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2023 Country Report - Denmark

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Recommendation for a COUNCIL RECOMMENDATION

on the 2023 National Reform Programme of Denmark

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2023 Country Report



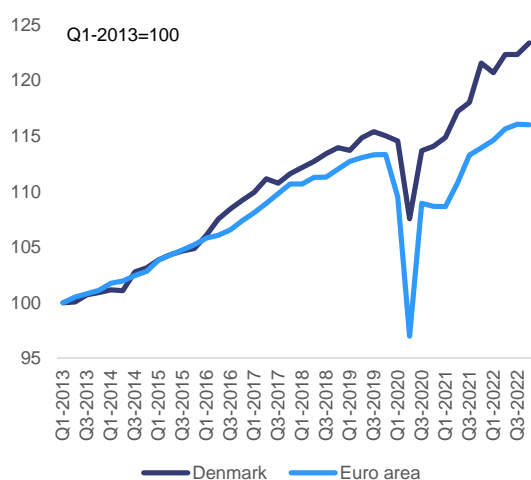
ECONOMIC AND EMPLOYMENT SNAPSHOT

Economic resilience in the face of new challenges

The Danish economy has experienced a prolonged period of robust growth, only interrupted by significant fluctuations in activity during the COVID-19 pandemic.

Denmark's per capita GDP (in purchasing power standard/PPS) was 133% of the EU average in 2021, the third highest in the EU. Between 2013 and 2019, economic growth averaged 2.1%, which was above the EU average growth rate of 1.8%, and significantly higher than the slow pace of recovery after the global financial crisis in 2008. Regional disparities have increased slightly between the capital region and the rest of the country, but remain moderate overall.

Graph 1.1: Real GDP



Source: Eurostat

Denmark's economy has proved broadly resilient to the pandemic-related challenges. The sharp economic downturn caused by the pandemic in 2020 was less pronounced than in the EU overall and was soon followed by a strong rebound. This was

helped by extensive economic support measures to mitigate the effects of the pandemic and a relatively quick lifting of most pandemic-related restrictions. Denmark's GDP already surpassed pre-pandemic levels in Q2-2021 (see Graph 1.1). The strong rebound has been sustained, with real GDP expanding by 4.9% in 2021 and 3.8% in 2022, despite the economic shocks caused by the Russian war of aggression against Ukraine. Strong net exports, resilient investments and positive stockbuilding were the main drivers of growth in 2022, while domestic demand faltered due to inflationary pressures eroding households' purchasing power and lowering private consumption. Denmark recorded a current account surplus of 13.1% of GDP in 2022. This is by far the largest surplus in the EU, and a large increase compared to the already high pre-pandemic level (see Annex 20). The increase in 2022 was largely due to a temporary spike in sea freight rates.

Economic growth is expected to be subdued in 2023 before improving in 2024. Headwinds to domestic demand are set to persist in 2023 given high — albeit slowing — inflation, while exports are being affected by the global economic slowdown. At the same time, activity and capacity utilisation continue to run at high levels, supporting investment. Real GDP growth is expected to decrease to 0.3% in 2023, before picking up pace again in 2024 to a growth rate of 1.5% .

The removal of COVID-19 restrictions has boosted employment. While employment growth has levelled off since Q3-2022, total employment reached a new high of almost 3 million people. Employment rates surged over the same period, from 77.8% in 2020 to 79.1% in 2021 and to 80.2% in Q3-2022. The labour force participation rate also grew rapidly, from 79.6% in Q3-2021 to 80.6% a year later, driven mainly by a surge in female labour market participation. Despite much

higher labour market participation, the unemployment rate has fallen to very low levels. In March 2023, the unemployment rate was 4.6%, up from 4.0% a year earlier and down from 6.4% in March 2021. Denmark has managed to substantially improve the labour market integration of young people and persons with disabilities, while unemployment remains high among foreign-born residents.

The tight labour market situation is beginning to ease. The low unemployment rate reflects a very tight labour market, making it difficult for businesses to fill vacancies. However, in recent months the slowdown in output and employment growth has started to ease pressures in the labour market. The number of vacant positions has started to fall and unemployment appears to have stabilised at a low level. In the Commission's 2023 Spring Economic Forecast, the unemployment rate is expected to increase slightly to 5.0% in 2023.

