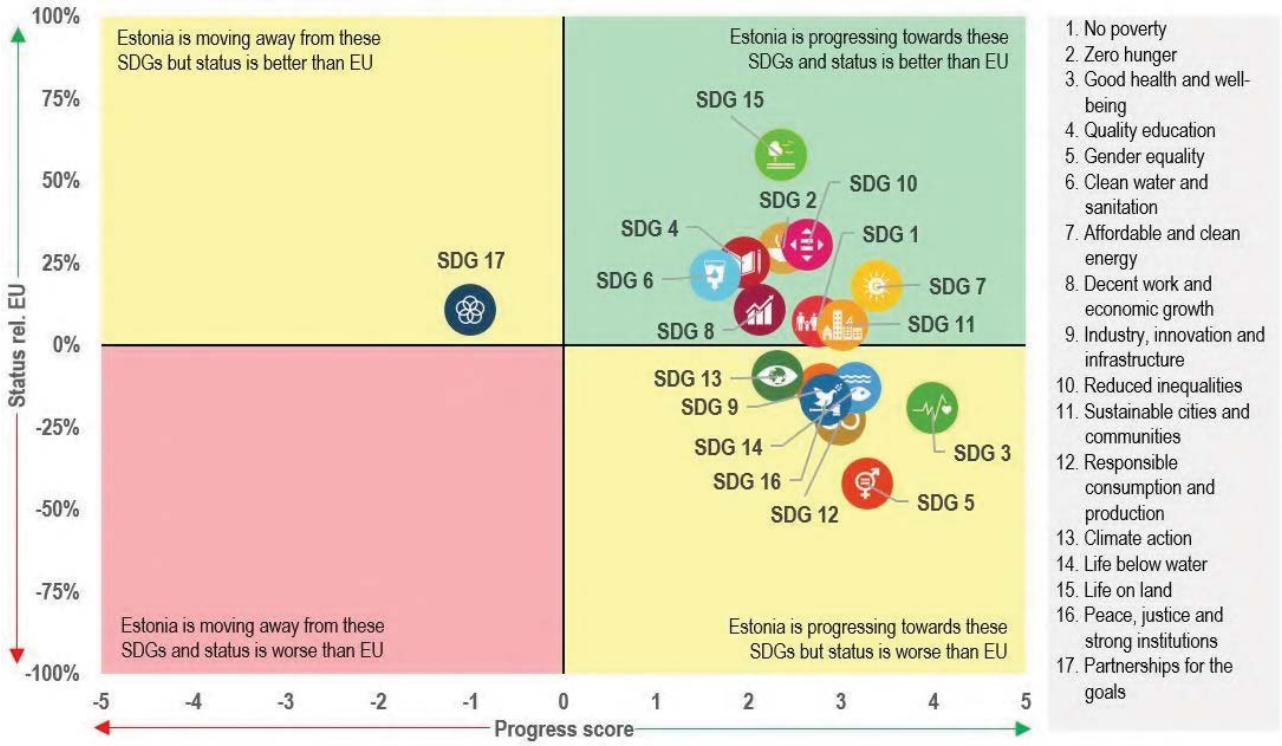
LIST OF MAPS

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 is improving and performs well on most of the SDG indicators related to *environmental sustainability* (SDGs 2, 6, 7, 11, 15), it needs to catch up with the EU average on SDG 12 (Responsible consumption and production) and on SDG 14 (Life below water). While coastal water bathing sites with excellent water quality (SDG 14) have increased from 51.9% in 2016 to 53.3% in 2021, they are still below the EU average of 88.3%. However, Estonia has made some progress on energy consumption indicators, including the share of renewable energy in gross final energy consumption (SDG 7; from 29.2% in 2016 to 38.0% in 2021; EU average 21.8%). It has also made progress on the industry sustainability indicators, reducing the air emission intensity of fine particulate matter from industry (SDG 9; from 0.63 g per euro in 2015 to 0.54 g per euro in 2020). Nevertheless, it remains above the EU average (0.07 g per euro). Similarly, while energy productivity has increased (SDG 12; from 2.9 euro per kilogram of oil equivalent (kgoe) in 2016 to euro 4.5 per kgoe in 2021), it is still below the EU average (8.5 euro per kgoe in 2021).

While Estonia is improving and performs

Graph A1.1: **Progress towards the SDGs in Estonia in the last 5 years**



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). The status of each SDG in a country is the aggregation of all indicators for the specific goal compared to the EU average. 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 20 January 2023. Data mainly refer to 2016-2021 or 2017-2022.

well on some SDG indicators related to *fairness* (SDGs 1, 4, 7, 10), it still needs to catch up on SDG 5 (Gender equality) and SDG 3 (Good health and well-being). The country performs well on low achieving 15-year-olds in reading (SDG 4; 11.1% of 15-year-old students in 2018 compared to the EU average of 22.5% in 2018). Estonia is also improving and performs well on the severe material and social deprivation rate (SDG 1; from 2.2% of the population in 2016 to 1.9% in 2021; EU average of 6.3% in 2021), on people living in households with very low work intensity (SDG 1; from 5.5% of the population aged less than 65 in 2016 to 5.1% in 2021; EU average of 8.9% in 2021). Estonia is making progress on the share of people at risk of income poverty (SDG 1; from 21.7% of the population in 2016 to 20.6% in 2021). Nevertheless, it remains above the EU average (16.8% in 2021). While Estonia is improving, it still needs to catch up with the EU average on the gender pay gap in unadjusted form (SDG 5; the average gross hourly earnings of women went from being 24.8% lower than men in 2016 to being 20.5% lower in 2021; the EU average was 12.7% lower than men in 2021). Similarly, Estonia is improving but still needs to catch up with the EU on healthy life years at birth (SDG 3; from 55.0 years in 2015 to 57.6 years in 2020; EU average 64.0 years in 2020). Estonia is also improving on self-reported unmet needs for medical care (SDG 3; from 15.3% of the population aged 16 or over in 2016 to 8.1% in 2021). Nevertheless, it remains above the EU average (2.0% in 2021). The Estonian recovery and resilience plan (RRP) includes measures aimed at addressing challenges in primary healthcare and long-term care.

Estonia is improving or performing well on all SDGs on *productivity* (SDGs 4, 8, 9), but still needs to catch up with the EU average on some (SDG 9). The country is performing well and improving on adult participation in learning in the past 4 weeks (SDG 4; from 16.8% of the active population aged 25-64 in 2017 to 21.1% in 2022; EU average 11.9% in 2022). Estonia is performing well and improving on the share of households with a high-speed internet connection (SDG 9; (from 48.5% in 2016 to 73.4% in 2021; EU average 70.2% in 2021). It also performs well and is improving on the investment share of GDP (SDG 8; from 24.4% of GDP in 2016 to 28.9% in 2021; EU average 23.2% in 2022). Estonia still needs to catch up with the EU average in the area of innovation. While gross domestic expenditure on R&D has increased (SDG 9; from 1.2% of GDP in 2016 to 1.8% in 2021), it is still below the EU average (2.3% in 2021). Similarly, the country is improving but still needs to catch up with the EU average on R&D personnel (SDG 9; from 0.9% of the active population in 2016 to 1.0% in 2021; EU average 1.5% in 2021). The Estonian RRP includes significant reforms and investments aimed at boosting innovation and digital transition in businesses. However, there is still room for improvement on addressing the remaining challenges.

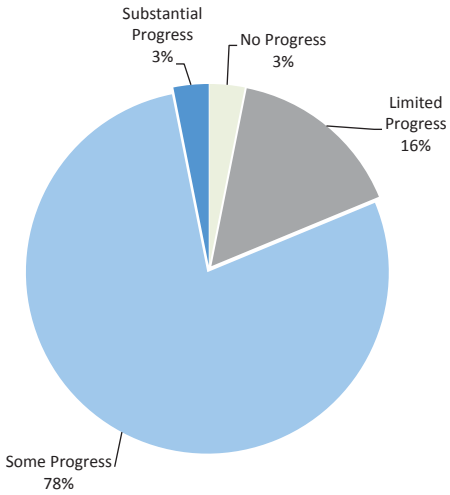
Estonia is improving or performing well on most of the SDG indicators related to *macroeconomic stability* (SDG 8), but it is moving away from SDG 17 (Partnerships for the goals), and the country also needs to catch up with the EU average on SDG 16 (Peace, justice and strong institutions). While the COVID-19 crisis caused a recession in 2020, recovery has been swift. Real GDP per capita (SDG 8) improved from EUR 14 410 in 2017 to EUR 16 250 in 2022. Nevertheless, it remains below the EU average (EUR 28 820 in 2022). Estonia is performing well on general government gross debt (SDG 17; 18.4% of GDP in 2022 compared to the EU average of 84.0% in 2022). But official development assistance (SDG 17) has declined from 0.19% of GNI in 2016 to 0.16% in 2021 (EU average 0.49% of GNI in 2021). Furthermore, while Estonia is improving on the standardised death rate due to homicide indicator (SDG 16; 3.6 per 100 000 persons in 2015 to 3.2 in 2020), the standardised death rate due to homicide nevertheless remains above the EU average (0.7 in 2020).

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

ANNEX 2: PROGRESS IN THE IMPLEMENTATION OF COUNTRY-SPECIFIC RECOMMENDATIONS

The Commission has assessed the 2019-2022 country-specific recommendations (CSRs) ([8]) 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 ([9]) and the commitments in its recovery and resilience plan (RRP) ([10]). At this stage of RRP implementation, 81% of the CSRs focusing on structural issues from 2019-2022 have recorded at least 'some progress', while 16% 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 2019-2022 CSRs (2023 European Semester)**



Source: European Commission.

([8]) 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)

([9]) 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).

([10]) Member States were asked to effectively address all or a significant subset of the relevant country-specific recommendations issued by the Council in 2019 and 2020 in their RRPs. 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 2019-2022 CSRs**

Estonia	Assessment in May 2023	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, 2023 and 2024	SDG 8, 16
and promote private investment to foster the economic recovery.	Some Progress	Relevant RRP measures being planned as of 2021, 2022, 2023 and 2024	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,	Some Progress	Relevant RRP measures being planned as of 2021 and 2022	SDG 7, 9, 13
resource efficiency, and	Some 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.	Limited 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
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

(Continued on the next page)

Table (continued)

2021 CSR 1	**Some progress**		
In 2022, maintain a supportive fiscal stance, including the impulse provided by the Recovery and Resilience Facility, and preserve nationally financed investment.	Some progress	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.	Some Progress	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.*	Some progress	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.	Substantial Progress	Not applicable	SDG 8, 16
2022 CSR 1	**Some 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.	Some progress	Not applicable	SDG 8, 16
For the period beyond 2023, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions.	Some 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 2023, 2024 and 2025	SDG 3
2022 CSR 4	**Limited progress**		
Reduce overall reliance on fossil fuels and diversify imports of fossil fuels	Limited progress	Relevant RRP measures being planned as of 2022	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	SDG 7, 8, 9, 13
ensuring sufficient capacity of interconnection	Limited progress		SDG 7, 9, 13
and strengthening the domestic electricity grid.	Limited 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 2024	SDG 11

Note:

* See footnote ([9]).

** RRP measures included in this table contribute to the implementation of CSRs. Nevertheless, additional measures outside the RRP are 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.

***A revised RRP was approved by the Commission on 12 May 2023, but has not yet been adopted by the Council. The table reflects the RRP measures as per the revised RRP.

Source: European Commission

The Recovery and Resilience Facility (RRF) is the centrepiece of the EU's efforts to help it recover from the COVID-19 pandemic, speed up the twin transition and strengthen resilience against future shocks. The RRF also contributes to implementation of the SDGs and helps to address the Country Specific Recommendations (see Annex 4). Estonia submitted its initial recovery and resilience plan (RRP) on 18 June 2021. The Commission's positive assessment on 5 October 2021 and Council's approval on 29 October 2021 paved the way for disbursing EUR 969.3 million under the RRF over the 2021-2026 period.

Table A3.1: **Key elements of Estonia's RRP**

	Current RRP
Scope	Initial plan
CID adoption date	29 October 2021
Total allocation	EUR 969,3 million in grants (3.16% of 2021 GDP) and EUR 0 million in loans
Investments and reforms	25 investments and 16 reforms
Total number of milestones and targets	124

Source: RRF Scoreboard

Since the entry into force of the RRF Regulation and the assessment of the national recovery and resilience plans, geopolitical and economic developments have caused major disruptions across the EU. In order to effectively address these disruptions, the (adjusted) RRF Regulation allows Member States to amend their recovery and resilience plan for a variety of reasons. In line with article 11(2) of the RRF, the maximum financial contribution for Estonia was moreover updated on 30 June 2022 to an amount of EUR 863.5 million in grants.

In this context, Estonia submitted an amended RRP to the Commission on 9 March 2023 to take account of the revised maximum financial contribution and cater for objective circumstances that make it no longer possible to achieve certain milestones and targets in the RRP, in line with Articles 18 and 21 of the RRF Regulation. The proposed RRP amendments entail removing 4 investments (Northern Estonia Medical Campus, multipurpose medical helicopters; the westbound Tallinn-Rohuküla railway; the Rail Baltic multimodal joint terminal in Tallinn) from the plan and adding 5 new investments. These are new Viljandi health center (EUR 72 million), to boost wind energy development (EUR 67 million); construction of Rail Baltic viaducts (EUR 31 million), to strengthen energy security of companies (EUR 20 million) and multifunctional vessels (EUR 18 million). Also, 13 existing measures have been adjusted notably by increasing their budget (EUR 64.3 million) and adjusting milestones and targets.

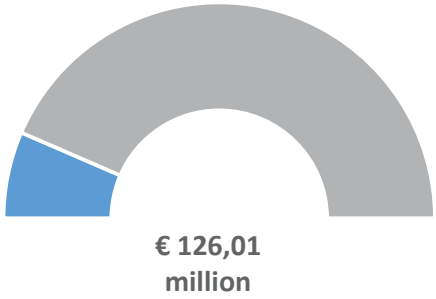
The modified RRP also includes **a new REPowerEU chapter** with one additional reform of the renewable energy permitting system (EUR 31.8 million) and two new investments to strengthen the electricity grid (EUR 38 million) and increase production and uptake of sustainable biogas and biomethane (EUR 20.2 million). This is part of the **EU's efforts to respond to the economic hardship and global energy market disruptions caused by Russia's invasion of Ukraine.** The revised RRP was approved by the Commission on 12 May 2023 and has been submitted to the Council for approval.

Estonia's progress in implementing its plan is published in the Recovery and Resilience Scoreboard ([11]). The Scoreboard also gives an overview of the progress made in implementing the RRF as a whole, in a transparent manner. The graphs in this Annex show the current state of play as reflected on the Scoreboard.

EUR 126.01 million has so far been disbursed to Estonia under the RRF in pre-financing on 17 December 2021, equivalent to 13% of the initial financial allocation.

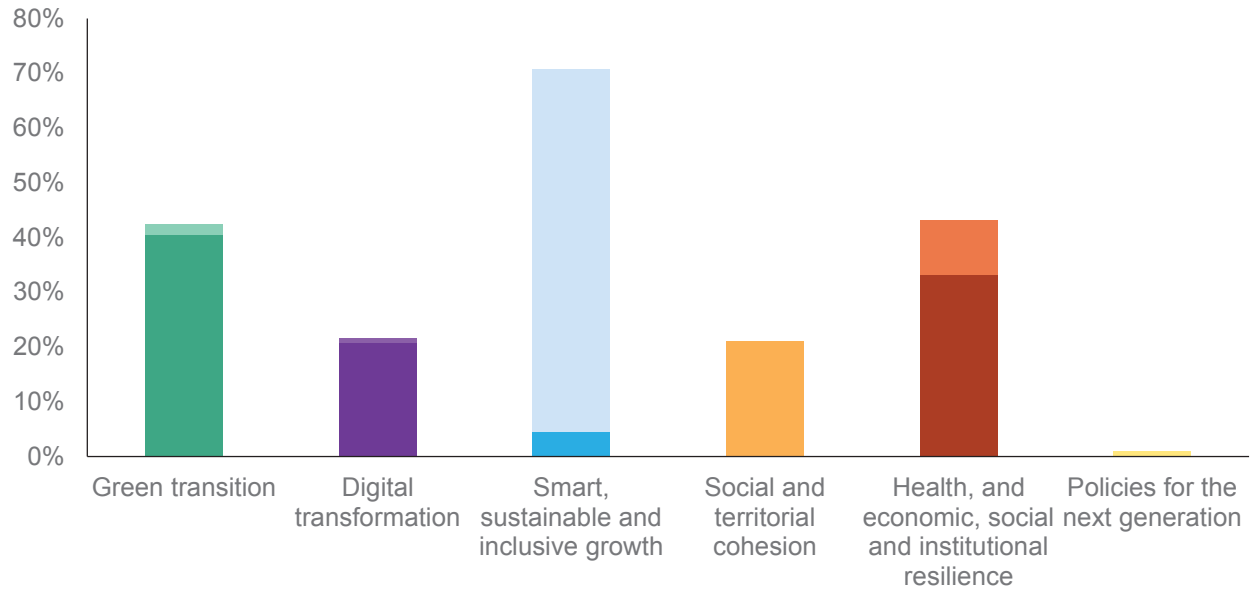
([11]) https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html

Graph A3.2: **Total grants disbursed under the RRF**



Note: This graph displays the amount of grants 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

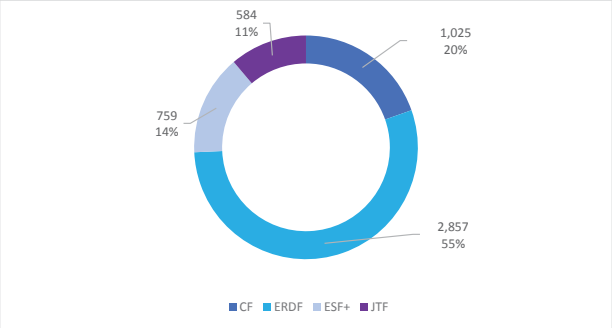
Graph A3.1: **Share of RRF funds contribution to each policy pillar**



Note: Each measure contributes towards two policy areas of the six pillars, therefore the total contribution to all pillars displayed on this chart amounts to 200% of the estimated cost of the RRP. The bottom part represents the amount of the primary pillar, the top part the amount of the secondary pillar.
Source: RRF Scoreboard

The EU budget of over EUR 1.2 trillion for 2021-2027 is geared towards implementing the EU's main priorities. Cohesion policy investment amounts to EUR 392 billion across the EU and represents almost a third of the overall EU budget, including around EUR 48 billion invested in line with REPowerEU objectives.

Graph A4.1: **Cohesion policy funds 2021-2027 in Estonia: budget by fund**

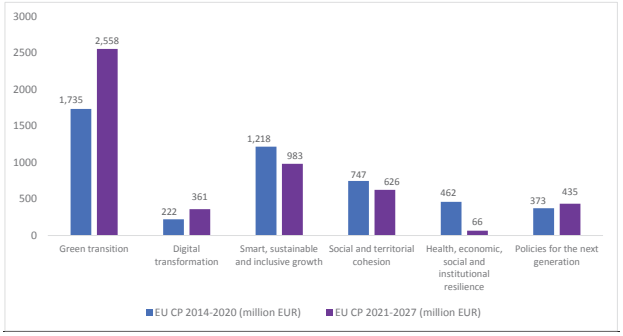


(1) million EUR in current prices, % of total; (total amount including EU and national co-financing)
Source: European Commission, Cohesion Open Data

In 2021-2027, in Estonia, cohesion policy programs ([12]) **will invest EUR 2.6 billion in the green transition and EUR 361 million in the digital transformation as part of the country's total allocation of EUR 5.2 billion.** In particular, the European Regional Development Fund (ERDF) will boost R&D, innovation and digitalisation by supporting more than 12 100 companies and ensuring that more than 290 enterprises are closely cooperating with research institutions. Energy efficiency investments will save energy and reduce heating costs for 32 000 dwellings. Particular attention should be paid to the greening of the economy, which is a priority in 2021-2027. The Just Transition Fund will enable further economic diversification and help create jobs in the Ida-Viru region. The fund will support the creation of 1 000 new jobs and will help Estonia fulfil its commitment to phase out oil shale in energy production by 2040 at the latest. Under the European Social Fund Plus (ESF+), Estonia allocated EUR 244 million to education and skills development, dedicating EUR 82 million to flexible re-skilling and upskilling measures. Benefits of this funding will include further developing the OSKA skills forecasting system, developing flexible study pathways and reforming the professional qualifications system.

Of the investments mentioned above, more than EUR 1 billion will be invested in line with the REPowerEU objectives. This is on top of the EUR 342 million dedicated to REPowerEU under the 2014-2020 budget**.** EUR 1 billion (2021-2027) and EUR 272 million (2014-2020) is for improving energy efficiency, and EUR 28 million (2021-2027) and EUR 70 million (2014-2020) is for renewable energy and low-carbon R&I.

Graph A4.2: **Synergy between Cohesion policy funds and RRP investment by RRF pillar in Estonia**



(1) million EUR in current prices (CP funds: total amount, including EU and national co-financing; RFF primary pillars)
Source: European Commission

In 2014-2020, cohesion policy funds made EUR 3.7 billion available to Estonia ([13]), with an absorption of 91% ([14]). Including national financing, the total investment amounted to EUR 4.9 billion - around 2.9% of GDP for 2014-2020.

Estonia continues to benefit from cohesion policy flexibility to support economic recovery, step up convergence and provide vital support to regions following the COVID-19 pandemic. The Recovery

([12]) European Regional Development Fund (ERDF), Cohesion Fund (CF), European Social Fund+ (ESF+), Just Transition Fund (JTF), excluding Interreg programmes. Total amount includes national and EU contributions. Data source: Cohesion Open Data.