Inflation remains very high in Denmark, as in most of the EU. Since early 2021, consumer price inflation has been rising as economic activity rebounded and pressures on global supply chains increased. Inflation increased sharply following the Russian war of aggression against Ukraine from 1.9% in 2021 to 8.5% in 2022, the highest rate of inflation recorded in Denmark since the early 1980s. Rising energy, food and commodity prices were the main drivers behind the initial surge in inflation. These pressures have become broader-based due to higher production costs and higher import prices, as also reflected in the considerable rise in core inflation.

Following successive declines in headline inflation since October 2022, price pressures appear to be receding. The recent decline has been driven mainly by falling energy inflation, which reflects the drop in wholesale energy prices as well as a temporarily lower electricity levy in the first half of 2023. In turn, core inflation remains high at 7.2% in March 2023. Price pressures are expected to continue easing given the weaker economic outlook, global supply chain pressures easing and energy prices levelling off. However, with broader-based price

increases and possible further lagged adjustments of prices to higher costs, inflation is expected to fall only gradually in 2023 to 4.3%. Collective wage bargaining rounds in 2023 point to higher wage growth than in previous years, helping restore real wage levels while also prolonging inflationary pressures.

Denmark's productivity is high and rising thanks to a favourable business environment, investment in R&D and sectoral reallocations. Labour productivity (GDP per hours worked, PPS) is 140% of the EU average, and has been growing at around 1.4% each year for the past 10 years⁽¹⁾. Over half of the estimated increase in total factor productivity⁽²⁾ between 2000 and 2018 resulted from resources shifting to more productive businesses/sectors⁽³⁾. Denmark also benefits from a comparatively high level of R&D expenditure and share of R&D personnel in total employment.

Increasing competition and broadening the innovation base may offer further productivity gains. Strong competition can drive productivity gains as it encourages firms to use labour and capital more efficiently, for example by adopting best workflow practices and new technologies. The Danish Productivity Board's 2022 annual report suggests domestic competitive pressures weakened in 2000-2018, as signalled by higher markups. While the innovation environment remains healthy, business R&D intensity⁽⁴⁾ has been decreasing and is concentrated in large companies. Start-ups and small and innovative companies face some difficulties in scaling up (see Annex 11).

(1) The Danish National Productivity Board, [Productivity 2022](#).

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

(3) The Danish National Productivity Board, [Productivity 2022](#).

(4) [Glossary: R & D intensity - Statistics Explained \(europa.eu\)](#)

Box 1.1: Energy policy response in Denmark

Denmark has adopted several support measures to cushion the impact of energy price inflation on households and businesses. The Commission's 2023 Spring Forecast projects the country's gross budgetary costs to amount to 0.2 % of GDP in 2023 ⁽⁵⁾.

The main measure, a temporary lowering of the electricity levy, is ineffective as it reduces the price incentive and is not targeted enough to help the most vulnerable. This measure took effect from 1 January 2023 and expires on 30 June 2023.

In addition, Denmark has introduced a range of social benefits that target older people, people not in work or training, students and other low-income groups. The measures maintain the price signals and are clearly targeted. A targeted and means-based lump sum payment in the form of a 'heat cheque' was also introduced ⁽⁶⁾, as well as a scheme to freeze energy expenses for gas, electricity and district heating when the prices exceeds a certain price cap. ⁽⁷⁾.

Denmark applies the EU solidarity contribution in application of Council Regulation (EU) 2022/1854 ⁽⁸⁾. The legislation carrying through the solidarity contribution is expected to be adopted and enter into force in May 2023. It will be applicable in 2023 only.

Furthermore, Denmark applies the compulsory revenue cap of EUR 180 per megawatt hour electricity. The first reading in the Parliament of the draft laws regarding both legislations took place on 30 March 2023. The new Government, which took office in December 2022 expects the legislation for the revenue cap to be adopted late April and enter into force in the beginning of May 2023. In accordance with the Council Regulation ⁽⁹⁾, it will be applicable for the period 1 December 2022 to 30 June 2023.