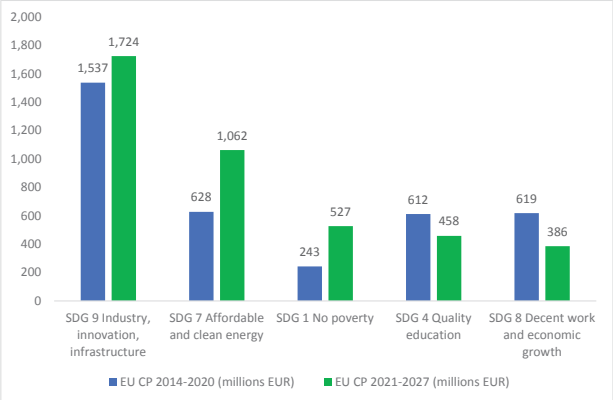
([13]) Cohesion policy funds include the ERDF, CF, ESF and the Youth Employment Initiative (YEI). ETC programmes are excluded here. According to the 'N+3 rule', the funds committed for 2014-2020 must be spent by 2023. REACT-EU is included in all figures. Data source: Cohesion Open Data.

([14]) 2014-2020 Cohesion policy EU payments by MS is updated daily on Cohesion Open Data.

Assistance for Cohesion and the Territories of Europe instrument (REACT-EU) ([15]) under NextGenerationEU provides EUR 207 million on top of the 2014-2020 cohesion policy allocation for Estonia. REACT-EU financed the vaccination of more than 869 000 people against COVID-19, the creation of 238 bedspaces for COVID-19 patients and the creation of 137 isolation rooms, making Estonian hospitals more pandemic-resilient. With SAFE (Supporting Affordable Energy), the 2014-2020 cohesion policy funds may also be mobilised by Estonia to support vulnerable households, jobs and companies particularly affected by high energy prices.

In both 2014-2020 and 2021-2027, cohesion policy funds have contributed substantially to the Sustainable Development Goals (SDGs). In 2021-2027, these funds support 11 of the 17 SDGs, notably SDG 9 'Industry, innovation and infrastructure' and SDG 7 'Affordable and clean energy' ([16]).

Graph A4.3: **Cohesion policy funds contribution to the SDGs in 2014-2020 and 2021-2027 in Estonia**



(1) 5 largest contributions to SDGs in million (EUR) current prices
Source: European Commission

Other EU funds provide significant support to Estonia. The common agricultural policy (CAP) made available EUR 2.2 billion in 2014-2022 and will keep supporting Estonia with EUR 1.4 billion in 2023-2027. The two CAP Funds (European Agricultural Guarantee Fund and European Agricultural Fund for Rural Development), contribute to the European Green Deal while ensuring long-term food security. They promote social, environmental and economic sustainability and innovation in agriculture and rural areas, in coordination with other EU Funds. The European Maritime and Fisheries Fund made EUR 101 million available to Estonia in 2014-2020 and the European Maritime, Fisheries and Aquaculture Fund makes EUR 97 million available in 2021-2027.

Estonia also benefits from other EU programmes, notably the Connecting Europe Facility, which under CEF 2 (2021-2027) has so far allocated EU funding of EUR 145.9 million to six specific projects on strategic transport networks, notably Rail Baltica, and strategic energy networks. Similarly, Horizon Europe has so far allocated nearly EUR 54 million for Estonian R&I on top of the EUR 274 million earmarked under the previous programme (Horizon 2020). The Public Sector Loan Facility established under the Just Transition Mechanism makes EUR 26.9 million of grant support from the Commission available for projects located in Estonia for 2021-2027, which will be combined with loans from the EIB, to support investments by public sector entities in just transition regions.

Estonia received support under the European instrument for temporary support to mitigate unemployment risks in an emergency (SURE) to finance short-time work schemes and similar measures to mitigate the impact of COVID-19. The Council granted financial assistance to Estonia of EUR 230 million in loans, which supported around 20% of workers and 13% of firms in 2020.

The Technical Support Instrument (TSI) supports Estonia in designing and implementing growth-enhancing reforms, including those set out in its recovery and resilience plan (RRP). Estonia has received significant support since 2017. Examples ([17]) include support to strengthen its financial management information system, to improve active labour market policies and to promote professional development of teachers and school leaders. The support also helped Estonia develop a draft transport and mobility plan.

([15]) REACT-EU allocation on Cohesion Open Data.

([16]) Other EU funds contribute to the implementation of the SDGs, in 2014-2022 this includes both the European Agricultural Fund for Rural Development (EARDF) and the European Maritime and Fisheries Fund (EMFF).

([17]) Country factsheets on reform support are available here.

This Annex illustrates Estonia's relative resilience capacities and vulnerabilities using the Commission's resilience dashboards (RDB) ([18]). Comprising a set of 124 quantitative indicators, the RDB provide broad indications of Member States' ability to make progress across four interrelated dimensions: social and economic, green, digital, and geopolitical. The indicators show vulnerabilities ([19]) and capacities ([20]) that can become increasingly relevant, both to navigate ongoing transitions and to cope with potential future shocks. To this end, the RDB help to identify areas that need further efforts to build stronger and more resilient economies and societies. They are summarised in Table A5.1 as synthetic resilience indices, which illustrate the overall relative situation for each of the four dimensions and their underlying areas for Estonia and the EU-27 ([21]).

According to the set of resilience indicators under the RDB, Estonia shows a similar but somewhat lower level of vulnerabilities compared to the EU average. Estonia has medium vulnerabilities in the green and geopolitical dimensions of the RDB and medium-low vulnerabilities in the social and economic and digital dimensions. Relative to the EU level, Estonia shows higher vulnerabilities related to 'sustainable use of resources', 'ecosystems, biodiversity, sustainable agriculture' and 'raw material and energy supply'. Estonian vulnerabilities are clearly lower compared to the EU in most areas in the digital and the social and economic dimensions, most notably in the areas 'digital for industry' and 'health, education and work'. Although Estonia faces higher challenges with respect to some health indicators ([22]), the lower vulnerabilities in this area are driven mainly by its below-average gender employment gap, and long-term unemployment rate.

Compared to the EU average, Estonia shows an overall similar level of capacities across all RDB indicators. While it has overall medium resilience capacities in the social and economic dimension, Estonia shows medium-high capacities in the green and geopolitical dimensions and high capacities in the digital dimension. Estonia has stronger capacities than the EU average related to the digitalisation of the personal or public space, in 'cybersecurity', 'raw material and energy supply' and 'sustainable use of resources'. However, there is room for improving capacities relative to the EU in, for example, the areas 'inequalities and social impact of the transitions' and 'financial globalisation'.

([18]) For details see https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en; see also 2020 Strategic Foresight Report (COM(2020) 493).

([19]) 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.

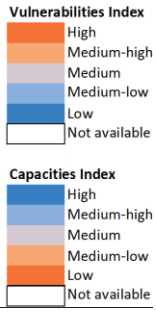
([20]) Capacities refer to enablers or abilities to cope with crises and structural changes and to manage the transitions.

([21]) 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.

([22]) For instance, its self-reported unmet need for medical care and the standardised preventable and treatable mortality rate are among the highest in Europe.

Table A5.1: **Resilience indices summarising the situation across RDB dimensions and areas**

Dimension/Area	Vulnerabilities		Capacities	
	EE	EU-27	EE	EU-27
Social and economic				
Inequalities and social impact of the transitions				
Health, education and work				
Economic & financial stability and sustainability				
Green				
Climate change mitigation & adaptation				
Sustainable use of resources				
Ecosystems, biodiversity, sustainable agriculture				
Digital				
Digital for personal space				
Digital for industry				
Digital for public space				
Cybersecurity				
Geopolitical				
Raw material and energy supply				
Value chains and trade				
Financial globalisation				
Security and demography				

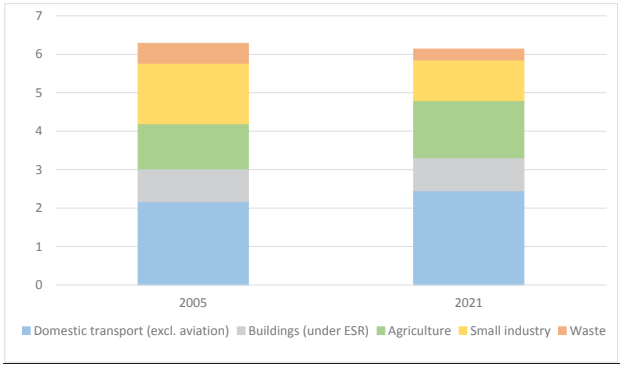


(1) Data are for 2021, and EU-27 refers to the value for the EU as a whole. Data underlying EU-27 vulnerabilities in the area 'value chains and trade' are not available as they comprise partner concentration measures that are not comparable with Member States' level values.
Source: JRC Resilience Dashboards - European Commission

Estonia's green transition requires continued action on several aspects including energy efficiency, sustainable mobility, and forest management. Implementation of the European Green Deal is underway in Estonia; this Annex provides a snapshot of the key areas involved ([23]).

Estonia has not yet defined all the climate policy measures it needs to reach its new 2030 climate target for the effort sharing sectors ([24]). Data for 2021 are expected to show that greenhouse gas emissions in these sectors have been slightly lower than Estonia's annual emission allocations ([25]). Current policies in Estonia are projected to reduce these emissions by -12% relative to 2005 levels in 2030. This reduction is not sufficient to reach the effort sharing target even before the target was raised to meet the EU's 55% emissions reduction objective. Additional measures tabled would bring a sharper reduction in emissions of -14%, surpassing the current target but not reaching Estonia's new effort sharing target for reductions of 24% ([26]). With the revised recovery and resilience plan (RRP) and its dedicated REPowerEU chapter, Estonia will allocate over 60% of its Recovery and Resilience Facility grants to key reforms and investments to attain climate objectives ([27]).The national strategy 'Estonia 2035' aims to achieve climate neutrality and climate-neutral energy production by 2050.

Graph A6.1: **Thematic – greenhouse gas emissions from the effort sharing sectors in Mt CO2eq, 2005-2021**



Source: European Environmental Agency.

Estonia's land use, land-use change and forestry (LULUCF) sector has recently shifted from net removals to net emissions; Estonia is not on track to meet its 2030 LULUCF removal target. Estonia's LULUCF sector has degraded sharply, from net removals of 4 835 $ktCO_2e$ in 2010 to net emissions of 1 297 kt CO_2eq in 2020. This is due to the capacity for carbon removals in forests significantly declining over the past 10 years. Improved forest management and wetland restoration would help Estonia reach its LULUCF target that implies removing 2 545 kt CO_2eq in 2030 (see Table A6.1) ([28]).

In 2021, oil products still represented more than half of Estonia's energy mix, **while renewables share of the gross inland consumption has stalled.** In 2021, oil shale accounted for 58% of the Estonian energy mix, a decrease of 5 points since 2019. Renewable energy share of the energy mix has been stable between 2020 and 2021, with

([23]) The overview in this Annex is complemented by the information provided in Annex 7 on energy security and affordability, Annex 8 on the fair transition to climate neutrality and environmental sustainability, Annex 9 on resource productivity, efficiency and circularity, Annex 11 on innovation, and Annex 19 on taxation.

([24]) Member States' greenhouse gas emission targets for 2030 ('effort sharing targets') were increased by Regulation (EU) 2023/857 (the Effort Sharing Regulation) amending Regulation (EU) 2018/842, aligning the action in the concerned sectors with the objective to reach EU-level, economy-wide greenhouse gas emission reductions of at least 55% relative to 1990 levels. The Regulation sets national targets for sectors outside the current EU Emissions Trading System, notably: buildings (heating and cooling), road transport, agriculture, waste, and small industry. Emissions covered by the EU ETS and the Effort Sharing Regulation are complemented by net removals in the land use sector, regulated by Regulation (EU) 2018/841 (the Land Use, Land Use Change and Forestry (LULUCF) Regulation) amended by Regulation (EU) 2023/839.

([25]) Estonia's annual emission allocations for 2021 were some 6.2 Mt CO_2eq, and its approximated 2021 emissions were at 6.1 Mt (see European Commission, *Accelerating the transition to climate neutrality for Europe's security and prosperity: EU Climate Action Progress Report 2022*, SWD(2022)343).

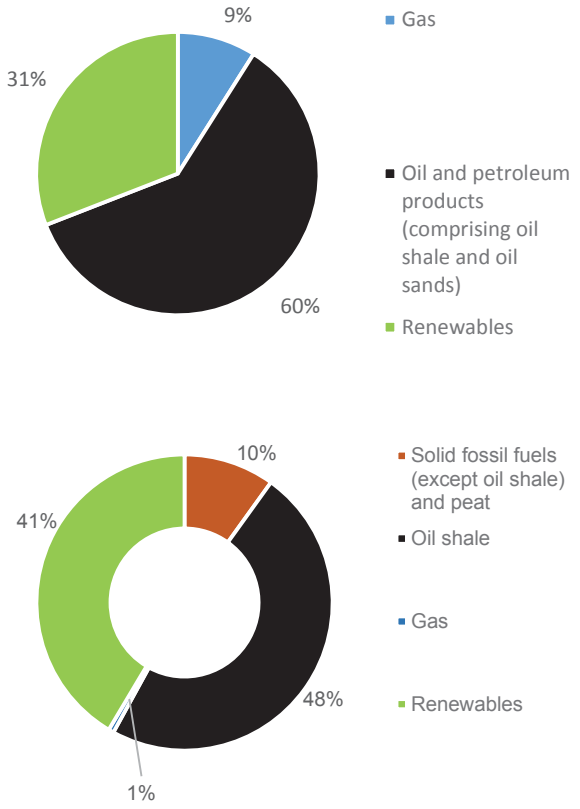
([26]) See the information on the distance to the 2030 climate policy target in Table A6.1. Existing and additional measures as at 15 March 2021.

([27]) For example, investments in sustainable transport, with a further electrification of the railway network and in energy efficiency, with the renovation of the building stock. For REPowerEU, see Annex 7.

([28]) This value is indicative and will be updated in 2025 (as mandated by Regulation (EU) 2023/839).

respectively 30 and 29%. Natural gas and oil (not accounting for oil shale) completes the energy mix, with stable contributions of 9% and 4% respectively. Besides the high carbon intensity of the Estonian energy mix, due to high oil shale consumption, oil-shale mining causes dire environmental damages, such as groundwater contamination. Estonia has committed to phasing out the use of oil shale in power generation by 2035.

Graph A6.2: **Energy mix (top) and Electricity mix (bottom), 2021**



The energy mix is based on gross inland consumption, and excludes heat and electricity. The share of renewables includes biofuels and non-renewable waste.
Source: Eurostat

Renewable energies represent an increasing share of Estonia's energy gross final consumption. Between 2020 and 2021, the share of Estonia's gross final consumption of energy from renewable sources rose from 30% to 38%. However, this increase stems from both the change in calculation method (Renewable Energy Directive methodology) and statistical transfers in 2020 (See Annex 7). Estonia's target of 42% share of energy from renewable sources in gross final energy consumption by 2030 included in the NECP was considered sufficiently ambitious. Estonia will need to strengthen its renewable energy target in the updated NECP to reflect more ambitious EU climate and energy targets in the Fit for 55 Package and in the REPowerEU Plan. Such a strengthening of the Estonia NECP could reflect the ambitious national objective set in 2022 of 100% of renewables in the gross final consumption of electricity by 2030 but should not be made at the expenses of increased emissions in the LULUCF sector. The Estonian RRP notably incentivises the uptake of renewable energy and aims to address grid stability and capacity challenges and will be reinforced with the REPowerEU chapter.

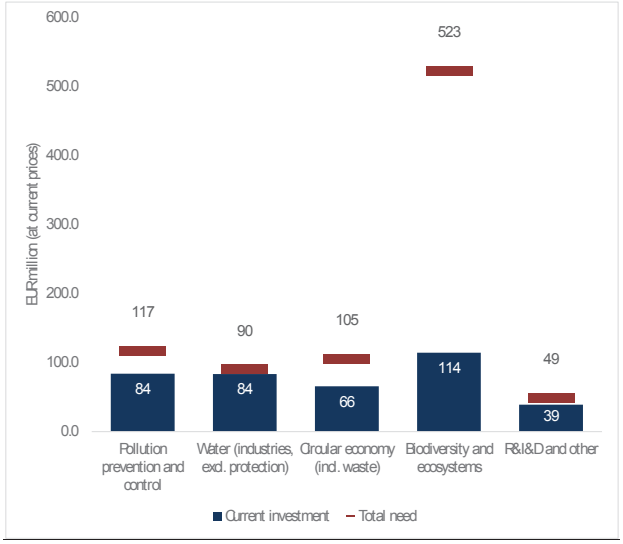
Energy efficiency is a central component of the Estonian energy transition. Estonia's targets for primary and final energy consumption (PEC and FEC) laid down in its national energy and climate plan were considered of modest and very low ambition respectively in the 2020 Commission assessment. Based on the energy consumption trajectory for 2018-2021, Estonia is expected to be on track to meet its 2030 target for PEC as well as its 2030 target for FEC, as these were notified in its NECP ([29]). Estonia's long-term renovation strategy estimates that 141 000 buildings – about 54 million m² - need renovation within 30 years. Estonia aims to renovate 3 % of the floor area of public buildings per year, about 170 000 m2 by 2030, and to increase the energy efficiency of residential buildings and offices. Estonia's recovery and resilience plan includes support for the renovation of apartment buildings and private residences.

Estonia's transition to sustainable mobility proceeds slowly. As the country has one of the lowest shares of railway electrification in the EU (11.8% in 2020), transport priorities are focusing on investments related to electrification of railways and eliminating bottlenecks in the development of the rail transport. Electric passenger cars only make

([29]) After the conclusion of the negotiations for a recast EED, the ambition of both the EU and national targets as well as of the national measures for energy efficiency to meet these targets is expected to increase

up a very small share of new registrations (around 3.2% in 2021), while the density of electric charging points is adequate in relation to the existing number of registered electric vehicles. Estonia's RRP includes some investments in sustainable transport, but the modal shift is yet to take off in Estonia. The national transport and mobility masterplan in line with 'Estonia 2035' strategy aim to reduce the greenhouse gas emissions of the transport sector by 30 % relative to 2018 and increase the share of commuters using public transport, cycling, or walking from 39 % in 2019 to 55 % by 2035. In 2021, Estonia has reported the largest rail freight transport decrease compared to 2011 (-66.1 %), mainly due to the decline in the transit of Russian oil products and domestic oil shale transport. On air quality, Estonia performs well for the most part: air pollution decreased significantly during the shift away from oil shale. However, pollution through emissions from large combustion plants remains to be addressed.

Graph A6.3: **Thematic – environmental investment needs and current investment, p.a. 2014-2020**



Source: European Commission.

Estonia would benefit from investing more in environmental protection and in measures addressing pollution and protecting biodiversity ([30]). Between 2014 and 2020, environmental investment needs were estimated to be at least EUR 884 million while investment stood at about EUR 387 million, leaving a gap of at least EUR 497 million, per year, with unmet investment needs for biodiversity and ecosystems accounting for 78% of the overall gap (see Graph A6.3) ([31]). For the Natura 2000 network ([32]), Estonia has designated all sites of community importance as special areas of conservation, but still needs to set conservation objectives for the sites and measures, improve the way semi-natural grasslands and forests are managed, and step up the protection and assessment requirements to meet its obligations under the Habitats Directive. Up to 2030, the additional cumulative investment need for Estonia over baseline levels is estimated at EUR 361 million, with around 90% concerning wastewater. Estonia has the potential to rely more on environmental taxes to internalise the cost of air pollution and to limit water pollution ([33]) (see Annex 19).

Climate change is likely to affect several sectors in Estonia, implying adaptation challenges ([34]). The rises in temperature, precipitation, and the sea level, as well as extreme weather phenomena accompanied by coastal and inland floods, wildfires, and new pathogens, are expected to affect the country's population, forests, infrastructure, coastal facilities, and the building stock. The development plan for climate change adaptation until 2030 sets the basis for increasing awareness, readiness, and capacity to adapt to these effects. Priority should be given to measures targeted at densely populated coastal areas and areas around inland water bodies, and forests, which could be affected the most by climate change.

Estonia provides fossil fuel and other environmentally harmful subsidies that

([30]) Environmental objectives include pollution prevention and control, water management and industries, circular economy and waste, biodiversity and ecosystems (European Commission, 2022, Environmental Implementation Review, country report Estonia).

([31]) When also accounting for needs estimated at EU level only (e.g. water protection, higher circularity, biodiversity strategy).

([32]) In 2021, Estonia had 20.9% terrestrial protected areas (Natura 2000 and nationally designated areas), against the EU average of 26.4% (European Environment Agency, 2023, Natura 2000 Barometer).

([33]) European Commission, 2021, Green taxation and other economic instruments – Internalising environmental costs to make the polluter pay, Ensuring that polluters pay.

([34]) Republic of Estonia Ministry of the Environment: Climate change adaptation development plan until 2030.

could be considered for reform in the medium-term, while ensuring food and energy security and mitigating social effects. Environmentally harmful subsidies have been identified, via an initial assessment, in the agriculture, forestry and fishing, electricity, gas, steam and air conditioning, transportation and storage, mining and quarrying, manufacturing and services sectors. Examples of such subsidies include the energy tax relief for companies in agriculture and forestry for gas oil, the reduced energy tax rate for light fuel oil used in mobile machinery, the excise duty exemptions on diesel used for agricultural, fishing, aquaculture and navigation purposes or the excise tax exemption and tax relief for natural gas for industrial consumers ([35]). In 2021, Estonia's national audit office already developed an overview of the subsidies that may conflict with national environmental policy objectives. Estonia could build on this mapping to prioritise candidates for reform.