On security of supply, the launch of the Baltic Pipe in September 2022, which connects the gas systems of Denmark, Norway and Poland, was key to compensating for the halted Russian imports and the temporarily closed production of the Tyra Field (set to gradually reopen at the end of 2023/early 2024). In addition, Denmark launched a comprehensive energy savings campaign ⁽¹⁰⁾ and adopted the reform paper 'Denmark can do more II' to accelerate the phasing out of individual gas and oil heating systems, and increase the production of biogas and electricity.

⁽⁵⁾ For 2022, gross budgetary costs of measures amounted to 0.1% of GDP.

⁽⁶⁾ [The heat check \(varmecheck.dk\)](https://varmecheck.dk)

⁽⁷⁾ [Indefrysning af energiudgifter \(borger.dk\)](https://indefrysning.af.energiudgifter(borger.dk))

⁽⁸⁾ The application of a mandatory temporary solidarity contribution at a rate of at least 33% to the extraordinary and unexpected profits of businesses active in the crude petroleum, natural gas, coal and refinery sectors. It is calculated on taxable profits, as determined under national tax rules in the fiscal year starting in 2022 and/or in 2023, which are above a 20% increase of the average yearly taxable profits in 2018-2021.

⁽⁹⁾ [EUR-Lex - 32022R1854 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/lexuri/cs.do?uri=CELEX:32022R1854-EN)

⁽¹⁰⁾ [State of energy supply | Dea \(ens.dk\)](https://ens.dk)

Government plans to raise the efficiency of public spending may support productivity growth. Planned measures include a shortening of certain higher education courses, mainly master programmes, and improving efficiency in the public sector, including healthcare and hospitals. The latter could be key to improving public services in the face of labour shortages and an ageing population.

Denmark scores very well on the UN Sustainable Development Goals (SDGs), although some challenges remain in improving productivity and life on land. The country ranks among the top 5 global

performers overall and excels in most of the areas of environmental sustainability, fairness and macroeconomic stability. However, on the productivity dimension, early leavers from education and training and the share of adults participating in training are significant challenges. Denmark also scores below the EU average on life on land (see Annex 1).

While Denmark performs very well on most indicators for employment and health-related policies in the European Pillar of Social Rights, there is a lack of affordable housing in some areas.

While its early leaving rate from education and training is near the EU average, it bucks the downward trend seen in other EU Member States with a stable share of 9.8%. Denmark is the only Member State classed as being in a 'critical situation' in terms of the housing cost overburden rate: for 15.5% of households, housing costs represent more than 40% of their disposable income, almost double the EU average of 8.3% (see Annex 14). The burden is particularly high for single people (41.0%) and for tenants paying rent at market prices (30.3%), while it is also high for people living in cities (21.9%) and for non-EU citizens (21.9%). House prices are starting to decline but remain high. House prices increased rapidly between the second half of 2020 and the first half of 2022 due to high demand for housing and higher prices for building materials. The house price index for single-family homes rose by 18.2% from Q1-2020 to Q2-2022. The increase was particularly strong in the capital region, where prices rose by 27%. In Q3-2022, house prices declined in all Danish regions, by 3.3% quarter on quarter, mainly reflecting successive rises in interest rates. The Danish Central Bank expects house prices to decline by 9.4% overall in 2023⁽¹¹⁾. Following rapid increases in 2020 and 2021, residential construction activity began to cool towards the end of 2022 as the significant increases in interest rates and building costs made it more expensive to finance the construction of new buildings.

⁽¹¹⁾ Danmarks Nationalbank, Outlook for the Danish Economy, March 2023.

Private sector indebtedness remains very high, but deleveraging resumed in 2021.

Both household and non-financial corporate debt-to-GDP ratios are high and above both prudential and fundamentals-based benchmarks⁽¹²⁾. However, the household debt-to-GDP ratio continued to decline in 2021 and in the first half of 2022, as net credit flows remained moderate and economic growth resumed, while the non-financial corporate debt-to-GDP ratio stabilised in 2021 after significant increases in previous years. The Danish banking sector is stable overall and has weathered the uncertainties of the past few years relatively well, but some vulnerabilities mainly linked to profitability remain (see Annex 18).