([35]) Fossil fuel figures in EUR of 2021 from the 2022 State of the Energy Union report. Initial assessment of environmentally harmful subsidies done by the Commission in the 2022 toolbox for reforming environmentally harmful subsidies in Europe, using OECD definitions, and based on the following datasets: OECD Agriculture Policy Monitoring and Evaluations; OECD Policy Instruments for the Environment (PINE) Database; OECD Statistical Database for Fossil Fuels Support; IMF country-level energy subsidy estimates. Annex 4 of the toolbox contains detailed examples of subsidies on the candidates for reform.

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

									'Fit for 55' 2030 target/value	Distance WEM	Distance WAM
			2005	2017	2018	2019	2020	2021			
Progress to policy targets	Greenhouse gas emission reductions in effort sharing sectors [1]	Mt CO_2eq; %; pp	5.4	14%	13%	14%	9%	-	-24%	-12	-10
	Net carbon removals from LULUCF [2]	kt CO_2eq	-2,754	270	2,257	1,149	2,509	2,883	-2545	n/a	n/a
			2005	2017	2018	2019	2020	2021	National contribution to 2030 EU target		
	Share of energy from renewable sources in gross final consumption of energy [3]	%	17%	30%	30%	32%	30%	38%	42%		
	Energy efficiency: primary energy consumption [3]	Mtoe	5.3	5.8	5.6	4.7	4.3	4.5	5.4		
	Energy efficiency: final energy consumption [3]	Mtoe	2.9	2.9	3.0	2.9	2.8	2.8	2.9		
			Estonia						EU		
			2016	2017	2018	2019	2020	2021	2019	2020	2021
Fiscal and financial indicators	Environmental taxes (% of GDP)	% of GDP	3.0	2.9	2.8	3.2	2.5	2.3	2.4	2.2	2.2
	Environmental taxes (% of total taxation) [4]	% of taxation	8.9	8.7	8.3	9.6	7.2	6.8	5.9	5.6	5.5
	Government expenditure on environmental protection	% of total exp.	1.5	1.9	1.9	1.7	1.5	1.3	1.7	1.6	1.6
	Investment in environmental protection [5]	% of GDP	0.5	0.5	0.7	0.4	-	-	0.4	0.4	0.4
	Fossil fuel subsidies [6]	EUR2021bn	0.1	0.0	0.0	0.0	0.0	0.0	53.0	50.0	-
	Climate protection gap [7]	score 1-4					1.1	0.8			1.5
Climate	Net greenhouse gas emissions	1990 = 100	49.0	52.0	50.0	36.0	28.0	33.0	76.0	69.0	72.0
	Greenhouse gas emission intensity of the economy	kg/EUR10	1.15	1.15	1.05	0.74	0.60	-	0.31	0.30	-
	Energy intensity of the economy	kgoe/EUR10	0.34	0.31	0.29	0.23	0.23	-	0.11	0.11	-
Energy	Final energy consumption (FEC)	2015=100	101.4	102.4	105.6	103.3	98.2	101.1	102.9	94.6	-
	FEC in residential building sector	2015=100	108.5	109.7	109.7	111.0	110.2	112.6	101.3	101.3	106.8
	FEC in services building sector	2015=100	107.1	100.3	105.3	99.2	100.4	110.0	100.1	94.4	100.7
Pollution	Smog-precursor emission intensity (to GDP) [8]	tonne/EUR10	3.8	3.7	3.3	2.3	2.0	-	0.9	0.9	-
	Years of life lost due to air pollution by PM2.5	per 100.000 inh.	117.9	64.0	202.0	70.8	51.8	-	581.6	544.5	-
	Years of life lost due to air pollution by NO_2	per 100.000 inh.	24.9	8.7	12.1	16.0	<1	-	309.6	218.8	-
	Nitrates in ground water	mg NO_3/litre	4.6	4.2	4.8	5.0	5.5	-	21.0	20.8	-
Biodiversity	Land protected areas	% of total	16.2	20.1	-	20.8	20.8	20.9	26.2	26.4	26.4
	Marine protected areas	% of total	18.5	-	-	18.6	-	18.7	10.7	-	12.1
	Organic farming	% of total utilised agricultural area	18.0	20.0	21.0	22.3	22.4	23.0	8.5	9.1	-
			2017	2018	2019	2020	2021	2021	2020	2021	2022
Mobility	Share of zero-emission vehicles [9]	% in new registrations	0.1	0.4	0.3	1.9	2.3	3.4	5.4	8.9	10.7
	Number of AC/DC recharging points (AFIR categorisation)		-	-	-	192	198	275	188626	330028	432518
	Share of electrified railways	%	12.8	12.8	13.4	n/a	n/a	11.8	56.6	n/a	56.6
	Hours of congestion per commuting driver per year		19.4	18.1	18.0	17.3	n/a	n/a	28.7	n/a	n/a

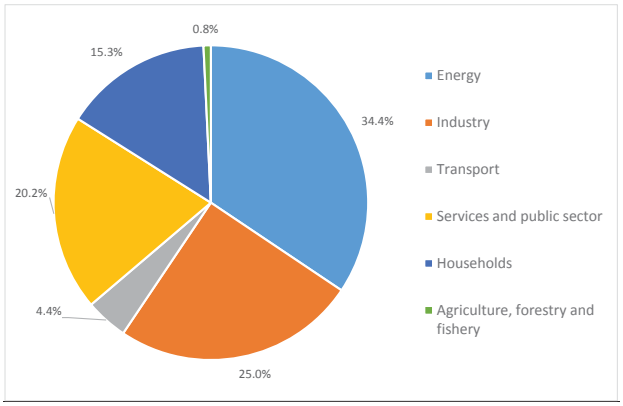
Sources: (1) Historical and projected emissions, as well as Member States' climate policy targets and 2005 base year emissions under the Effort Sharing Decision (for 2020) are measured in global warming potential (GWP) values from the 4th Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC). Member States' climate policy targets and 2005 base year emissions under the Effort Sharing Regulation (for 2030) are in GWP values from the 5th Assessment Report (AR5). The table above shows the base year emissions 2005 under the Effort Sharing Decision, using AR4 GWP values. Emissions for 2017-2021 are expressed in percentage change from 2005 base year emissions, with AR4 GWP values. 2021 data are preliminary. The table shows the 2030 target under Regulation (EU) 2023/857 that aligns it with the EU's 55% objective, in percentage change from 2005 base year emissions (AR5 GWP). Distance to target is the gap between Member States' 2030 target (with AR5 GWP values) and projected emissions with existing measures (WEM) and with additional measures (WAM) (with AR4 GWP values), in percentage change from the 2005 base year emissions. Due to the difference in global warming potential values, the distance to target is only illustrative. The measures included reflect the state of play as of 15 March 2021.
(2) Net removals are expressed in negative figures, net emissions in positive figures. Reported data are from the 2023 greenhouse gas inventory submission. 2030 value of net greenhouse gas removals as in Regulation (EU) 2023/839 amending Regulation (EU) 2018/841 (LULUCF Regulation) – Annex IIa, kilotons of CO2 equivalent, based on 2020 submissions.
(3) Renewable energy and energy efficiency targets and national contributions are in line with the methodology established under Regulation (EU) 2018/1999 (Governance Regulation).
(4) Percentage of total revenue from taxes and social contributions (excluding imputed social contributions). Revenue from the EU Emissions Trading System is included in environmental tax revenue.
(5) Expenditure on gross fixed capital formation for the production of environmental protection services (abatement and prevention of pollution) covering government, industry, and specialised providers.
(6) European Commission, Study on energy subsidies and other government interventions in the European Union, 2022 edition.
(7) The climate protection gap refers to the share of non-insured economic losses caused by climate-related disasters. This indicator is based on modelling of the current risk from floods, wildfires and windstorms as well as earthquakes, and an estimation of the current insurance penetration rate. The indicator does not provide information on the split between the private/public costs of climate-related disasters. A score of 0 means no protection gap, while a score of 4 corresponds to a very high gap (EIOPA, 2022).
(8) Sulphur oxides (SO2 equivalent), ammonia, particulates < 10 µm, nitrogen oxides in total economy (divided by GDP).
(9) Battery electric vehicles (BEV) and fuel cell electric vehicles (FCEV).

Before Russia invaded Ukraine, Estonia was highly dependent on Russian gas and refined oil, even though gas represented a relatively small share of its energy, amounting to 8% in 2021. Estonia has acted to reduce the curtailment risks after it stopped buying Russian gas, notably by cooperating with Finland and benefiting from the Finnish Inkoo terminal, as well by extremely reducing the national natural gas consumption by 36% between August 2022 and March 2023 compared to the previous 5-years average. This Annex ([36]) sets out the actions carried out by Estonia to achieve the REPowerEU objectives, including through the implementation of its recovery and resilience plan, in order to improve energy security and affordability while accelerating the clean energy transition, and contributing to enhancing the EU's competitiveness in the clean energy sector ([37]) .

Diversification of Estonia's gas supply presented a challenge, but the country has strengthened its security of supply in cooperation with Finland through the Inkoo FSRU. Estonia has acted to reduce the curtailment risks after it stopped buying Russian gas, notably by cooperating with Finland and securing access to the new Finnish Inkoo LNG terminal, which went online in early January 2023, which had been assessed as of significant importance in Annex 3 of the REPowerEU Communication. Estonia does not operate a gas storage facility but has access to the Latvian Incukalns facility.

The security of supply of the gas system and the one of the electricity system are loosely interlinked, as electricity generated from gas represents less than 1% of electricity generated overall in 2021, and Estonia is one of the most energy independent Member States. However, the Estonian energy network, similarly to other Baltic states, is exposed, as its electricity grid is synchronised with the BRELL power grid (Russia and Belarus). Estonia has adopted demand response measures, particularly through communication campaigns on energy savings. These target customers, while digital solutions allow them to better monitor their consumption. Estonia also rolled out supply side measures and allowed a few combined heat and power plants to switch from natural gas to the domestically produced shale oil under strict conditions for the 2022-2023 heating season.

Graph A7.1: **Share of gas consumption per sector in Estonia, 2021**



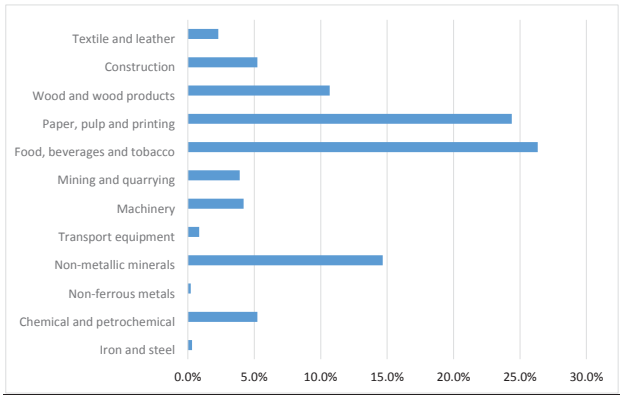
Source: Eurostat

Estonia is accelerating its green transition, but further infrastructure investments and acceleration of renewables permitting would allow it to accommodate a higher share of renewable electricity, strengthening energy independence. As part of its recovery and resilience plan, Estonia supports green hydrogen roll-out, energy efficiency and the renovation of private buildings, the development of its energy networks and infrastructure, as well as the green transition in businesses through the development of green skills. However, to ensure the unrolling of renewables, investments and reforms are needed to further remove barriers. Increasing commitments and investments in energy efficiency and renovation investments are critical for Estonia to achieve further energy security while addressing energy poverty.

([36]) It is complemented by Annex 6 as the European Green Deal focuses on the clean energy transition, by Annex 8 on the actions taken to mitigate energy poverty and protect the most vulnerable ones, by Annex 9 as the transition to a circular economy will unlock significant energy and resource savings, further strengthening energy security and affordability, and by Annex 12 on industry and single market complementing ongoing efforts under the European Green Deal and REPowerEU.

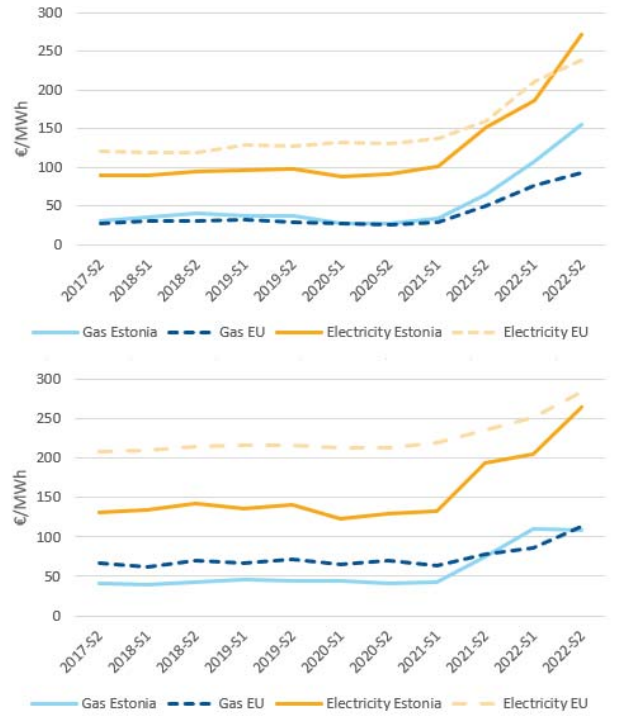
([37]) in line with the Green Deal Industrial Plan COM(2023) 62 final, and the proposed Net-Zero Industry Act COM(2023) 161 final

Graph A7.2: **Gas consumption per industrial sector, 2021 (% of total gas consumption in industry)**



Source: Eurostat

Graph A7.3: **Estonia´s retail energy prices for industry (top) and households (bottom)**



1) On electricity, the band consumption is DC for households and ID for industry
(2) On gas, the band consumption is D2 for households and I4 for industry
Source: Eurostat

Despite the mechanisms introduced by Estonia to mitigate the effects of the energy crisis, it is still impacted by high energy prices. Electricity retail prices for households in the country increased 98% at the end of 2022 compared to December 2021. The surge in energy prices has had a considerable impact on Estonian industry, which accounted for 25% of gas consumption in the country in 2021 (see Graph A7.1). Sectors such as the food industry, paper and non-metallic minerals are highly exposed to energy shocks and are experiencing growing pressure to either raise their prices to safeguard margins or reduce production due to the high share of energy consumption. The distributional impact of these energy prices is covered further in Annex 8.

Estonia has high ambitions to transform its energy system, having committed to a new renewable electricity target of 100% by 2030, and deployed new electricity production capacity from renewables in 2021. Its deployment of renewable energy reached a total of 915 MW in 2021, increasing by 25% compared to 2020. This growth comes mostly from solar, whose installed capacity almost doubled from 2020 to 2021 (For the share of renewables in the gross electricity production, see Annex 6). In 2022, Estonia deployed an additional 166 MW of renewable energy capacity (Source: IRENA renewables capacity statistics, 2023). There are no offshore wind farms in Estonia for the time being, and the development of onshore wind has been stagnant over the last decade. However, a wind energy benefit scheme for local authorities and residents was recently introduced to facilitate project development. A successful tender for renewable energy generation concluded in 2022, and additional tenders are planned for the next 3 years. The government is also planning to review the permit-granting procedures of renewable energy projects in order to speed up their implementation (see Annex 12 on the aspect of permit-granting). Estonia is cooperating with Latvia on a joint 1 GW offshore wind farm that will contribute significantly to the total electricity generation of the Baltics.

On research and innovation (R&I) investment in the EU's Energy Union priorities ([38]), Estonia shows a downward trend in public and private R&I investment., Public R&I investment decreased from 0.020% in 2014 to 0.005% in 2021 (as a share of GDP), even though this figure includes a significant increase in public R&I investment in the Smart system priority (55.4% in 2021 compared to 34.6% in 2014). Private R&I

([38]) Renewables, smart systems, efficient systems, sustainable transport, carbon capture, utilisation and storage, and nuclear safety, COM(2015) 80 final (Energy Union Package).

investment decreased from 0.07% in 2014 to 0.01% in 2019 (as a share of GDP). As a positive trend, in 2021, venture capital investment ([39]) in climate tech start-ups and scale-ups accounted for 2.1% of the total venture capital investment, a significant increase compared to 2020 (0.2%)). In 2021, 63.2% of the EUR 23.1 million of venture capital invested in climate tech start-ups and scale-ups was in the Energy – Generation & Grid Tech domain.. Regarding market surveillance activities, based on information provided through the relevant reporting mechanisms, Estonia is not carrying out checks on products covered by ecodesing and energy labelling. This raises serious concerns with respect to the enforcement of market surveillance obligations and the compliance levels of the concerned products, level playing field among economic operators, missed energy and CO2 savings and consumer trust.

([39]) Venture Capital investments include Venture Capital deals (all stages) and Private Equity Growth/Expansion deals (for companies that have previously been part of the portfolio of a VC investment firm).

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

		ESTONIA				EU			
		2018	2019	2020	2021	2018	2019	2020	2021
ENERGY DEPENDENCE	**Import Dependency [%]**	1%	5%	11%	1%	58%	61%	57%	56%
	of Solid fossil fuels	85%	107%	392%	95%	44%	44%	36%	37%
	of Oil and petroleum products	85%	130%	130%	55%	95%	97%	97%	92%
	of Natural Gas	100%	100%	100%	100%	83%	90%	84%	83%
	Dependency from Russian Fossil Fuels [%]								
	of Hard Coal	100%	100%	100%	83%	40%	44%	49%	47%
	of Crude Oil	0%	0%	0%	0%	30%	27%	26%	25%
	of Natural Gas	100%	99%	46%	11%	40%	40%	38%	41%

		2015	*2016*	2017	2018	2019	2020	2021	2022
ELECTRICITY	**Gross Electricity Production (GWh)**	10,149	12,170	13,160	12,364	7,616	6,078	7,204	-
	Combustible Fuels	9,407	11,531	12,397	11,682	6,836	4,959	6,095	-
	Nuclear	0	0	0	0	0	0	0	-
	Hydro	27	35	26	15	19	30	23	-
	Wind	715	594	723	636	687	844	733	-
	Solar	0	10	14	31	74	245	354	-
	Geothermal	0	0	0	0	0	0	0	-
	Other Sources	0	0	0	0	0	0	0	-
	Net Imports of Electricity (GWh)	-925	-2,037	-2,734	-1,897	2,157	3,644	2,629	-
	As a % of electricity available for final consumption	-12%	-27%	-35%	-23%	26%	42%	30%	-
	Electricity Interconnection (%)	-	-	63.2%	69.0%	67.6%	67.6%	83.4%	85.8%

		2015	2016	2017	2018	2019	2020	2021	2022*
DIVERSIFICATION OF GAS SUPPLIES	**Gas Consumption (in bcm)**	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4
	Gas Imports - by type (in bcm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-
	Gas imports - pipeline	0.5	0.5	0.5	0.5	0.5	0.4	0.5	-
	Gas imports - LNG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	Gas Imports - by main source supplier (in bcm) (1)				-				
	Latvia	0.0	0.0	0.0	0.0	0.0	0.2	0.4	-
	Russia	0.5	0.5	0.5	0.5	0.5	0.2	0.1	-
	Lithuania	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	Finland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
	Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-

		2019	2020	2021	2022
DIVERSIFICATION OF GAS SUPPLIES	**LNG Terminals**				
	Number of LNG Terminals (2)	0	0	0	1
	LNG Storage capacity (m3 LNG)	0	0	0	68,000
	Underground Storage				
	Number of storage facilities	0	0	0	0
	Operational Storage Capacity (bcm)	0	0	0	0

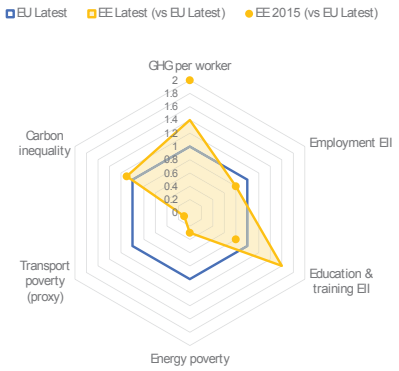
		2019	2020	2021	2022
CLEAN ENERGY	**VC investments in climate tech start-ups and scale-ups (EUR Mln) (3)**	0.1	0.6	23.1	n.a.
	as a % of total VC investments in Estonia	0.0%	0.2%	2.2%	n.a.
	Research & Innovation spending in Energy Union R&i priorites				
	Public R&I (EUR mln)	4.0	3.2	1.5	n.a.
	Public R&I (% GDP)	0.015%	0.012%	0.005%	n.a.
	Private R&I (EUR mln)	0.0	n.a.	n.a.	n.a.
	Private R&I (% GDP)	n.a.	n.a.	n.a.	n.a.

(1) The ranking of the main supliers is based on the latest available figures (for 2021)
(2) includes FSRU in Inkoo (FI) contracted in cooperation between EE and FI
(3) Venture Capital investments include Venture Capital deals (all stages) and Private Equity Growth/Expansion deals (for companies that have previously been part of the portfolio of a VC investment firm).
Source: Eurostat, Gas Infrastructure Europe (Storage and LNG Transparency Platform), JRC SETIS (2022), JRC elaboration based on PitchBook data (06/2022)

ANNEX 8: FAIR TRANSITION TO CLIMATE NEUTRALITY

This Annex monitors Estonia's progress in ensuring a fair transition towards climate neutrality and environmental sustainability, notably for workers and households in vulnerable situations. The number of workers in energy-intensive industry participating in education and training has risen significantly from 8.6% in 2015 to 12.1% in 2021. Skills for the green transition, in line with the Council Recommendation on ensuring a fair transition towards climate neutrality ([40]), support a fair transition and the implementation of REPowerEU. Estonia's recovery and resilience plan (RRP) outlines crucial reforms and investment for a fair green transition ([41]), complementing the territorial just transition plans and projects supported by the European Social Fund Plus (ESF+).

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



Source: Eurostat, EMPL-JRC GD-AMEDI/AMEDI+ projects and World Inequality Database (see Table A8.1).

Employment in Estonia's sectors most affected by the green transition remains stable, while the green economy is expanding. The greenhouse gas (GHG) emissions intensity of Estonia's workforce declined from 27.9 to 18.7 tonnes per worker between 2015 and 2021, above the EU average of 13.7 tonnes (see Graph A8.1 and Table A8.1). Employment in Estonia's energy-intensive industries (EII) represented a share of 2.5% of total employment in 2020: 2.5% vs 3.0% in the. But employment in mining and quarrying increased by 4.6% since 2015 (to around 4 000 workers). The transition away from oil shale for energy production creates a risk for 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 region are oil shale companies), both in terms of their turnover and due to their impact on other companies. The shrinking of the oil shale sector thus has an impact on the effective functioning of the whole region. ([42]) On the other hand, total jobs in the environmental goods and services sector grew by 4.1% (to 31 421) during 2015-19 (EU: +8.3%), reaching 4.9% of total employment (EU average 2.2%, see Annex 9 for circular jobs specifically). The job vacancy rate is relatively low at 2.0%, including in construction, a key sector for the green transition (1.4% vs 4.0% in EU) ([43]). As from 2021, ESF+ will offer active labour market measures in regions with high unemployment, taking into account the regional situation and climate objectives.

Upskilling and reskilling in declining and transforming sectors has increased. In energy-intensive industries, workers' participation in education and training has increased from 8.6% in 2015 to 16.3% in 2022 and is above the EU average (10.4%). But 36% of citizens believe they do not have the necessary skills to contribute to the green transition (EU: 38%) ([44]) (cf. Annex 15). Investment under the RRP and the Just Transition Plan includes measures to mitigate the social and employment impact of this transition, including retraining and upskilling programmes for workers in the oil shale industry and effective job transition measures (see Annex 14). ESF+ will integrate the development of green skills into the labour market, education and training measures, and this helps to increase the attractiveness and people's awareness of study fields related to green and digital change.

Energy poverty indicators have remained relatively stable and below EU average, but the spike in energy prices can aggravate the situation. In 2021, the share of the total

([40]) 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

([41]) See 2022 Country Report (Annex 6) and Annex 3 for an overview.

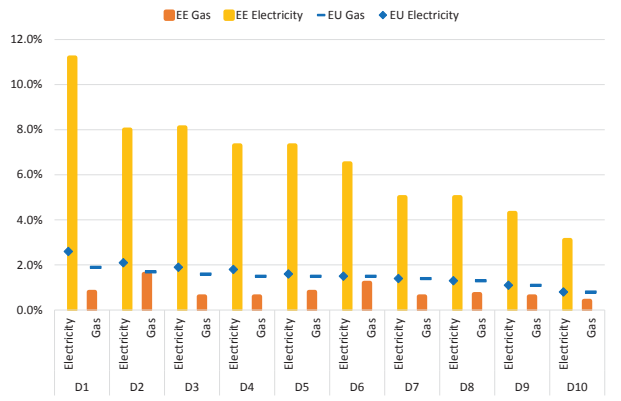
([42]) See report on oil shale industry from Praxis think tank: Adaptation of Ida-Virumaa county's economy and labor market to the reduction of oil shale industry | Praxis

([43]) Eurostat (JVS_A_RATE_R2)

([44]) Special Eurobarometer 527. Fairness perceptions of the green transition (May – June 2022).

population unable to keep their homes adequately warm dropped back to the levels of 2015 (2.0%) (well below the EU average of 6.9% in 2021) ([45]). In particular, the share of the at-risk-of-poverty population unable to keep their homes adequately warm dropped from 6.1% in 2015 to 3.2% in 2021 (EU average 16.4% in 2021). At the same time, 2% of lower middle-income households (in income deciles 4-5) were in this situation in 2021 (EU: 8.2% in 2021). Before the energy price hikes, an estimated 42.8% of the total population and 76.3% of the (expenditure-based) at-risk-of-poverty (AROP) population had expenditure shares on electricity, gas, and (heating) oil ([46]) above 10% of their household budget (well above the estimated EU average of 26.9% and 48.2%, respectively). Already in December 2021, half of the total rise in prices in the consumer basket came from energy, as prices for electricity and gas were more than 120% higher than a year earlier, pushing heating prices up 40%.

Graph A8.2: **Distributional impacts of energy prices due to rising energy expenditure (2021-2023)**



Mean change of energy expenditure as a percentage (%) of total expenditure per income decile (D) due to observed price changes (August 2021 – January 2023 relative to the 18 months prior), excl. policy support and behavioural responses.
Source: EMPL-JRC GD-AMEDI/AMEDI+ projects, based on Household Budget Survey 2015 and Eurostat inflation data for CP0451 and CP0452.

The record energy prices affected inflation, which was one of the highest in the EU in 2022. The increased energy prices in 2021-2023 have negatively affected households' budgets, in particular for low-income groups. As a result of energy price changes during the August 2021 to January 2023 period relative to the 18 months prior (cf. Annex 7), in the absence of policy support and behavioural responses, the share of individuals living in households which spend more than 10% of their budget on energy would have increased by 30.5 percentage points (pps) for the whole population and by 15.2 pps among the (expenditure-based) AROP population (EU-level increases by 16.4 pps and 19.1 pps, respectively) ([47]). Expenditure shares of low and lower-middle income groups would have increased the most, in particular for electricity compared to EU-average effects, as shown in Graph A8.2. Among the (expenditure-based) AROP population, the share of individuals living in households with budget shares for private transport fuels ([48]) above 6% would have increased by 0.7 pps (EU average: 5.3 pps) due to the increase in transport fuel prices and was relatively low at 4.4% in January 2023 (vs 37.1% in the EU). The RRP supports the green transition of companies by encouraging the uptake of green technologies through knowledge transfer, the organisation of proficiency training programmes in higher education and vocational education and training, and upskilling and reskilling.

Access to public transport displays an urban-rural divide. Citizens perceive public transport to be relatively available (63% vs 55% in the EU), affordable (72% vs 54% in the EU) and of good quality (74% vs 60% in the EU). As regards these perceptions, rural areas in Estonia perform worse than urban areas, yet still better when compared to rural areas in the EU overall ([49]). The average carbon footprint of the top 10% of emitters among the population in Estonia is about 5.5 times higher than that of the bottom 50% (see Graph A8.1), i.e. slightly more pronounced than the EU average (5.0 times).

([45]) 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.

([46]) Products defined according to the European Classification of Individual Consumption according to Purpose (ECOICOP): CP045.

([47]) EMPL-JRC GD-AMEDI/AMEDI+ ; see details in the related technical brief.

([48]) ECOICOP: CP0722.

([49]) EU (rural): 46%, 48%, 56% respectively. Special Eurobarometer 527.

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

Indicator	Description	EE 2015	EE Latest	EU Latest
GHG per worker	Greenhouse gas emissions per worker - CO2 equivalent tonnes	27.9	18.7 (2021)	13.7 (2021)
Employment EII	Employment share in energy-intensive industries, including mining and quarrying (NACE B), chemicals (C20), minerals (C23), metals (C24), automotive (C29) - %	2.4	2.5 (2020)	3 (2020)
Education & training EII	Adult participation in education and training (last 4 weeks) in energy-intensive industries - %	8.6	16.3 (2022)	10.4 (2022)
Energy poverty	Share of the total population living in a household unable to keep its home adequately warm - %	2	2 (2021)	6.9 (2021)
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	Average emissions per capita of top 10% of emitters vs bottom 50% of emitters	5.6	5.5 (2020)	5 (2020)

Source: Eurostat (env_ac_ainah_r2, nama_10_a64_e, ilc_mdes01), EU Labour Force Survey (break in time series in 2021), EMPL-JRC GD-AMEDI/AMEDI+ projects and World Inequality Database (WID).

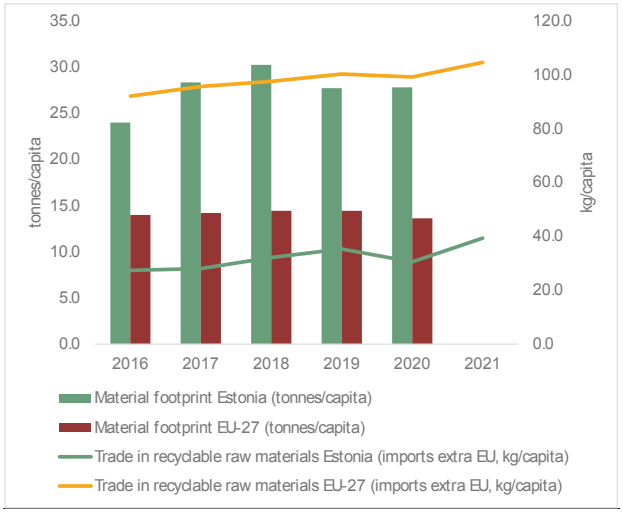
The circular economy transition is key to delivering on the EU's climate and environmental goals and provides large socio-economic benefits. It spurs job growth, innovation and competitiveness and fosters resilience and resource security. The circularity transition of industry, the built environment and agri-food can generate significant environmental improvements (see Annex 6), as they rank among the most resource-intensive systems.

Estonia is on track to meet the EU's circular economy goals, although there remain areas in which improvement is needed. The EU's 2020 circular economy action plan (CEAP) aims at doubling the circular material use rate between 2020 and 2030. The CEAP also aims to significantly decrease the EU's material footprint. Estonia's material footprint is well above the EU average, with a tendency to increase the gap further (see graph A9.1). With 15.1% of circular use of material, Estonia is above the EU average of 11.7% in 2020.

Estonia recently adopted new policies to address circular economy challenges, but more measures are needed. A circular economy strategic document and action plan were finalised at the end of 2022. Estonia also launched the Accelerate Estonia programme in 2018 to offer institutional and regulatory arrangements supporting the transition towards a resource-efficient economy. After completing the Technical Support Instrument project on Estonian waste system analysis, including good circular economy measures in the recovery and resilience plan (RRP) and adoption of the CEAP, Estonia has an opportunity to further accelerate its transition towards the circular economy.

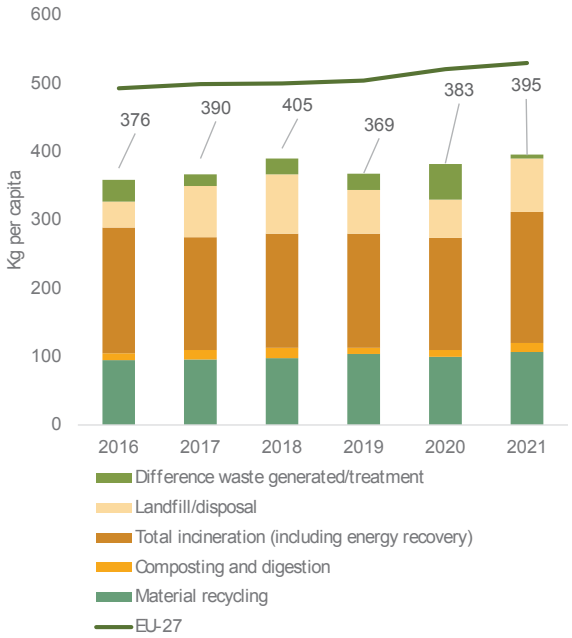
The treatment of municipal waste needs considerable improvement. Since Estonia's waste management performance in recent years has been stagnating, reaching the recycling rate for municipal waste of 30.3% in 2021, it has been assessed as being at high risk of missing the 2025 recycling targets for municipal and packaging waste. Estonia has moved away from heavy reliance on landfilling (landfill rate of 20% in 2021) to treating municipal waste by incineration (48.6% in 2021). Estonia will need to make strong efforts to meet EU recycling targets through improvements in separate collection and treatment of waste, with particular focus on biowaste.

Graph A9.1: **Trend in material use**



Source: Eurostat

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



Source: Eurostat

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. In 2021, Estonia ranked 18th on the 2021 Eco-

Table A9.1: **Overall and systemic indicators on circularity**

AREA	2016	2017	2018	2019	2020	2021	EU-27	Latest year EU-27
Overall state of the circular economy								
Material footprint (tonnes/capita)	24.1	28.4	30.3	27.8	27.9	-	13.7	2020
YoY growth in persons employed in the circular economy (%)[1]	-	-	-	-	-	-	2.9	2019
Water exploitation index plus (WEI+) (%)	2.6	6.4	8.5	5.4	-	-	3.6	2019
Industry								
Resource productivity (purchasing power standard (PPS) per kilogram)	0.8	0.8	0.8	0.9	0.9	1.0	2.3	2021
Circular material use rate (%)[2]	11.6	12.4	13.5	15.6	15.6	15.1	11.7	2021
Recycling rate (% of municipal waste)	27.9	28.2	28.0	30.8	28.9	30.3	49.6	2021
Built environment								
Recovery rate from construction and demolition waste (%)[3]	97.0	-	95.0	-	93.0	-	89.0	2020
Soil sealing index (base year = 2006)[4]	105.3	-	109.6	-	-	-	108.3	2018
Agri-food								
Food waste (kg per capita)[5]	-	-	-	-	125.0	-	131.0	2020
Composting and digestion (kg per capita)	10.0	14.0	15.0	9.0	10.0	13.0	100.0	2021

(1) Persons employed in the circular economy only tracks direct jobs in selected sub-sectors of NACE codes E, C, G and S; (2) the circular material use rate measures the share of material recovered and fed back into the economy in overall material use, including composting and digestion; (3) the recovery rate of construction and demolition waste includes waste which is prepared for reuse, recycled or subject to material recovery, including through backfilling operations; (4) soil sealing: 2016 column refers to 2015 data; (5) food waste includes primary production, processing and manufacturing, retail and distribution, restaurants and food services, and households.
Source: Eurostat, European Environment Agency

Innovation Index. Estonia performs below the EU average in three out of five components of the Eco-Innovation Index of 2021, namely in eco-innovation inputs, eco innovation activities and resource efficiency outcomes. The resource-intensive energy production from oil shale also has an impact on resource productivity. 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 in 2020 (Eurostat, 2020).

Additional measures are planned to support the circular transition of the built environment system. In 2021, Estonia adopted the Construction 2035 long-term view. Through seven steps, it will focus on identifying the best developments for the construction 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.

The agri-food system has yet to sustainably manage water resources and to optimise the use of agricultural residues. Estonia reuses 91.9% of wastewater sludge in agriculture and landfills the remaining 8.1%. Estonia needs to reduce and prevent eutrophication of inland and marine surface waters where the agricultural pressure is significant. Estonia's composting and anaerobic digestion per head remained well below the EU average. Increasing composting and anaerobic digestion could enhance Estonia's strategic autonomy by producing organic fertilisers and/or biomethane. Estonia's recovery and resilience plan as well as REPowerEU include measures targeted at increasing the production of biomethane.

There remains a financing gap in the circular economy, including waste management. Additional investments will be required to address growing needs. The financing gap was estimated at EUR 39 million per year between 2014 and 2020. Over this period, investment needs were estimated to be at least EUR 105 million per year while investment baselines were EUR 66 million per year (see Annex 6). Investing in the circular economy is key to achieving the transition. Investment in capacity building, innovative sustainable solutions and awareness-raising campaigns are crucial for accelerating the circular economy transition ([50]). Estonia is already using funds from the ERDF and the RRF, but further investments are needed.

([50]) 2022 EEA Circular Economy self-report for Estonia

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 the Recovery and Resilience Plan (RRP). Estonia allocates 21% of its total RRP budget to digital (EUR 0.2 billion) ([51]).

The Digital Decade Policy Programme sets out a pathway for Europe's successful digital transformation by 2030. The Programme provides a framework for assessing the EU's and Member States' digital transformation, notably via the Digital Economy and Society Index (DESI). It also provides a way for the EU and its Member States to work together, including via multi-country projects, to accelerate progress towards the Digital Decade digital targets and general objectives ([52]). More generally, several aspects of digital transformation are particularly relevant in the current context. In 2023, the European Year of Skills, building the appropriate skillset to make full use of the opportunities that digital transformation offers is a priority. A digitally skilled population increases the development and adoption of digital technologies and leads to productivity gains ([53]). Digital technologies, infrastructure and tools all play a role in the fundamental transformation needed to adapt the energy system to the current structural challenges ([54]).

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 a skills gap still exists. With a relatively high proportion of ICT graduates (8.4% compared to the EU average of 3.9%), Estonia is taking targeted measures to fill this gap, such as schemes to attract foreign ICT experts and upskilling and reskilling programmes ([55]). The Estonian RRP also includes skills reform for the ICT sector.

Estonia still suffers from relatively poor digital infrastructure/connectivity, although this has improved significantly in recent years. Very high capacity network (VHCN) coverage is above the EU average. However, the country still lags behind in terms of overall 5G coverage and 5G coverage on the 3.4-3.8 GHz spectrum band. 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 (67% compared to an EU average of 69%), and their adoption of some advanced technologies is lower than the EU average (big data and artificial intelligence), but higher in others (cloud computing). Nevertheless, 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.

Estonia's digital public services, known as E-Estonia, are very advanced. With very high scores from the DESI for digital public services for citizens and businesses, Estonia is one of the most advanced countries in the EU in this

([51]) The share of financial allocations that contribute to digital objectives has been calculated using Annex VII of the RRF Regulation.

([52]) The Digital Decade targets as measured by DESI indicators and complementary data sources are integrated to the extent currently available and/or considered particularly relevant in the MS-specific context.

([53]) 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).

([54]) The need and possible actions for a digitalisation of the energy system are laid out in the Communication 'Digitalisation the energy system – EU action plan' (COM(2022)552.

([55]) 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 DESI indicators**

	Estonia			EU	Digital Decade target by 2030 (EU)
	DESI 2021	DESI 2022	DESI 2023	DESI 2023	
Digital skills					
At least basic digital skills	**NA**	**56%**	**56%**	**54%**	**80%**
% individuals		2021	2021	2021	2030
ICT specialists ([1])	**6.2%**	**6.2%**	**6.2%**	**4.5%**	**20 million**
% individuals in employment aged 15-74	2020	2021	2021	2021	2030
Digital infrastructure/connectivity					
Fixed Very High Capacity Network (VHCN) coverage	**71%**	**73%**	**79%**	**73%**	**100%**
% households	2020	2021	2022	2022	2030
Fibre to the Premises (FTTP) coverage ([2])	**71%**	**73%**	**79%**	**56%**	**-**
% households	2020	2021	2022	2022	2030
Overall 5G coverage	**0%**	**18%**	**43%**	**81%**	**100%**
% populated areas	2020	2021	2022	2022	2030
5G coverage on the 3.4-3.8 GHz spectrum band	**NA**	**NA**	**15%**	**41%**	**-**
% populated areas			2022	2022	2030
Digitalisation of businesses					
SMEs with at least a basic level of digital intensity	**NA**	**NA**	**67%**	**69%**	**90%**
% SMEs			2022	2022	2030
Big data ([3])	**10%**	**10%**	**10%**	**14%**	**75%**
% enterprises	2020	2020	2020	2020	2030
Cloud ([3])	**NA**	**51%**	**51%**	**34%**	**75%**
% enterprises		2021	2021	2021	2030
Artificial Intelligence ([3])	**NA**	**3%**	**3%**	**8%**	**75%**
% enterprises		2021	2021	2021	2030
Digitalisation of public services					
Digital public services for citizens	**NA**	**92**	**94**	**77**	**100**
Score (0 to 100)		2021	2022	2022	2030
Digital public services for businesses	**NA**	**98**	**99**	**84**	**100**
Score (0 to 100)		2021	2022	2022	2030
Access to e-health records	**NA**	**NA**	**89**	**71**	**100**
Score (0 to 100)			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 evaluation will also be monitored separately and taken into consideration when interpreting VHCN coverage data in the Digital Decade.

(3) At least 75 % of Union 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

respect (with scores of 94 for citizens and 99 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'.

This Annex provides a general overview of the performance of Estonia's research and innovation system, which is essential for delivering the twin green and digital transition.

Estonia has established new comprehensive national strategy framework that integrates the research and innovation system. The sectoral action plan 'Estonian Research and Development, Innovation and Entrepreneurship Strategy 2021-2035' ([56]) was adopted in July 2021 under the national long-term development strategy "Estonia 2035". The focus areas are: (1) digital solutions, (2) health technologies and services, (3) valorisation of local resources, (4) smart and sustainable energy solutions, and (5) a vibrant Estonian society, language, and cultural space. By the end of 2022, roadmaps for 3-4 years were compiled for each of the national focus area (including four roadmaps in relation to local resources). The Ministry of Education and Research as well as the Ministry of Economy and Communications, that coordinate R&D and innovation policies, have strengthened cooperation as was evident during the R&I Enhanced Dialogue between the Commission and Estonia in November 2022. Advisory councils of research and innovation (initially separately advising the two ministries in charge for R&I) have had only joint meetings since late 2021.

A dynamic R&D base and good framework conditions for tech start-up support the innovativeness of Estonia's economy. Estonia's R&D intensity (gross domestic expenditure on R&D as a percentage of GDP) has increased over the 2016-2021 period. According to Eurostat, R&D intensity was 1.80% of GDP in 2021, compared to 1.63% in 2019 and 1.24% in 2016. According to 'The State of European Tech 2021' ([57]), Estonia retains its leadership position as the EU's most entrepreneurial country for tech start-ups. By the end of 2022, Estonia had over 1.1 start-ups per 1 000 people, the highest rate in the EU. Innovative Estonian firms have good access to finance (also see Annex 12). The volume of venture capital as a percentage of GDP (market statistics) is the highest in the EU and three times the EU average (calculated using a three-year moving average to reduce volatility). According to the OECD 'Financing SMEs and Entrepreneurs 2022' Scoreboard ([58]), Estonia had seven unicorns (private companies valued at more than USD 1 billion), the best result per capita in the EU.

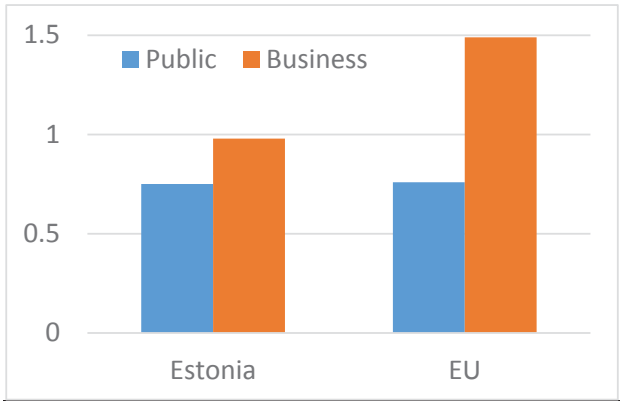
The business sector's research-based innovation activities have expanded but are still too limited. Despite the growth since 2018, business R&D intensity remains well below the EU average. While Estonian public R&D intensity is nearly on a par with the EU average, business R&D intensity was 0.98% of GDP in 2021, compared to an EU average of 1.49%. The 'Estonia 2035' action plan includes several measures supporting R&D and innovation in enterprises. In 2022, Estonia improved innovation funding and established a national innovation agency in line with a key recommendation of the Horizon Policy Support Facility's review of the Estonian R&D system. The Estonian Business and Innovation Agency was formed by merging national foundations KredEx and Enterprise Estonia. Another recommendation of the Horizon Policy Support Facility's review was to strengthen the system of 'intermediary organisations' able to support industrial innovation through cooperation with the public R&D base. The establishment of such an organisation is a work in progress; discussions started in 2022. Estonia is encouraging doctoral students to work in companies related to their doctoral research. A new option from 2022 to obtain a 'knowledge transfer doctor' degree enables doctoral research to be orientated towards company needs.

([56]) Available at https://www.hm.ee/en/ministry/ministry/strategic-planning-2021-2035#documents--2

([57]) Available at https://2021.stateofeuropeantech.com.

([58]) Link to Estonian section: https://www.oecd-ilibrary.org/sites/ff8dd165-en/index.html?itemId=/content/component/ff8dd165-en.

Graph A11.1: **R&D intensity in % of GDP, 2021**



Source: Eurostat

The level of green innovation is below EU average, but the Estonian recovery and resilience plan (RRP) is expected to help to improve it. The share of environment-related patents has been decreasing and was 4.9% in 2019 (the EU average was 13.3%). The RRP includes EUR 55 million for measures addressing the innovation capability of the business sector. In addition, EUR 50 million is available to support the process of establishing the hydrogen value chain. The Green Fund, with EUR 100 million from the RRP, targets innovation and supports the development of innovative green technologies.

Another positive development is the special attention given to adding value to wood, the nation's most important natural resource, through R&I. 'Wood' is one of three new national roadmaps in the R&D, innovation and entrepreneurship focus area, 'Adding value to local resources' ([59]). According to the Roadmap, chemical and molecular upcycling of wood is a priority as the key to increasing added-value (and as a substitute for fossil-based materials). New technologies enable a transition from traditional wood processing to a biomaterials and biochemicals industry, dramatically increasing efficiency of this forest-based resource.

([59]) Available at https://www.hm.ee/korgharidus-ja-teadus/teadus-ja-arendustegevus/taie-fookusvaldkonnad.

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

	2010	2015	2019	2020	2021	EU (1)
Key indicators						
R&D intensity (gross domestic expenditure as % of GDP)	1.58	1.47	1.63	1.75	1.75	*2.26*
Public expenditure on R&D as & of GDP	0.77	0.77	0.74	0.76	0.75	*0.76*
Business enterprise expenditure on R&D (BERD), % of GDP	0.79	0.68	0.87	0.96	0.98	*1.49*
Quality of the R&I system						
Scientific publications in top 10% most cited publications worldwide as % of total publications of the country	7.0	7.5	8.6	:	:	*9.8*
The Patent Cooperation Treaty patent applications per billion GDP (in Purcasing Power Standards)	2.3	1.0	1.3	:	:	*3.3*
Academia-business cooperation						
Public-private scientific co-publications as % of publications	6.8	5.9	9.8	8.3	8.3	*7.1*
Public expenditure on R&D financed by business, % of GDP	0.029	0.035	0.049	:	:	*0.054*
Human capital and skills availability						
New graduates in science & engineering per thousand population aged 25-34	12.5	11.8	9.6	9.5	:	*16*
Public support for business enterprise expenditure on R&D						
Public sector support for BERD as % of GDP	0.093	0.065	0.057	:	:	*0.194*
Green innovation						
Share of environment-related patents filed (%)	18.7	11.1	4.9	:	:	*13.3*
Finance for innovation and economic renewal						
Venture capital (market statistics) as % of GDP	0.034	0.032	0.068	0.099	0.214	*0.074*
Employment in fast-growing enterprises in 50% most innovative sectors	3.0	3.4	4.5	:	:	*5.5*

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

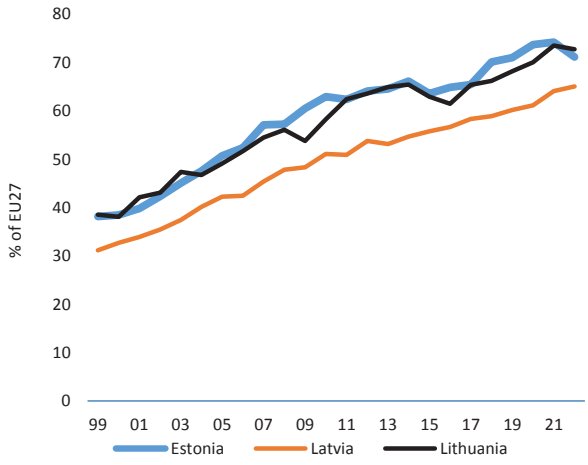
Estonia continues to be well integrated into the Single Market. Intra-EU trade accounts for 64.1% of the GDP, one of the higher shares among the EU Member States. Furthermore, Estonia has a comparatively low level of trade restrictiveness compared to the EU average. In 2021, it was among the top 10 EU countries with the highest share of both public and private net investments, considerably higher than the EU average. In 2022, net private investment as a percentage of GDP dropped from 9.1% to 5.5%, which is still above the EU average of 3.7%. Net public investment also decreased slightly from 2.6% in both 2020 and 2021 to 2.1% in 2022 but remained above the EU average of 0.4%.

Estonia also remains among the countries with the lowest number of infringements (8 pending compared to the EU average of 27) and recorded the lowest transposition deficit among all Member States in 2021, thus confirming its good 2020 record in the Single Market. Furthermore, Estonia's SOLVIT resolution rate remained at 100% in 2021, with very good scores on handling time as well as a very small number of submitted and received cases ([60]). Regarding public procurement, Estonia is an average performer overall, with a rather high share of one third of contracts (32%) awarded after receiving only single bids in 2022 ([61]).

In terms of productivity, the gap between Estonia and the EU average was overall narrowing until 2021 and the country was slowly catching up. However, compared with 2021 levels, Estonia recorded a decline in its productivity in 2022. While still considerably below the EU average, Estonia was first among its Baltic peers until 2021 but was overtaken by Lithuania in 2022 (see Graph A12.1.). In 2022, Estonia's labour productivity stood at 71.2% of the EU aggregate in terms of GDP per hour worked, as well as at 82.5% in terms of GDP per persons employed. Generally, there are also quite substantial regional differences regarding productivity (see Annex 17). The post-pandemic economic recovery allowed labour productivity in industry to grow by 7.4% in 2021, which was, however, followed by a decline of -8.4% in 2022, compared to an EU average growth of 1.4%.

One of the main long-term barriers to investment and a challenge seen as a major concern ahead is the availability of skilled staff ([62]). Industrial companies facing constraints in terms of labour shortages may also hamper exporting industries in the long run. Other challenges to the Estonian economy are posed by the Russian invasion of Ukraine, which creates supply chain bottlenecks and has a negative effect on performance and productivity levels as well as on access to skills. The Estonian recovery and resilience plan (RRP) seeks to tackle the challenge of access to skills through measures aiming at facilitating access to transversal skills. Despite the pandemic and the impact of Russia's war of aggression against Ukraine, Estonia recorded a robust export performance, which is partly due to the fact that Latvia, Sweden, and Finland are the country's main trading partners, economies which have suffered only relatively mild contractions, and because trade with Russia had already fallen considerably since 2014 ([63]).

Graph A12.1: **Hourly productivity in PPS (% of EU27)**



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

High energy and raw material prices are impacting the competitiveness of Estonian industrial ecosystems overall (also see Annex 7). They are particularly affecting some sectors, such as the construction sector as well as the forest-based industries and the metalworking industry, with the ICT and real

([60]) Single Market Scoreboard

([61]) Single Market Scoreboard – Public Procurement

([62]) European Investment Bank Investment Survey 2022

([63]) OECD Economic Surveys: Estonia 2022

estate sectors also impacted. While the share of industrial companies reporting constraints due to materials shortages remained below the EU average in 2022, the accessibility of raw materials is nevertheless affected by geopolitical developments. In terms of resource productivity (see Annex 9), which is also one of the country's relative weaknesses when it comes to innovation ([64]), Estonia has one of the lowest rates in the EU (41.8% of the EU average in 2021 ([65])), which can be partially explained by the country's use of oil shale. Improving in the area of resource productivity can generally decrease dependency on volatile raw materials markets.

A soaring producer price index for industrial output is putting additional strain on businesses ([66]). Also, the construction sector has suffered from supply chain disruptions, sanctions and high timber prices. The high raw materials and energy prices may also reduce the export competitiveness of the metalworking industry, which tends to export around 90% of the goods it produces. The forest-based sector plays a key role in the country and wood price increases, particularly driven by the price of firewood, have impacted the timber market, with pulpwood and firewood prices increasing even further towards the end of 2022. Furthermore, in terms of raw materials, the country also has a very high dependency on potash (94.3% compared to the EU average of 51.5% ([67])), which is mainly exported from Canada, Belarus and Russia and essential for the production of fertilisers.

Estonia's business environment improved further since 2020. In terms of access to finance for companies, Estonia is one of the top performers on access to equity finance and also scores above the EU average for loans. In addition, the country has the highest share of venture capital investment per GDP (see Annex 11), which may also be connected to the low level of regulatory obstacles to investment.

An enabling start-up and scale-up environment, aided by the high digitalisation level of the public administration also significantly reduces the administrative burden for businesses. Related to this, the percentage of firms reporting business regulation as a major obstacle for doing business remains well below the EU average, despite an increase compared to 2021. In 2022, 9.4% of firms declared such obstacles, which is considerably below the EU average of 29.6% ([68]). However, a Flash Eurobarometer of early 2022 indicates that 46% of Estonian companies are also concerned about frequent legislative changes which can create confusion and uncertainty and add burdens for businesses operations in this challenging economic climate, in which business survival is threatened by the energy crisis ([69]).

In terms of professions, regulatory restrictiveness in Estonia is generally lower than the EU average, except for patent/trademark agents ([70]), for which reassessing the scope of reserved activities could increase competitiveness. Furthermore, lawyers in Estonia are subject to incompatibility rules and multidisciplinary restrictions, which could affect their potential to innovate and roll out digital solutions and new business models in this sector.

The tackling of some process-related barriers to the deployment of renewable energy sources is an aspect which is particularly important for the energy transition and for ensuring energy security in the country (also see Annex 7). This issue is also addressed in the RRP (see Annex 3). As identified by the Single Market Enforcement Taskforce (SMET), barriers relate to the length of administrative authorisation procedures, which tend to take a long time, particularly for wind energy projects, and to a lack of consistency in the approaches of national and municipal authorities.

([64]) European Innovation Scoreboard

([65]) Eurostat, Resource Productivity, GDP and DMC, by country 2021

([66]) Statistics Estonia

([67]) OECD Policy Responses on the Impacts of the War in Ukraine, 2022

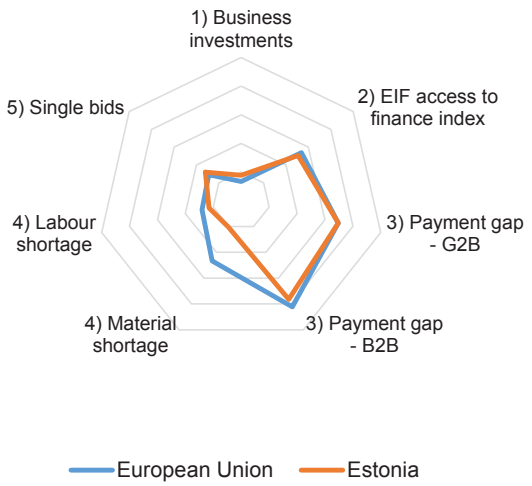
([68]) European Investment Bank Investment Survey 2022

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

([70]) Communication on updating the reform recommendations for regulation in professional services, COM(2021)385

Small and medium-sized enterprises (SMEs) represent 99.8% of the firms in the country and created 78.7% of the value added in 2021 ([71]). Late payments remain the largest barrier to their resilience and growth. Estonia has an above EU-average share of SMEs experiencing late payments (45.2% in 2022), which is a slight decrease from 2021 but an increase compared to 2020, while still below the 2019 level. In 2022, Estonia recorded a slightly higher than EU-average payment gap of 16 days for payments from the public sector (see Graph A12.2), a significant increase if compared to the average of 11 days in 2021. The gap for payments in the private sector, namely business-to-business, has remained on a similar level, with a modest improvement (13 days in 2022, 14 in 2021). The current geopolitical situation is a contributing factor in this regard, as uncertainty as well as high energy costs are among the main causes for the increasing share of late payments in the country. Though Estonian SMEs have seen their share of credit losses decrease since the loosening of pandemic-related restrictions, circa 73% of Estonian firms identified credit loss as a major problem in 2022 (26% more than in 2021), and an even bigger share (86%) are concerned about payments after the set due date ([72]), an aspect exacerbated by the current economic challenges.

Graph A12.2: **Business environment and productivity drivers**



Source: 1) % of GDP, 2021 Eurostat;
2) composite indicator, 2021 European Investment Fund access to finance index;
3) average payment delay in number of days, 2022 Intrum;
4) % of firms in manufacturing facing constraints, 2022 European Commission business consumer survey;
5) proportion of contracts awarded with a single bidder, 2022 Single Market Scoreboard.

([71]) SME Performance Review 2021/2022 – Estonia country sheet

([72]) INTRUM European Payment Report 2022

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

	POLICY AREA	INDICATOR NAME	2018	2019	2020	2021	2022	EU27 average (*)
HEADLINE INDICATORS	Economic Structure	Net private investment, level of private capital stock, net of depreciation, % GDP [1]	9.1	7.5	11.2	9.1	5.5	**3.7**
		Net public investment, level of public capital stock, net of depreciation, % GDP [1]	2.2	1.9	2.6	2.6	2.1	**0.4**
		Real labour productivity per person in industry (% yoy)[2]	3.2	-0.1	-0.7	7.4	-8.4	**1.4**
	Cost competitive-ness	Nominal unit labour cost in industry (% yoy)[2]	4.9	8	2.5	0.9	16.3	**2.9**
RESILIENCE	Shortages	Material shortage (industry), firms facing constraints, % [3]	5	4	7	22	20	**47**
		Labour shortage using survey data (industry), firms facing constraints, % [3]	25	21	8	27	23	**28**
		Vacancy rate (business economy)[4]	1.8	1.8	1.1	1.5	1.8	**3.1**
	Strategic dependencies	Concentration in selected raw materials, Import concentration index based on a basket of critical raw materials [5]	0.19	0.18	0.16	0.17	0.18	**0.18**
		Installed renewables electricity capacity, % of total electricity produced [6]	12.5	16.2	19.6	28.3	n.a.	**50.9**
SINGLE MARKET	Single Market integration	EU trade integration, % [7]	54.5	52.5	50.8	57.1	64.1	**45.8**
	Restrictions	EEA Services Trade Restrictiveness Index [8]	0.04	0.04	0.04	0.04	0.04	**0.05**
	Public procurement	Single bids, % of total contractors [9]	22	34	27	25	32	**29**
BUSINESS ENVIRONMENT - SMEs	Investment obstacles	Impact of regulation on long-term investment, % of firms reporting business regulation as major obstacle [10]	10.1	13.0	8.9	5.6	9.4	**29.6**
	Business demography	Bankruptcies, Index (2015=100)[11]	89.6	103.7	105.9	73.3	67.4	**86.8**
		Business registrations, Index (2015=100) [11]	123.2	128.6	130.9	148.7	123	**121.2**
	Late payments	Payment gap - corporates B2B, difference in days between offered and actual payment [12]	2	1	15	14	13	**13**
		Payment gap - public sector, difference in days between offered and actual payment [12]	7	1	14	11	16	**15**
		Share of SMEs experiencing late payments in past 6 months, % [13]	n.a.	52.3	37.8	48.4	45.2	**43**
	Access to finance	EIF Access to finance index - Loan, Composite: SME external financing over last 6 months, index values between 0 and 1 [14]	0.37	0.24	0.48	0.47	n.a.	**0.46**
		EIF Access to finance index - Equity, Composite: VC/GDP, IPO/GDP, SMEs using equity, index values between 0 and 1 [14]	0.4	0.27	0.2	0.41	n.a.	**0.23**

(*) Last available year

Source: (1) AMECO, (2) Eurostat, (3) ECFIN BCS, (4) Eurostat, (5) COMEXT and Commission calculations, (6) Eurostat, (7) Eurostat, (8) OECD, (9) Single Market Scoreboard, (10) EIB survey, (11) Eurostat: (12) Intrum, (13) SAFE Survey, (14) EIF SME Access to Finance Index.

This Annex outlines the performance of Estonia's public administration, which is essential for providing services and carrying out reforms. Overall, Estonia's government effectiveness is above the EU average, showing a steady improvement over the last 10 years ([73]). The government has identified administrative modernisation as a continuous process in support of national long-term strategic objectives ([74]). Among the current efforts are improving the quality of services, through the consolidation of agencies, and providing better access to open data, digitalisation of the justice system, and telework. Long-term priorities also include strengthening local governance ([75]).

The recovery and resilience plan (RRP) focuses mainly on the green and digital transitions. Digital challenges are addressed in the plan, mostly under Component 1 on digital transformation of enterprises and Component 3 on the digital state. Component 3, in particular, is expected to drive the digitalisation of the public sector and public services through: (i) the development of an excellence centre for data management and open data; (ii) the development of cloud solutions in the Estonian public sector; (iii) the further development of digital public services for people and businesses; (iv) a virtual assistance platform.

Estonia's civil service is relatively young and well-skilled and outperforms the private sector on job satisfaction ([76]). A large share of employees in the public administration have a higher education (69.7%), compared to the EU average of 52%. The ratio of employees between 25 to 49 years of age to those who are between 50 and 64 is also among the highest in the EU, as is gender parity in senior management positions (Table A13.1). The government has promoted remote work and flexible working arrangements and has continued the policy of relocating more civil servants from the capital to the regions. Merit-based selection has been promoted.

Estonia ranks well above the EU-27 average on the overall maturity of e-government. This includes the extent to which key technologies have been put in place to deliver e-services and the ease with which citizens are able to access and use online services from abroad ([77]). Based on an analysis of 'life events', Estonia ranks visibly above the EU-27 average on digital public services for people, as well as for business (annex 10).

Estonia performs well on the composite indicator for regulatory governance. Impact assessments and policy evaluations are a well-established practice. The quality of impact analyses has improved over time. There is regular oversight and reporting on the application of the process and its quality ([78]). The Ministry of Justice has launched the development of a co-creation workspace for law-making ([79]). This measure aims to improve the transparency and traceability of legislative initiatives, including information on which lobbyists and stakeholders participated in preparing them. A new public sector innovation programme was launched in 2022, looking to develop solutions to 10 crucial social problems.

The justice system performs efficiently overall. The length of court proceedings in civil, commercial and administrative cases is among the shortest in the EU (27 days on average for cases at first instance in 2021), and the combined number of pending civil, commercial and administrative cases is amongst the lowest in the EU (1.6 per 100 inhabitants at first instance). The overall quality of the justice system is good. However, it does not offer many arrangements to make it easier for people at risk of discrimination and older people to get access to justice. The level of digitalisation is very advanced and keeps improving. As regards judicial independence,

([73]) Worldwide Governance Indicators, 2021 (http://info.worldbank.org/governance/wgi/).

([74]) Government Office, Estonia 2035 strategy, 2021 (https://www.valitsus.ee/media/4269/download).

([75]) Government of Estonia (https://ec.europa.eu/info/sites/default/files/nrp_2022_estonia_en.pd).

([76]) Civil service dedication and satisfaction survey 2021, in Estonian (https://www.fin.ee/media/2803/download).

([77]) European Commission, eGovernment benchmark 2022 (https://ec.europa.eu/newsroom/dae/redirection/document/88517).

([78]) 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).

([79]) Open government initiative (https://www.opengovpartnership.org/members/estonia/commitments/EE0058/).

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

	EE Indicator ([1])	2017	2018	2019	2020	2021	2022	EU-27([2])
E-government and open government data								
1	Share of individuals who used the internet within the last year to interact with public authorities (%)	87.7	87.7	88.1	89.3	89.4	n/a	64.8
2	E-government benchmark overall score ([3])	n/a	n/a	n/a	91.6	90.0	91.8	72.9
3	Open data and portal maturity index	n/a	0.4	0.7	0.9	0.9	0.9	0.8
Educational attainment level, adult learning, gender parity and ageing								
4	Share of public administration employees with tertiary education (levels 5-8, %)	68.3	66.9	68.9	70.3	66.4 (b)	69.7	52.0
5	Participation rate of public administration employees in adult learning (%)	39.8	38.6	42.0	29.3	36.9 (b)	41.4	16.9
6	Gender parity in senior civil service positions ([4])	8.0	9.4	4.4	1.0	3.0	3.4	11.0
7	Ratio of 25-49 to 50-64 year olds in NACE sector O	3.0	2.4	2.4	2.6	2.4 (b)	2.6	1.5
Public financial management								
8	Medium term budgetary framework index	0.7	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	1.3	n/a	1.5
Evidence-based policy making								
10	Regulatory governance	2.19	n/a	n/a	n/a	2.17	n/a	1.7

([1]) High values denote a good performance, except for indicator # 6. ([2]) 2022 value. If not available, the 2021 value 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: ICT use survey, 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).

no systemic deficiencies have been reported ([80]).

([80]) For a more detailed analysis of the performance of the justice system in Estonia, see the 2023 EU Justice Scoreboard (forthcoming) and the country chapter for Estonia in the 2023 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 EU headline and national targets for 2030 on employment, skills and poverty reduction.

Estonia's labour market continued to perform strongly in 2021 and 2022, but challenges remain, including by Russia's war of aggression against Ukraine. The employment rate in Estonia reached 81.9% in 2022, surpassing the national employment rate target of 81.3% set for 2030, despite an economic slowdown in the second part of the year. The influx of displaced people from Ukraine has increased the labour supply. Around 40% of these Ukrainians are working, but one third of them are non-active ([81]). The unemployment rate decreased slightly in 2022, reaching 5.6% (6,2% in 2021).. Regional differences in unemployment remain significant, with figures twice as high as the national average in the north-eastern part of the country (11.5% in 2021). Estonia's youth unemployment rate (16.9% in 2022) is much higher than the total unemployment rate. The European Social Fund Plus (ESF+) will support access to employment by removing obstacles to participation in the labour market for vulnerable groups and promote healthier working years. As part of its recovery and resilience plan (RRP), Estonia is implementing the 'My First Job' scheme, which helps get young people into employment.

Estonia has one of the lowest gender employment gaps in the EU but also one of the highest gender pay gaps. The impact of parenthood on employment is high at 23.1 percentage points (pps) for women (aged 25-49) with young children (aged 0-6). The reform of the parental benefit and child leave system in 2022, building on the reforms in 2020 which extended paternity leave and allowed more flexibility, has contributed to reducing the gender pay gap (21.1% in Estonia vs EU 13% in 2021). This pay gap is also addressed in the RRP. ESF+ measures will tackle gender segregation in the labour market by promoting more diverse vocational training and career paths. Only 25.7% of children aged less than 3 years were enrolled in childcare in 2021 (EU: 36.2%), a decline of 6.1 pps compared to 2019, partly due to the COVID-19 pandemic.

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

Policy area	Headline indicator	
Equal opportunities and access to the labour market	Early leavers from education and training (% of population aged 18-24, 2022)	10.8
	Share of individuals who have basic or above basic overall digital skills (% of population aged 16-74, 2021)	56.37
	Youth NEET rate (% of population aged 15-29, 2022)	10.6
	Gender employment gap (percentage points, 2022)	2.9
	Income quintile ratio (S80/S20, 2021)	5.03
Dynamic labour markets and fair working conditions	Employment rate (% of population aged 20-64, 2022)	81.9
	Unemployment rate (% of active population aged 15-74, 2022)	5.6
	Long term unemployment (% of active population aged 15-74, 2022)	1.3
	GDHI per capita growth (2008=100, 2021)	133.65
Social protection and inclusion	At risk of poverty or social exclusion rate (% of total population, 2021)	22.2
	At risk of poverty or social exclusion rate for children (% of population aged 0-17, 2021)	17.4
	Impact of social transfers (other than pensions) on poverty reduction (% reduction of AROP, 2021)	30.64
	Disability employment gap (percentage points, 2021)	18.7
	Housing cost overburden (% of total population, 2021)	4.4
	Children aged less than 3 years in formal childcare (% of population under 3-years-old, 2021)	25.7
	Self-reported unmet need for medical care (% of population 16+, 2021)	8.1

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

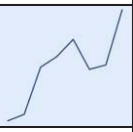
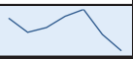
Update of 27 April 2023. Members States are classified on the Social Scoreboard according to a statistical methodology agreed with the EMCO and SPC Committees. It looks jointly at levels and changes of the indicators in comparison with the respective EU averages and classifies Member States in seven categories. For methodological details, please consult the Joint Employment Report 2023. Due to changes in the definition of the individuals' level of digital skills in 2021, exceptionally only levels are used in the assessment of this indicator; NEET: neither in employment nor in education and training; GDHI: gross disposable household income.
Source: Eurostat.

Skills and labour shortages persist, particularly in healthcare and education. There is a severe shortage of nurses, care workers, specialised doctors and

([81]) Share of beneficiaries of temporary protection in age group 20-64 years of a in Employment. Data by Statistics Estonia, calculations by Ministry of Social Affairs.

psychologists ([82]) (see Annex 16). Similarly, teacher shortages remain a major challenge. Although participation in adult learning is high, early school leaving in Estonia has risen (see Annex 15). Tackling challenges related to skills will support the national employment rate target of 81% and progressing towards the adult learning target of 52.3% by 2030.

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

Indicators	Latest data	Trend (2015-2022)	National target by 2030	EU target by 2030
Employment (%)	81.9 (2022)		81	78
Adult learning[1] (%)	33.9 (2016)		52	60
Poverty reduction[2] (thousands)	-18 (2021)		-39	-15 000

(1) Adult Education Survey, adults in learning in the past 12 months
(2) Number of persons at risk of poverty or social exclusion (AROPE), reference year 2019
Source: Eurostat, DG EMPL.

The risk of poverty or social exclusion remains high among vulnerable groups. The share of people at risk of poverty or social exclusion (AROPE) continued to decrease from 23.7% in 2019 to 22.8% in 2021 (EU: 21.9%). However, persons with disabilities face a high risk of poverty or social exclusion (40.4% in 2021) compared to the EU average (28.9%). Older people (65 years and over) are at a particularly high risk of poverty or social exclusion (41.6% against 19.5% in the EU in 2021). This is largely due to the average pension, which is below the at-risk-of-poverty (AROP) threshold. Pensions are among the lowest in the EU relative to work income. In addition, a gender gap in poverty among older people persists (the AROP rate for older women is 47.9%, almost 21pps higher than for men). Estonia has taken some steps to protect people with low-income pensions by increasing the minimum pension. The impact of social transfers (excluding pensions) on reducing poverty improved to 30.6% in 2021, from 28.1% in 2019, but remains below the EU average (32.7%). Social expenditure in Estonia remains low (19,2% of GDP vs 31,7% of EU GDP in 2020). The low coverage of unemployment benefits and restrictive criteria contribute to income inequality and increased poverty as people with short work spells and in non-standard forms of work are not covered. In 2022, only 36% of the newly registered unemployed received unemployment insurance benefits and 39% received the fixed unemployment allowance. The adequacy of minimum income benefits is low, at 50% of the poverty threshold ([83]) and 32% as a share of the income of a low-wage earner (EU averages: 59% and 47% respectively).

Access to healthcare and social services remain a challenge. Estonia has one of the highest levels of self-reported unmet needs for medical care in the EU (8.1% vs 2% in the EU in 2021, see Annex 16). As the share of the population aged 65 and over is expected to increase from 19.8% in 2019 to 23.2% in 2030, the demand for long-term care becomes even more acute. Public spending on long-term care in Estonia is amongst the lowest in the EU (0.4% of GDP vs 1.7% of EU GDP in 2019) ([84]). Only 10.3% of people aged 65 and over in need of long-term care say they use home-care services, against the EU average of 28.6% in 2019. Out-of-pocket payments for long-term care have slightly decreased but remain high, accounting for 43.8% of all long-term care health-related expenditure in 2020 (EU 18.1%). Fragmentation in the organisation and financing of long-term care between the social and healthcare sector, and between the state and local governments leads to an uneven supply of similar home and community services. Under the RRP, in 2022 the Estonian Parliament adopted two sets of amendments to improve the accessibility and affordability of long-term care. These amendments should prioritise home care to institutional care, ensure the provision of higher quality of long-term care assistance, and create legal clarity, to support those in need of long-term care assistance and people with care burden. The "Care reform" that enters into force on 1 July 2023 is the first significant step in reducing out

([82]) Estonian Unemployment Insurance Fund Survey (Labour Market Barometer: Tööturu uuring: tööturg liigub tasakaalu poole | Töötukassa (tootukassa.ee).

([83]) MI adequacy is computed for income year 2020, for a single-person household. The AROP threshold is an average over the 3 income years 2018 to 2020.

([84]) 3) Ageing Report 2021, Public LTC expenditure % GDP.

of pocket payments for general care service. However, an integrated and sustainable long-term care framework to ensure equal access, availability and quality long-term care services evenly in all municipalities is not in place yet. The ESF+ will finance measures fostering social inclusion, including a reform of long-term care, integration measures, and action to tackle material deprivation. This should help Estonia achieve the 2030 EU headline target on poverty reduction (39 000 fewer people AROPE compared to 2019).

This Annex outlines the main challenges for Estonia's education and training system in light of the EU-level targets and other contextual indicators under the European Education Area strategic framework, based on the 2022 Education and Training Monitor.

The education system faces major shortages of teachers and educational support specialists. Although the education system delivers very good outcomes, high equality and advanced digitalisation of schools, teacher shortages are severe. Estonia's teaching force is one of the oldest in the EU (see Table A15.1) and shortages in science, technology, engineering and mathematics (STEM), crucial for the green and digital transitions, are particularly acute. The annual age-related replacement need for general education teachers is around 570 teachers ([85]). One in five teachers in maths, chemistry, geography and biology and one in four physics teachers are at least 60 years old. Further outflows stem from the considerable share of novice teachers that leave the profession within the first 5 years (around 50%) ([86]). The shortage of support specialists (such as speech therapists, social workers and psychologists) is also an issue. In almost a third of kindergartens and a quarter of basic schools, children and teens received inadequate or no support in 2019/2020 ([87]). A teacher action plan was adopted in 2022 to improve the working conditions, training and career progression of teachers and continues to be implemented; it also covers support specialists, school leaders and school managers. Developing leadership quality and organisational culture is key to improving the reputation of the teaching profession, bringing new teachers to school and ensuring their job security. While the number of university admissions in the field of educational support has increased in recent years, it is still insufficient to replace retirements. The teacher and support specialist shortages are intensified by current challenges of the education system, such as integrating Ukrainian refugees, dealing with learning gaps after the COVID pandemic and accelerating the transition to Estonian-language education.

Participation in early childhood education and care increases with children's age, but remains somewhat below the EU average. Participation of children between 3 years and the starting age of compulsory education (7 years) stood at 91.9% in 2020, somewhat below the EU average of 93% and the EU-level target of 96% by 2030. Efforts to reform early childhood education and care continue: a draft reform act aims, inter alia, to detect special educational needs earlier and to create a single, integrated early childhood education and care system with common quality standards. However, the draft act is not yet adopted.

Early school leaving and gender gaps throughout the education system remain a stumbling block to solving skills shortages. The early leaving rate was 10.8% in 2022, up from 9.8% in 2021. Boys leave the education and training system with low or without qualification significantly more often than girls: while girls' early leaving rate slightly declined between 2021 and 2022, boys' rate increased by 2.3 pps (see Table A15.1). Boys also account for a greater number among those with lower educational achievement ([88]). Estonia's 2035 education strategy acknowledges that, from secondary school on, the choice of educational paths influenced by a person's gender might lead to socio-economic inequality and labour market segregation ([89]). One of the strategy's main priorities is to address early leaving from education and training. Reducing gender gaps and early leaving could enable the education system to produce more vocational and higher education graduates, and hence to increase the supply of highly needed skills.

Estonia aims to accelerate the transition to an Estonian-language education system, while it also undertakes major efforts to integrate Ukrainian pupils. The government

([85]) Rosenblad, Y., Leoma, R., & Krusell, S. (2022). OSKA üldprognoos 2022–2031. Ülevaade Eesti tööturu olukorrast, tööjõuvajadusest ning sellest tulenevast koolitusvajadusest (Summary of the 2022-2031 forecast. Overview of the Estonian labour market, labour needs and resulting training needs)

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

([87]) National Audit Office of Estonia (2020), Availability of education support services.

([88]) Government of Estonia (2021). Education Strategy 2021–2035.

([89]) idem

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

				2015		2022	
Indicator			Target	Estonia	EU27	Estonia	EU27
[1]Participation in early childhood education (age 3+)			96%	90.6% [b]	91.9%	91.9% [2020]	93.0% [2020]
[2]Low achieving 15-year-olds in:		Reading	< 15%	10.6%	20.0%	11.1% [2018]	22.5% [2018]
		Mathematics	< 15%	11.2%	22.3%	10.2% [2018]	22.9% [2018]
		Science	< 15%	8.8%	21.1%	8.8% [2018]	22.3% [2018]
Early leavers from education and training (age 18-24)	[3]Total		< 9 %	13.7%	11.0%	10.8%	9.6%
	[3] By gender	Men		16.4%	12.5%	14.3%	11.1%
		Women		10.9%	9.4%	7.5%	8.0%
	[4] By degree of urbanisation	Cities		6.3%	9.6%	9.3%	8.6%
		Rural areas		20.3%	12.2%	12.7%	10.0%
	[5] By country of birth	Native		13.8%	10.0%	10.5%	8.3%
		EU-born		: [u]	20.7%	: [u]	20.3%
		Non EU-born		: [u]	23.4%	: [u]	22.1%
[6]Equity indicator (percentage points)				:	:	5.1 [2018]	19.3 [2018]
[7]Exposure of VET graduates to work based learning	Total		≥ 60% (2025)	:	:	78.9%	60.1%
Tertiary educational attainment (age 25-34)	[8]Total		45%	38.5%	36.5%	43.9%	42.0%
	[8] By gender	Men		28.3%	31.2%	34.0%	36.5%
		Women		49.2%	41.8%	54.8%	47.6%
	[9] By degree of urbanisation	Cities		47.2%	46.2%	53.3%	52.2%
		Rural areas		27.1%	26.9%	33.4%	30.2%
	[10] By country of birth	Native		38.0%	37.7%	42.3%	43.0%
		EU-born		: [u]	32.7%	: [u]	39.5%
		Non EU-born		46.2% [u]	27.0%	65.2%	35.7%
[11]Share of school teachers (ISCED 1-3) who are 50 years or over				45.2%	38.3%	50.4% [2020]	39.2% [2020]

Source: (1,3,4,5,7,8,9,10,11) = Eurostat; 2 = OECD (PISA); 6 = European Commission (Joint Research Centre). Notes: Data are not yet available for the remaining EU-level targets under the European Education Area strategic framework, covering underachievement in digital skills and participation of adults in learning. The equity indicator shows the gap in the share of underachievement in reading, mathematics and science (combined) among 15-year-olds between the lowest and highest quarters of socio-economic status.

aims to complete the transition to an Estonian-language education system already by 2030, 5 years earlier than previously planned. Starting from 2024/25, public kindergartens and primary schools will gradually use Estonian as the sole language of instruction for subject teaching, with secondary schools being phased in up to 2030. The Parliament adopted the required amendments to relevant education acts; the government put in place an action plan to support the language transition, covering continuous training, educational materials and financial incentives for teachers. Around 8 500 children and young people from Ukraine are registered in Estonian schools ([90]); the government supports local governments, teachers and parents with various measures.

Tertiary education attainment is relatively high, albeit with some disparities. In 2022, 43.9% of Estonians between 25 and 34 held a university degree (EU average: 42%), but the urban-rural and gender gaps remain high (see Table A15.1). The tertiary education attainment gap in favour of women remains among the highest in the EU (20.8 pps in 2022, EU average: 11.1 pps). The population's labour market potential is negatively impacted by a relatively high drop-out rate from higher education ([91]) – the reasons for this are related to the difficulty of covering living costs while studying and the lower wage premium for tertiary educated workers than in the OECD on average ([92]), ([93]). The government has taken various measures to improve graduation on time and reduce the dropout rate. The share of STEM graduates in 2020, at 27.5%, was above the EU average (24.9%). This is mainly due to one of the highest shares of ICT graduates in the EU, while the share of graduates in natural

([90]) Estonian Education Information System (EHIS), April 2023.

([91]) Government of Estonia (2021). Education Strategy 2021–2035.

([92]) OECD (2022) Education at a Glance. Estonia Country Report.

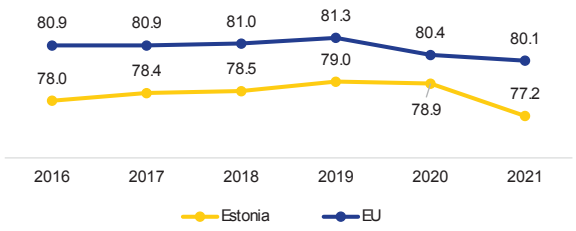
([93]) Arenguseire Keskus (2022), The future of higher education. Development trends up to 2035.

sciences/statistics/maths (6.1%) and in engineering/construction/manufacturing (13%) is somewhat below the EU average (6.2% and 14.8%, respectively).

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, having dropped by a further 1,7 years in 2021 compared to 2020. This was one of the largest drops in the EU and reflects the increase in COVID-19 mortality in 2021 (almost quintupled compared to 2020 ([94]). Treatable mortality is higher in Estonia than in the EU overall, but has decreased substantially over the last decade. In 2020, the leading causes of death were diseases of the circulatory systems ("cardiovascular diseases") followed by cancer and external causes.

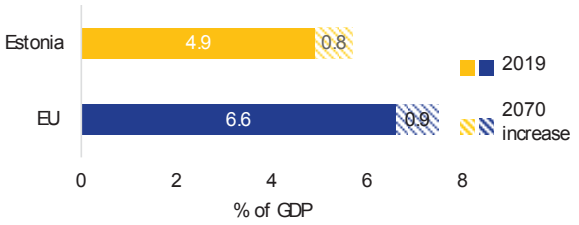
Graph A16.1: **Life expectancy at birth, years**



Source: Eurostat

Health expenditure in Estonia is among the lowest in the EU, and only 77.2% of it was publicly funded in 2020. Spending on inpatient care, pharmaceuticals and medical devices is below the EU average, while spending on outpatient care is above. In 2020, total healthcare spending increased to 7.8% of GDP, up from 6.8% in 2019. This is in line with the upward trend in all Member States in 2020. In Estonia, this increase can mainly be attributed to higher spending per capita and only to a lesser extent to the observed GDP contraction. The spending remains one of the lowest in the EU where the average healthcare spending in 2020 was 10.9% of GDP. This said, as a share of total public spending, health spending remained relatively stable at 14.6%. In 2020, the share of out-of-pocket healthcare spending was 21.44%, compared 14.4% for the EU average. Public expenditure on health is projected to increase by 0.8 percentage points (pps) of GDP by 2070 (compared to 0.9 pps for the EU overall). This projection is based on the age profile of the Estonian population.

Graph A16.2: **Projected increase in public expenditure on healthcare over 2019-2070**



AWG reference scenario
Source: Source: European Commission / EPC (2021)

Spending on prevention in Estonia amounted to 4.8% of total spending on healthcare in 2020, compared to 3.4% for the EU overall. This is comparatively high, with four other Member States also reporting a level above 4%. Between 2019 and 2020, spending on prevention in Estonia increased by 47%, compared to a 26% increase for the EU overall. Across the EU, this increase was primarily driven by spending on disease detection, surveillance, control and response programmes as part of the public health response to COVID-19. Between 2019 and 2020, a remarkable proportional increase in reported spending was noted in Estonia for early disease detection programmes and disaster preparedness and emergency response programmes.

Estonia faces a shortage and an uneven distribution of health workers, which plays a role 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). Unmet needs improved between 2020 (13%) and 2021 (8,.1%) (compared to an EU average of 2%). However, this improvement may be partially due to more patients using private practices for specialist out-patient care – the use of which increased by 35%. In 2020 Estonia had fewer doctors (3.5 per 1 000 population) and nurses (6.4 per 1 000 population) than the EU overall, with respective averages of 3.9 and 8.3. The numbers of graduating doctors and nurses have fallen in recent years. The percentage of

([94]) Based on data provided directly by Member States to ECDC under the European Surveillance System (data current as of 13 April 2023)

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

	2017	2018	2019	2020	2021	EU average (latest year)
Treatable mortality per 100 000 population (mortality avoidable through optimal quality healthcare)	136.6	133.5	129.4	123.9	NA	91.7 (2020)
Cancer mortality per 100 000 population	286.8	292.3	279.5	265.0	NA	242.2 (2020)
Current expenditure on health, % GDP	6.6	6.7	6.8	7.8	NA	10.9 (2020)
Public share of health expenditure, % of current health expenditure	73.6	73.7	74.5	77.2	NA	81.2 (2020)
Spending on prevention, % of current health expenditure	3.3	3.5	3.6	4.8	NA	3.4 (2020)
Acute care beds per 100 000 population	338	332	332	NA	NA	387.4 (2019)
Doctors per 1 000 population *	3.5	3.5	3.5	3.5	NA	3.9 (2020)
Nurses per 1 000 population *	6.2	6.3	6.2	6.4	NA	8.3 (2020)
Consumption of antibacterials for systemic use in the community, daily defined dose per 1 000 inhabitants per day (total consumption in CY and CZ) **	9.9	10.2	10.2	8.8	8.7	14.5 (2021)

Note: The EU average is weighted for all indicators, except for (*) and (**), for which the EU simple average is used. The simple average for (*) uses data for 2020 or most recent year if former not available. Doctors' density data refer to practising doctors in all countries except EL, PT (licensed to practice) and SK (professionally active). Nurses' density data refer to practising nurses in all countries except FR, PT, SK (professionally active) and EL (nurses working in hospitals only).
Source: Eurostat; except: ** ECDC

doctors aged over 55 is high in Estonia (46.2% compared to an EU unweighted average of 35.9%), raising concerns about the long-term accessibility of health services. Working conditions are an important issue, with low remuneration being a deterrent, in particular for nurses. The wage of nurses in Estonia compared to the average wage of full-time employees in all sectors in the country is 1,1 compared to an average calculated for 20 EU countries at 1,2 (2020 data).

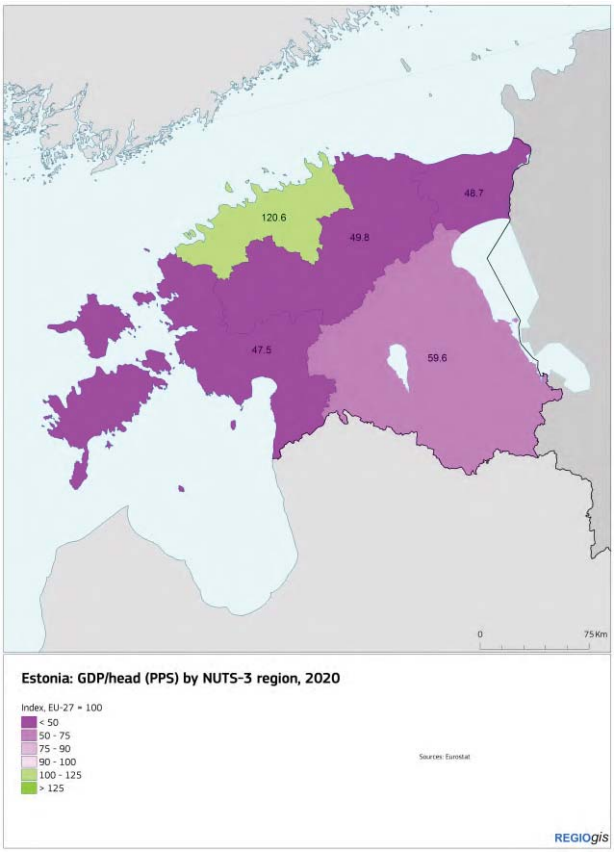
Through its recovery and resilience plan, Estonia plans to address health-related challenges. Investments will be used to improve health infrastructure, implement organisational reforms, strengthen primary healthcare, some measures on health workforce, and update the e-health institutional framework. Work has started on the last two reforms, including through the entry into force of the Government's Decree amending the list of the Estonian Health Insurance Fund for costs and services of general practitioners, the entry into force of the Government's Decree amending the list of healthcare services of the Estonian Health Insurance Fund for specialised medical care, and the approval of the e-health governance framework and its implementation roadmap.

ANNEX 17: ECONOMIC AND SOCIAL PERFORMANCE AT REGIONAL LEVEL

This Annex showcases the economic and social regional dynamics in Estonia, providing an update on economic, social and territorial cohesion in the Estonian regions compared with the EU as a whole and the main regional economic recovery challenges.

The regional outlook continues to be characterised by significant disparities between its capital region (Põhja-Eesti) and the rest of the country. In 2021, GDP per capita (purchasing power standard – PPS) of Põhja-Eesti stood above the EU average at 122%. In the other four NUTS 3 regions, GDP per capita ranged from between around 52% in Kirde-Eesti to around 68% in Lõuna-Eesti (Map A17.1). Similarly, annual average growth in GDP per capita in 2011-2020 was highest in the capital region of Põhja-Eesti (at 4%), while Kirde-Eesti had a growth rate close to zero and Lääne-Eesti had a negative growth rate (-0.5%).

Map A17.1: **GDP per capita (in PPS) in Estonia, NUTS 3, 2020**



In 2021, labour productivity was much higher in the capital region of Põhja-Eesti, at 100% of the EU average but in the other regions ranged between 60% (in Lääne-Eesti) and 71% (in Lõuna-Eesti). However, real productivity growth in 2011-2020 was the highest in two regions - Lõuna-Eesti (1.8%) and Kesk-Eesti (1.6%), but the region of Lääne-Eesti experienced a decrease of -1.3% (table A17.1).

Much like its Baltic neighbours, Estonia is experiencing depopulation, particularly from its non-capital regions. Estonia's population fell by 0.2% in 2011-2019 and demographic projections indicate that its population could decline by 5.5% between 2020 and 2050. In 2011-2019, the capital region's population grew by a noteworthy 8.9%, while all the other regions experienced population decline ranging from 3.9% in Lõuna-Eesti to 14.8% in Kirde-Eesti.

Table A17.1: **Estonia selected indicators at regional level**

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, 2021	EU27=0, 2011-2020	EU27=100, 2021	EU27=1 2011-2020
European Union	100	0	100	1
Eesti	89	3	84	2
Põhja-Eesti	122	3	100	2
Lääne-Eesti	56	0	60	-1
Kesk-Eesti	56	3	67	2
Kirde-Eesti	52	2	60	1
Lõuna-Eesti	68	3	71	2

Source: EUROSTAT, EDGAR database, Estonian statistics

The urban-rural divide is also visible in terms of education and employment. In rural areas, the share of NEETs ([95]) stood at 14.1% in 2021 (but 3.2 percentage points (pps) down on 2020), compared to an EU average for rural areas of 14.8%. This figure is 11.2% in cities, reflecting a significant performance gap. NEETs face more difficulties in finding a job in Estonia's rural areas. The 63% employment rate for young people in rural areas is 16 pps lower than in cities (79%). There is also a

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

much higher level of educational attainment in cities. In 2021, 50.6% of the population aged 25-64 had a tertiary education degree, compared with only 34.5% in towns and suburbs, and 32.8% in rural areas. The reduction of the digital gap between urban and rural areas has been very slow. Rural fixed broadband coverage of 78.6% remains one of the lowest in the EU (91.5%).

The share of the population at risk of poverty or social exclusion (AROPE) is also related to the urban-rural divide. In rural areas, 22.7% people were at risk of poverty or social exclusion in 2021 (4 pps lower than in 2020), which is in line with the EU average for rural areas that stood at 22.5%. In Estonian cities, this rate was at 21%, which was stable when compared with 2020.

The COVID-19 pandemic significantly affected Estonia. Excess mortality in the country from March 2020 onward increased by 10.9%, compared with the average mortality in the same weeks in 2015-2019. The share of persons usually working from home increased by 5.9 pps in 2020. Estonia's shift to teleworking could have been cushioned by its high internet penetration rate, with 80% of Estonians having interacted with public authorities online in 2020, which was significantly higher than the EU average of 56%.

The impact of the pandemic was somewhat different from one type of region to another. Estonia's unemployment rate rose from 4.5% in 2019 to 6.8% in 2020 but increased slightly more in cities (by almost 3 pps) than in towns and suburbs, and rural areas (where it increased by 2 pps). Tallinn experienced the sharpest decline in tourism, which also increased the unemployment rate of other cities.

The Estonian financial sector is bank-focused and relatively concentrated. The Estonian banking system has four systemically important credit institutions (Swedbank, SEB Pank, Luminor and LHV) supervised jointly by the Single Supervisory Mechanism and the Estonian Financial Supervisory Authority. The assets of the five largest credit institutions account for over 90% of total Estonian banking-sector assets. Total banking assets as a share of GDP have increased in recent years due to the headquartering of Luminor in Estonia in 2019 and the consolidation of assets and liabilities of the Latvian and Lithuanian branches of Luminor in Estonia. Nevertheless, the size of Estonia's banking sector remains less than half the EU average. The share of domestic banks in the sector increased to just below half of the sector by 2021.

The Estonian banking sector is resilient. Banks operating in Estonia are among the best capitalised in the EU (their average 2022 capital-adequacy ratio stood at 22.7% vs 18.6% in the EU). The resilience of the banks has also been boosted by their strong profitability (their return on equity in Q3-2022 was 10.2% vs an EU average of 6.1%). This profitability has allowed them to maintain their level of capitalisation and cover losses on small loans. Estonian banks have, on average, one of the lowest non-performing loan ratios in the EU (0.7% for households and 1.4% for non-financial corporations). The share of overdue loans or loans on payment holidays shrunk considerably over 2022, allowing banks to reduce the provisions they made to cover possible loan losses. This has supported banks' capacity to finance the economy. In 2022, deposits increased, but not as much as the increase in private sector credit, pushing up the loan-to-deposit ratio to 84.8%.

The structure of assets and liabilities in the Estonian banking sector is affected by the lack of development of the local capital market. On the liability side, the Estonian banking sector is mainly funded from local deposits. Thanks to the strong and stable domestic-customer deposit base (around three quarters of total funding) credit institutions do not need to draw additional funding from financial markets. This reduces their exposure to possible global financial stress and capital flight in times of market volatility. It also reduces their reliance on cross-border parent banking groups. Although banks have actively expanded their funding mix in recent years, the share of funding from bonds remains small at around 10% of all liabilities on average. This is one of the smallest shares in the euro area. There are several factors behind this. Firstly, the Estonian central government has the lowest government debt in the EU, so there is no practical need to issue sovereign bonds. Moreover, the local bond market is not able to support the issuance of bonds by large infrastructure companies as it is too small for these companies and they prefer to issue their bonds in foreign markets. Finally, there is a large share of SMEs in the Estonian economy, and these SMEs mostly finance themselves through banks. There is therefore no great demand for alternative sources of financing. This explains why, on the asset side of bank balance sheets, the share of mortgage loans and corporate loans is larger than the euro-area average.

Both corporate and household debt have grown strongly in recent years. Risks have now built up in the real-estate and construction sectors. The economy in Estonia has seen strong demand in recent years. Combined with low interest rates and rapid growth in income and savings, this has led to a substantial increase in the issuance of mortgage loans. And this in turn has coincided with rapid growth in house prices (up 64% since 2015). Similarly, the main driver of the rapid growth in the corporate loan portfolio was financing for the real-estate and construction sector. The amounts borrowed by companies and households in the 12 months to the end of Q3-2022 were 12.5% and 11.1% greater respectively than in the twelve-month period to the end of Q3-2021. Although household indebtedness in Estonia is not excessive so far (at only 38% of GDP), banks' exposure to mortgage debt is relatively high (accounting for 43% of their total loan portfolio). This makes Estonian banks vulnerable to any negative change in loan servicing by households if incomes fall or if interest rates rise. Banks' loan portfolios have also become more concentrated and exposed to risks from the highly cyclical market for commercial real estate (CRE). According to the European Banking Authority, the share of CRE loans as a proportion of total bank loans is almost 20% in

Table A18.1: **Financial soundness indicators**

	2017	2018	2019	2020	2021	2022	EU	Median
Total assets of the banking sector (% of GDP)	106.8	101.1	103.7	125.1	121.5	106.3	276.8	207.9
Share (total assets) of the five largest banks (%)	90.3	91.0	93.0	93.7	93.0	-	-	68.7
Share (total assets) of domestic credit institutions (%)[1]	25.9	27.3	49.5	49.6	49.0	50.7	-	60.2
NFC credit growth (year-on-year % change)	5.5	4.0	3.0	3.1	7.4	12.5	-	9.1
HH credit growth (year-on-year % change)	7.0	6.6	6.4	5.0	7.8	11.1	-	5.4
Financial soundness indicators:[1]								
- non-performing loans (% of total loans)	1.9	1.3	1.6	1.6	1.1	0.9	1.8	1.8
- capital adequacy ratio (%)	30.6	31.0	26.3	27.8	24.3	22.7	18.6	19.8
- return on equity (%)[2]	9.2	9.8	8.3	7.4	9.5	10.2	6.1	6.6
Cost-to-income ratio (%)[1]	46.3	45.3	52.5	52.6	53.8	50.0	60.6	51.8
Loan-to-deposit ratio (%)[1]	89.8	93.5	90.0	76.7	77.3	84.8	88.6	78.0
Central bank liquidity as % of liabilities	0.5	0.3	0.1	6.4	5.7	0.5	-	2.9
Private sector debt (% of GDP)	106.2	101.2	98.9	101.4	95.3	-	-	120.7
Long-term interest rate spread versus Bund (basis points)	-	-	-	48.1	43.7	114.4	-	93.3
Market funding ratio (%)	23.1	24.5	24.1	22.2	22.3	-	50.8	40.0
Green bonds issued to all bonds (%)	-	-	-	-	-	-	3.9	2.3

1-3 | 4-10 | 11-17 | 18-24 | 25-27 — Colours indicate performance ranking among 27 EU Member States.

(1) Last data: Q3 2022.
(2) Data is annualized.
Source: ECB, Eurostat, S&P Global Capital IQ Pro.

Estonia. This is the highest percentage of CRE loans of all EU countries. At 60%, the share of CRE loans to non-financial corporations to total bank loans is also very high. Moreover, CRE loans represent 40% of total banking NPLs. Although the banking sector is particularly exposed to CRE, since the end of 2017, insurers' share of total CRE exposure has roughly tripled, implying higher spill-over risks in interlinkages between banks, investment funds and insurers.

Banks must hold sufficient capital and set aside sufficient provisions to be able to cover the accumulated risks if these risks were ever to materialise. Currently, the base requirement of the countercyclical capital buffer is 1%, effective from 7 December 2022. However, Eesti Pank, Estonia's central bank, believes the cyclical risks from rapid growth in the debt of companies and households are increasing, and therefore decided to set the countercyclical capital buffer rate at 1.5% from 1 December 2023. Further raising the countercyclical capital buffer requirement should not have a significant negative impact on the funding of the economy, as the banking sector currently meets the capital and buffer requirements with sufficient margin. The good profitability of the banks, which is likely to further increase in the near term as money market interest rates rise, is also supporting the capital position of Estonian banks.

Geopolitical and inflationary pressures risk cutting credit volume, reducing asset quality, and damaging the profitability of financial institutions in the longer term. Falling demand, high inflation and market disruptions reinforced by Russia's war against Ukraine have eroded households' disposable income and purchasing power. They have also reduced companies' profits. The combination of a worsening economic outlook and rising financing costs will depress the debt-servicing capacity of households and non-financial corporations. These pressures risk cutting demand for loans and reducing asset quality. Moreover, Estonian banks anticipate a tightening of their credit standards, and their lending will become more cautious. If the share of non-performing loans increases significantly, there may be a decline in banks' risk appetite, credit volumes, and profitability.

Estonian insurers are significantly exposed to the banking sector, mainly through covered bonds. The European Insurance and Occupational Pensions Authority has calculated that, at the end of 2020, approximately 42% of Estonian insurers' total investment on average was concentrated in banks. This could potentially become a channel of risk transmission and contagion in the future. Moreover, the exposure of Estonian insurers was predominantly to cross-border banks (65% of all exposure to banks) and in bank bonds (mainly covered bonds) rather than bank equity.

ANNEX 19: TAXATION

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 stood at 32.8% of GDP in 2022 and were considerably below the EU aggregate in 2021. Labour taxes generated revenue of 17.3% of GDP in 2021 (below the EU aggregate), while consumption taxes generated revenue of 13.0% of GDP (above the EU aggregate). As regards environmental taxation, Estonia is one of the few Member States without an annual road vehicle tax and has the lowest share of transport taxation as percentage of GDP. At the same time Estonia levies relatively high excise duties on road fuels. (For more on policies related to environmental sustainability, see Annex 6). Very little revenue is generated from total property taxes, including from recurrent taxes on immovable property (0.3% and 0.2% of GDP in 2021 respectively compared with the EU aggregate of 2.2% and 1.1%), which are among the taxes least detrimental to growth. Greater use of currently underused environmental and property taxation could be considered in order to counteract the challenges of climate change and an ageing population.

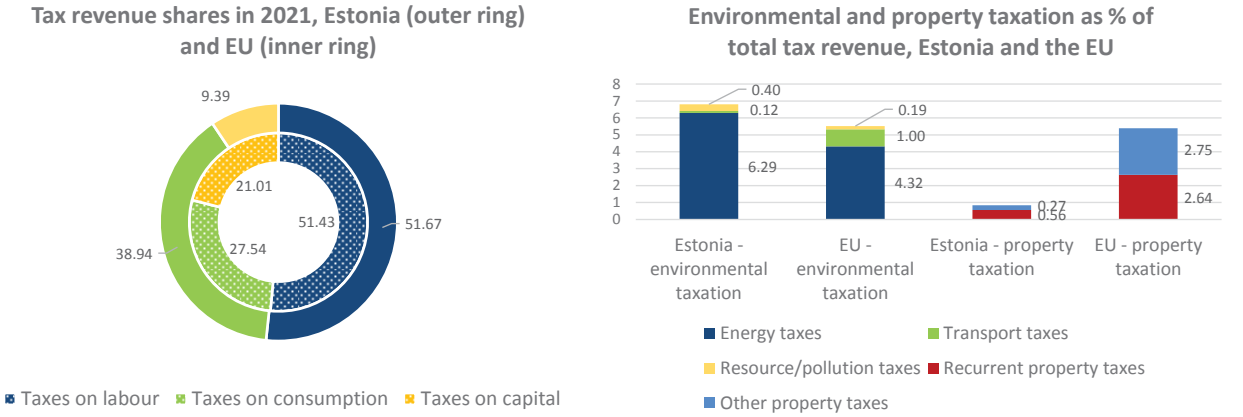
Estonia's labour tax burden is slightly less progressive than the EU average, but reforms over the years have reduced the total tax burden on low wages. Graph A19.2 shows that the labour tax wedge for Estonia in 2021 was close to the EU average for single people at 50% of the income level of the average wage and lower than the EU average at higher levels of income. Second earners at a wage level of 67% of the average wage, whose spouses earn the average wage, are subject to a lower tax wedge in Estonia than the EU average. The tax wedge for workers earning 50% of the average wage was reduced from 37.3% in 2010 to 32.2% in 2022. The very high level of inflation recorded for 2022 (17.5%), which was the fourth highest in the EU, may have reduced the benefit of lower taxation for lower-paid workers as they may be shifted to higher tax brackets. A review of tax bands and tax-free thresholds could address this risk, also known as "bracket creep".

Table A19.1: **Taxation indicators**

		Estonia					EU-27				
		2010	2019	2020	2021	2022	2010	2019	2020	2021	2022
Tax structure	Total taxes (including compulsory actual social contributions) (% of GDP)	33.2	33.5	33.3	33.5	32.8	37.9	39.9	40.0	40.6	
	Labour taxes (as % of GDP)	17.7	16.9	17.7	17.3		20.0	20.7	21.3	20.9	
	Consumption taxes (as % of GDP)	13.2	13.9	13.0	13.0		10.8	11.1	10.7	11.2	
	Capital taxes (as % of GDP)	2.3	2.6	2.6	3.1		7.1	8.1	8.0	8.5	
	Total property taxes (as % of GDP)	0.4	0.3	0.3	0.3		1.9	2.2	2.2	2.2	
	Recurrent taxes on immovable property (as % of GDP)	0.3	0.2	0.2	0.2		1.1	1.2	1.2	1.1	
	Environmental taxes as % of GDP	2.9	3.2	2.4	2.3		2.4	2.4	2.2	2.2	
Progressivity & fairness	Tax wedge at 50% of average wage (Single person) (*)	37.3	30.5	30.8	31.5	32.2	33.9	32.3	31.9	32.1	31.7
	Tax wedge at 100% of average wage (Single person) (*)	40.1	37.0	37.3	38.2	39.0	41.0	40.1	39.9	39.6	39.7
	Corporate income tax - effective average tax rates (1) (*)		17.0	17.0	17.0			19.5	19.4	19.1	
	Difference in Gini coefficient before and after taxes and cash social transfers (pensions excluded from social transfers) (2) (*)	6.4	5.3	8.0	7.9		8.6	7.7	8.1	7.8	
Tax administration & compliance	Outstanding tax arrears: total year-end tax debt (including debt considered not collectable) / total revenue (in %) (*)		6.1	6.8				31.6	40.7		
	VAT Gap (% of VAT total tax liability, VTTL)		3.3	1.8				11.0	9.1		

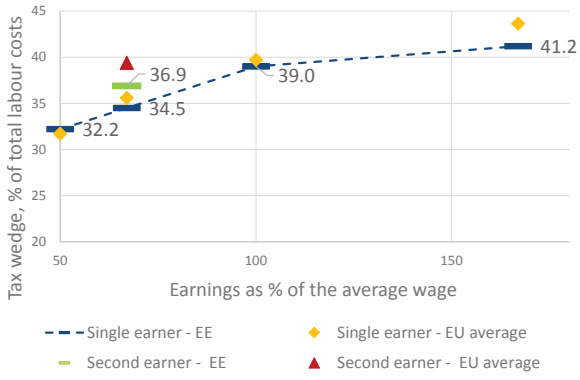
(1) Forward-looking effective tax rate (OECD).
(2) A higher value indicates a stronger redistributive impact of taxation.
(*) EU-27 simple average
For more data on tax revenues as well as the methodology applied, see European Commission, Directorate-General for Taxation and Customs Union, Taxation trends in the European Union: data for the EU Member States, Iceland, Norway and United Kingdom: 2021 edition, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2778/843047 and the Data on Taxation webpage data https://ec.europa.eu/taxation_customs/taxation-1/economic-analysis-taxation/data-taxation_en.
For more details on the VAT gap, see European Commission, Directorate-General for Taxation and Customs Union, VAT gap in the EU: report 2022, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2778/109823
Source: European Commission, OECD.

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



Source: European Commission

Graph A19.2: **Tax wedge for single and second earners, % of total labour costs, 2022**



Second earner tax wedge assumes 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

Estonia performs well on tax compliance and tax administration, including digitalising the tax administration. Outstanding tax arrears increased slightly in 2020 by 0.7 percentage points to 6.8% of total net revenue (by comparison with the previous year), but they are significantly below the EU average of 40.7%. The Annual report on taxation 2022 shows that the rate of tax return e-filing in Estonia is 100% for corporate income taxation and close to 100% for personal taxation ([96]). 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) has decreased to 1.9%, which is significantly below the EU-wide gap of 9.1%. Finally, the average forward-looking effective corporate income tax rates were below the EU average in 2020.

([96]) European Commission, Directorate-General for Taxation and Customs Union, *Annual report on taxation 2022: review of taxation policies in the EU Member States*, Publications Office of the European Union, 2022 (see Section 2.4.1 on improving tax administration).

ANNEX 20: TABLE WITH ECONOMIC AND FINANCIAL INDICATORS

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

	2004-07	2008-12	2013-19	2020	2021	2022	forecast 2023	forecast 2024
Real GDP (y-o-y)	8.4	-1.7	3.2	-0.6	8.0	-1.3	-0.4	3.1
Potential growth (y-o-y)	5.9	0.7	2.9	3.7	3.1	2.4	1.8	1.8
Private consumption (y-o-y)	9.8	-2.7	4.1	-1.0	6.4	2.3	0.3	4.2
Public consumption (y-o-y)	4.1	1.2	2.3	2.8	4.0	-0.3	4.3	0.7
Gross fixed capital formation (y-o-y)	13.3	-4.1	2.9	24.7	2.8	-10.9	1.8	4.2
Exports of goods and services (y-o-y)	14.8	5.4	3.2	-5.3	19.9	5.0	0.9	2.8
Imports of goods and services (y-o-y)	16.6	2.0	3.4	0.4	21.0	5.8	1.8	3.2
Contribution to GDP growth:								
Domestic demand (y-o-y)	10.5	-2.9	3.2	6.3	4.9	-2.1	1.4	3.3
Inventories (y-o-y)	0.5	-0.5	0.0	-0.4	1.6	3.2	-1.0	0.1
Net exports (y-o-y)	-2.5	2.3	0.0	-4.2	-0.7	-0.7	-0.8	-0.3
Contribution to potential GDP growth:								
Total Labour (hours) (y-o-y)	0.0	-0.7	0.3	0.5	0.9	1.5	0.9	0.6
Capital accumulation (y-o-y)	3.3	1.4	1.3	1.9	1.7	1.1	1.0	1.1
Total factor productivity (y-o-y)	2.6	0.0	1.3	1.3	0.4	-0.2	-0.1	0.2
Output gap	7.1	-4.0	0.3	-2.8	1.8	-1.9	-4.0	-2.8
Unemployment rate	7.2	11.6	6.4	6.9	6.2	5.6	6.2	6.1
GDP deflator (y-o-y)	7.9	3.5	3.1	-0.5	6.0	16.6	10.3	3.6
Harmonised index of consumer prices (HICP, y-o-y)	4.6	4.5	2.0	-0.6	4.5	19.4	9.2	2.8
HICP excluding energy and unprocessed food (y-o-y)	3.8	3.7	2.1	0.2	2.4	11.8	11.2	5.4
Nominal compensation per employee (y-o-y)	15.7	3.3	6.5	6.2	9.8	8.3	10.3	4.8
Labour productivity (real, hours worked, y-o-y)	6.3	1.1	2.6	5.8	-0.1	-5.8	-0.8	2.7
Unit labour costs (ULC, whole economy, y-o-y)	8.5	3.4	4.7	3.9	1.8	14.8	11.0	2.0
Real unit labour costs (y-o-y)	0.5	-0.1	1.5	4.4	-3.9	-1.5	0.6	-1.5
Real effective exchange rate (ULC, y-o-y)	6.5	1.0	3.5	0.0	0.5	10.6	5.3	-1.4
Real effective exchange rate (HICP, y-o-y)	2.8	1.5	1.5	-0.3	1.5	8.6	.	.
Net savings rate of households (net saving as percentage of net disposable income)	-8.9	3.8	6.1	10.5	6.5	.	.	.
Private credit flow, consolidated (% of GDP)	25.1	1.9	4.6	3.0	6.5	.	.	.
Private sector debt, consolidated (% of GDP)	104.4	130.7	109.3	101.4	95.3	.	.	.
of which household debt, consolidated (% of GDP)	36.1	49.7	39.3	40.7	37.8	.	.	.
of which non-financial corporate debt, consolidated (% of GDP)	68.3	81.0	70.0	60.8	57.5	.	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances) (1)	.	5.6	1.8	1.5	1.0	.	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	-6.5	1.9	1.5	1.4	10.7	4.6	6.0	5.9
Corporations, gross operating surplus (% of GDP)	32.9	30.3	30.4	29.3	31.1	31.7	31.3	31.6
Households, net lending (+) or net borrowing (-) (% of GDP)	-6.4	1.0	1.6	3.0	0.9	-2.7	-1.1	-1.1
Deflated house price index (y-o-y)	.	-10.5	5.5	7.0	10.4	4.7	.	.
Residential investment (% of GDP)	5.3	3.1	4.2	5.4	4.9	5.2	.	.
Current account balance (% of GDP), balance of payments	-12.6	-1.0	1.4	-1.0	-1.8	-2.2	-1.1	-0.6
Trade balance (% of GDP), balance of payments	-7.9	3.0	3.5	0.1	-0.4	-0.6	.	.
Terms of trade of goods and services (y-o-y)	1.8	-0.3	0.7	0.4	0.3	0.6	2.0	0.8
Capital account balance (% of GDP)	1.2	3.1	1.6	1.8	8.9	0.5	.	.
Net international investment position (% of GDP)	-78.4	-65.8	-37.5	-21.9	-13.0	-20.5	.	.
NENDI - NIIP excluding non-defaultable instruments (% of GDP) (2)	-16.8	-16.2	18.6	41.5	39.9	27.5	.	.
IIP liabilities excluding non-defaultable instruments (% of GDP) (2)	79.4	93.1	70.8	70.4	67.9	67.7	.	.
Export performance vs. advanced countries (% change over 5 years)	55.7	29.6	7.4	17.0	23.2	.	.	.
Export market share, goods and services (y-o-y)	7.9	1.3	1.0	4.8	7.8	1.0	-1.7	-0.9
Net FDI flows (% of GDP)	-6.4	-5.0	-2.5	-10.4	-1.9	1.6	.	.
General government balance (% of GDP)	2.3	-0.8	0.0	-5.5	-2.4	-0.9	-3.1	-2.7
Structural budget balance (% of GDP)	.	.	-0.1	-4.1	-4.3	-0.2	-1.2	-1.3
General government gross debt (% of GDP)	4.6	6.9	9.5	18.5	17.6	18.4	19.5	21.3

(1) Domestic banking groups and stand-alone banks, EU and non-EU foreign-controlled subsidiaries and EU and non-EU foreign-controlled branches.
(2) Net international investment position (NIIP) excluding direct investment and portfolio equity shares.
Source: Eurostat and ECB as of 2 May 2023, where available; European Commission for forecast figures (Spring forecast 2023).

This Annex assesses fiscal sustainability risks for Estonia over the short, medium and long term. It follows the same multi-dimensional approach as the European Commission's 2022 Debt Sustainability Monitor, updated based on the Commission 2023 spring forecast.

1 - Short-term risks to fiscal sustainability are low overall. The Commission's early-detection indicator (S0) does not signal major short-term fiscal risks (Table A21.2). ([97]) Gross financing needs are expected to remain low at around 4% of GDP in the short term (2023-2024), considerably below the peak in 2020 (Table 1, Table A21.1). Financial markets' perceptions of sovereign risk are positive, as confirmed by the ratings of the main agencies.

2 - Medium-term risks to fiscal sustainability are low overall.

The baseline DSA for Estonia shows that the government debt ratio is projected to rise over the medium term, though remaining at a very low level (around 26% of GDP in 2033) (Graph 1). ([98]) ([99]) The assumed structural primary balance (a deficit of 0.7% of GDP) contributes to these developments. It appears plausible compared with past fiscal performance, indicating room for corrective action. At the same time, the baseline projections up to 2033 benefit from a favourable (although declining) snowball effect, with real GDP growth averaging 1.8% in 2025-2033. Government gross financing needs are expected at around 4% of GDP during the projection period.

The baseline projections are stress tested against four alternative scenarios to assess the impact of changes in key assumptions (Graph 1). For Estonia, reverting to historical fiscal trajectories under the 'historical structural primary balance (SPB)' would not change the projected debt ratio considering that the baseline SPB is close to the historical 15-year average (a deficit of 0.6% of GDP). A permanent worsening of the macro-financial conditions, as reflected under the 'adverse interest-growth rate differential' scenario (i.e. 1 pp. higher than the baseline) would result in a debt-to-GDP ratio about 2 pps. higher than the baseline projection. A temporary worsening of financial conditions, as captured by the 'financial stress' scenario, would result in a debt projection similar to the baseline. The 'lower structural primary balance (SPB)' scenario (i.e. SPB level permanently reduced by half of the cumulative forecast change) estimates the debt-to-GDP ratio would be about 3 pps. of GDP higher in 2033 compared to the baseline.

Additionally, stochastic debt projections indicate low risks (Graph 2). ([100]) These stochastic simulations point to a 95% probability of the debt ratio in 2027 being greater than in 2022, entailing some risk. However, such shocks point to low uncertainty (i.e. the difference between the 10th and 90th debt distribution percentiles) surrounding the government debt baseline projections.

([97]) The So is a composite indicator of short-term risk of fiscal stress. It is based on a wide range of macro-financial and fiscal variables that have proven to perform well in the past in detecting situations of upcoming fiscal stress.

([98]) The assumptions underlying the Commission's 'no-fiscal policy change' baseline notably comprise: (i) a structural primary deficit, before ageing costs, of 0.7% of GDP as of 2024; (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 from now); (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 (as for all Member States); (iv) real GDP growth rates from the Commission 2023 spring forecast until 2024, followed by EPC/OGWG 'T+10 methodology projections between T+3 and T+10, i.e. for 2025-2033 (on average 1.8%); (v) ageing costs in line with the 2021 Ageing Report (European Commission, Institutional Paper 148, May 2021). For information on the methodology, see the 2022 Debt Sustainability Monitor (European Commission, Institutional Paper 199, April 2023).

([99]) Table 1 shows the baseline debt projections and its breakdown into the primary balance, the snowball effect (the combined impact of interest payments and nominal GDP growth on the debt dynamics) and the stock-flow adjustment.

([100]) These projections show the impact on debt of 2000 different shocks affecting the government's primary balance, economic growth, interest rates and exchange rates. The cone covers 80% of all simulated debt paths, therefore excluding tail events.

3 - Long-term risks to fiscal sustainability are low overall. ([101])

The S2 sustainability gap indicator (at -0.3 pp. of GDP) points to low risks since Estonia would not need to improve its structural primary balance to ensure debt stabilises over the long term. This results from the projected decrease in ageing costs (-1.1 pps. of GDP), in particular for pensions, which more than offsets the initial budgetary position (0.8 pp.) (Table 2).

Given low long-term debt vulnerabilities, as highlighted by the S1 indicator, overall long-term risks are assessed as low. Indeed, the S1 sustainability gap indicator indicates that the SPB could deteriorate by up to 0.7 pps. of GDP without debt exceeding 60% of GDP by 2070. This result is driven by the current low debt level (-0.8 pps. of GDP) and the projected decline in ageing costs (-0.5 pps. of GDP), which compensate for the slightly unfavourable initial budgetary position (Table 2).

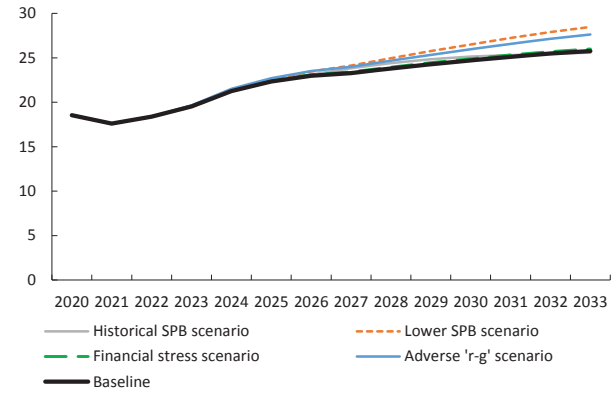
Finally, several additional risk factors need to be considered in the assessment. On the one hand, risk-increasing factors include the recent increase of interest rates, the large share of short-term debt in total debt, and the large share of public debt held by non-residents. On the other hand, risk-mitigating factors include the fact that debt is fully denominated in euro. In addition, the structural reforms under the NGEU/RRF, if fully implemented, could have a further positive impact on GDP growth in the coming years, and therefore help to mitigate debt sustainability risks.

([101])The S2 fiscal sustainability gap indicator measures the permanent fiscal effort (SPB adjustment) in 2024 that would be required to stabilise public debt over the long term. It is complemented by the S1 fiscal sustainability gap indicator, which measures the permanent fiscal effort required in 2024 to bring the debt-to-GDP ratio to 60% in the long term (by 2070). 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 pps. of GDP, 'medium risk' if it lies between 2 pps. and 6 pps. of GDP, and 'low risk' if the effort is negative or below 2 pps. of GDP. The overall long-term risk classification brings together the risk categories derived from S1 and S2. S1 may notch up the risk category derived from S2 when it signals a higher risk than S2. See the 2022 Debt Sustainability Monitor for further details.

Table A21.1: Debt sustainability analysis - Estonia

Table 1. Baseline debt projections	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Gross debt ratio (% of GDP)	**18.5**	**17.6**	**18.4**	**19.5**	**21.3**	**22.3**	**23.0**	**23.3**	**23.8**	**24.3**	**24.7**	**25.1**	**25.5**	**25.8**
Changes in the ratio	10.0	-0.9	0.8	1.1	1.7	1.1	0.6	0.3	0.5	0.5	0.4	0.4	0.4	0.3
of which														
Primary deficit	5.4	2.4	0.8	2.7	2.1	1.6	1.1	0.8	0.8	0.7	0.7	0.6	0.6	0.5
Snowball effect	0.1	-2.3	-2.2	-1.2	-0.7	-0.6	-0.5	-0.5	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3
Stock-flow adjustments	4.4	-1.0	2.2	-0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross financing needs (% of GDP)	10.5	2.8	4.4	4.2	4.5	4.0	3.7	3.4	3.5	3.6	3.6	3.6	3.7	3.7

Graph 1. Deterministic debt projections



Graph 2. Stochastic debt projections 2023-2027

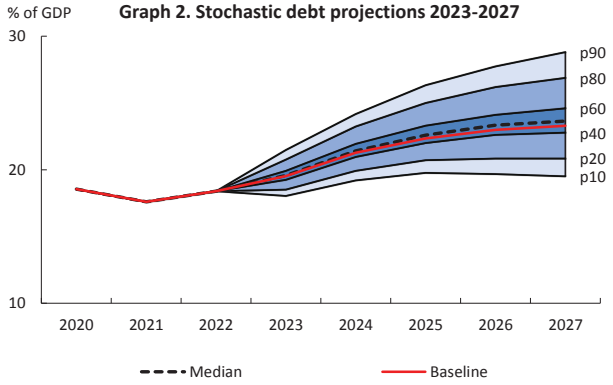


Table 2. Breakdown of the S1 and S2 sustainability gap indicators

		S1	S2
Overall index (pps. of GDP)		**-0.7**	**-0.3**
of which			
Initial budgetary position		0.7	0.8
Debt requirement		-0.8	
Ageing costs		-0.5	-1.1
of which	*Pensions*	-1.0	-1.7
	Health care	0.5	0.6
	Long-term care	0.2	0.3
	Others	-0.2	-0.3

Source: Commission services.

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

Short term	Medium term - Debt sustainability analysis (DSA)								Long term		
			Deterministic scenarios								
Overall (S0)	Overall		Baseline	Historical SPB	Lower SPB	Adverse 'r-g'	Financial stress	Stochastic projections	S2	S1	Overall (S1 + S2)
LOW	LOW	Overall	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW
		Debt level (2033), % GDP	25.8	25.6	28.5	27.6	26.0				
		Debt peak year	2033	2033	2033	2033	2033				
		Fiscal consolidation space	62%	61%	77%	62%	62%				
		Probability of debt ratio exceeding in 2027 its 2022 level						95%			
		Difference between 90th and 10th percentiles (pps. GDP)						9.3			

(1) *Debt level* in 2033. 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 2027 its 2022 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 2000 different shocks. Green, yellow and red cells indicate increasing uncertainty.

Source: Commission services.

The Macroeconomic Imbalance Procedure matrix presents the main elements of the in-depth review undertaken for Estonia ([102]). Estonia was selected for an in-depth review in the 2023 Alert Mechanism Report. This in-depth review on the prevention and correction of macroeconomic imbalances presents the main findings on the gravity and evolution of the challenges identified, as well as policy responses and potential policy needs. Findings cover all areas of vulnerability assessed in the in-depth review.

Estonia is facing vulnerabilities relating to deteriorating price competitiveness linked to the build-up of wage and price inflation differentials with its trading partners and strong housing price growth. Estonia's economy came through the COVID-19 crisis relatively unscathed. The labour market has been tight, with relatively rapid wage wage growth (averaging 7% between 2012 and 2019) and household savings at record levels. With the energy crisis, this overall setting gave a further boost to competitiveness concerns, reflected in high HICP inflation leading to a large inflation differential with respect to the euro area, unit labour cost growth and a sharp increase in real estate prices. Some gaps with macroeconomic fundamentals emerged for wages, house prices and inflation in 2022, negatively impacting competitiveness. Real estate prices surged especially over 2022, but do not show strong signs of overvaluation. However, the current account is close to balance. The deficit in goods trade is compensated by a significant surplus in services trade, largely thanks to tourism and ICT exports. Estonia has gained world export market shares over the past decade, although these trends turned slightly negative in 2022. The NIIP is only slightly negative, giving Estonia a buffer to absorb even several years of moderate current account deficits, should competitiveness losses result in such an outcome, contrary to current forecasts.

Going forward, competitiveness concerns remain, but economy-wide repercussions seem limited and house prices are likely to undergo a period of moderation. The potential competitiveness losses seem not to affect trade outcomes significantly, as services export is forecast to remain robust. The current account is forecast to weaken only marginally from the current close-to-balance position. The net international indebtedness position is expected to remain favourable and does not signal notable funding constraints going forward. House prices are likely to undergo a period of moderation, given the interest rate rises and the recent economic recession. However, risks of a sudden disorganised adjustment on the housing market are considered low, as household debt is relatively moderate (37% of GDP) and the financial sector is well capitalised, highly profitable and benefits from currently low NPLs.

Estonia's policy setup related to the above vulnerabilities can be considered as broadly appropriate. Nevertheless, certain policies could help to address the identified vulnerabilities. In particular, Estonia does not make full use of housing or wealth-based taxation, which could dampen real-estate cycles. More focus on some specific structural policies could also help to manage price pressures, such as fostering competition in the domestic market or improving labour supply. Continuing to follow counter-cyclical economic policies, such as fiscal and macroprudential policies, and reinforcing them when needed, would be important in the small and volatile Estonian economy.

Based on this assessment, the Commission considered in its communication European Semester – 2023 Spring Package (COM(2023) 600 final) that Estonia does not experience macroeconomic imbalances.

([102]) European Commission (2023), In-Depth Review for Estonia, Commission staff working document, (COM(2023) 630 final), in accordance with Article 5 of Regulation (EU) No 1176/2011 on the prevention and correction of macroeconomic imbalances.

Table A22.1: **Assessment of macroeconomic imbalances matrix**

	Gravity of the challenge	Evolution and prospects	Policy response
	Unsustainable trends, vulnerabilities and associated risks		
Housing price growth	House price growth was in line with income growth until 2019 but has since accelerated. House prices were estimated to be 2% overvalued in 2022. Prices were boosted by rising incomes and low interest rates, but also by the post-COVID economic surge (which was relatively strong in Estonia) and the 2021 pension reform, which allowed the immediate withdrawal of second pillar pension assets (worth 5% of GDP). Nevertheless, household debt is relatively low and stable at 36% of GDP in 2022, below prudential and fundamental limits.	House prices are likely to undergo a period of moderation, given the interest rate rises and the recent economic recession, already reflected in a decline in transactions. This adjustment can be expected to slow down construction and private consumption. However, risks of a disorderly adjustment are considered low, as household debt is relatively moderate and the financial sector is well capitalised, highly profitable and benefits from currently low NPLs.	Some policy needs related to the house price increases remain. The ESRB assessment of 2022 is that the macroprudential policy stance on the real estate market developments is appropriate and sufficient. Still, as a precautionary measure, the Bank of Estonia raised the countercyclical capital buffer rate for the banks from 1% to 1.5% starting from 1 December 2023.However, Estonia does not make full use of housing or wealth-based taxation, which could also dampen real-estate cycles.
Cost competitiveness	HICP inflation was in check prior to 2022, but has since surged, to 19.4% in 2022, well above the EA and EU average. This increase not only reflected energy price increases, but also domestic factors. Over the past decade, the core inflation REER (compared to 42 main trading partners) appreciated by almost 15% and Estonia's ULC growth was very high, at 6.4% annually, compared to an EU average of 1.7%. Wage growth was also above a benchmark of economic fundamentals. Nevertheless, the current account has been close to balance and Estonia gained world export market shares until 2022. The loss in exportsover recent months could be related to some transient sector specific problems due to global demand and supply chain shifts.	HICP inflation is forecast to abate to rates similar to the rest of the EA and EU, helped by the decline in energy prices. However, relatively rapid ULC growth is forecast to continue, reflecting the catching-up of the economy and the tight labour market. Unless still compensated by non-cost competitiveness factors, as in the previous decade, some exporting sectors could face more persistent cost competitivness issues.	The policy setting is overall consistent with an improvement in competitiveness. Still, ongoing policy actions related to improving the labour market supply side, competition in the domestic market and boosting energy supply and efficiency could help to ease price and wage pressures. Appropriately, in April 2023, the new government has announced intentions to improve the effetiveness of the Competition Authority, increase funding for innovation and education and prioritise green energy production capacity. Continuing to follow counter-cyclical economic policies, such as fiscal and macroprudential policies, and reinforcing them when needed, would be important.

Source: European Commission