Sound public finances

Denmark benefits from sound public finances overall.

The general government budget balance has been in surplus in recent years, while the gross debt ratio has been falling. The general government surplus reached 3.3% of GDP in 2022, but is forecast to decline in 2023 and 2024, mainly due to weaker growth and employment outlook. Nevertheless, the general government budget balance is expected to remain solidly in positive territory.

Denmark is considered to be at low risk as regards the longer-term sustainability of public debt (see Annex 21).

Its general government gross debt ratio was 30.1% of GDP in 2022 and has been declining in recent years, punctuated only by a pronounced increase due to emergency pandemic measures. Even in relatively adverse scenarios, the gross debt ratio is expected to keep falling (see Annex 21). Financial market confidence in Denmark's public finances is high, as reflected in its AAA sovereign credit rating.

Denmark's sound fiscal position allowed for sizeable emergency packages during the pandemic. These measures helped shield

⁽¹²⁾ European Commission, Alert Mechanism Report 2023, COM(2022) 781 final, November 2022.

businesses and workers from the worst effects. The measures came at a sizeable cost, totalling around 4.0% of GDP. The rapid resumption of economic growth and employment then supported a renewed strengthening of public finances.

Denmark's comfortable fiscal position is linked to the longer-term economic policy mix based on stability. The fiscal policy stance rests on the Budget Law requirement of a maximum budget deficit of 1% of structural GDP. This fiscal-structural framework has helped Denmark keep public finances under control.

In 2022, Denmark welcomed a sizeable number of people fleeing the Russian war of aggression in Ukraine. The number of refugees (mainly women and children) from Ukraine reached around 35 700 permits in early April 2023. More than 27 700 displaced persons from Ukraine living in Denmark by the end of January 2023, corresponding to 0.5% of the Danish population. The number was significantly lower than expected at the beginning of the war, and in December 2022 around 3 600 displaced persons had returned to Ukraine. 40% of the displaced persons from Ukraine were employed by the end of January 2023. The overall budgetary costs linked to people arriving from Ukraine are estimated at 0.2% of GDP in 2023.

THE RECOVERY AND RESILIENCE PLAN IS UNDERWAY

Denmark's recovery and resilience plan (RRP) aims to address the key challenges related to the green and digital transition and strengthen the resilience of the healthcare sector. It consists of 10 reforms and 42 investments that are supported by EUR 1.43 billion in grants, representing 0.46% of GDP (see Annex 3).

The implementation of Denmark's recovery and resilience plan is well underway. Denmark submitted one payment request, corresponding to 25 milestones and targets in the plan and resulting in an overall disbursement of EUR 301 million. Beyond the first payment request, the implementation of the plan is on track, which will result in the submission of the second payment scheduled by the end of 2023. The preparation of a new REPowerEU chapter is underway with a view to submitting in May 2023.

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.

Implementation of the Danish RRP is underway

Denmark has successfully implemented a broad range of measures that support the green and digital transition and make the Danish economy and society more resilient. The Commission has disbursed EUR 301 million for the fulfilment of milestones and targets related to the first payment request. The first payment request included the implementation of investments and reforms related to digitalising the healthcare system, making agriculture more climate-friendly, improving energy efficiency in households and the public sector, creating the

framework for comprehensive green tax reform, sustainable mobility and investing in green R&D, such as carbon capture and storage.

REPowerEU is an opportunity to accelerate the green transition and diversify Denmark's fossil fuel dependency and its supply sources, in particular through reforms that could unlock the potential of renewables. For this instrument, Denmark benefits from a grant of EUR 131 million, on top of which the country decided to transfer EUR 66 million from the Brexit Adjustment Reserve into its REPowerEU chapter.

Denmark's second payment request will help cement the plan's impact. This payment request is the largest in financial terms. It will ensure further digitalisation of the healthcare sector and will help rehabilitate industrial sites and contaminated land. The scrappage scheme for diesel cars is having an impact, with 36 000 diesel cars expected to have been scrapped. This instalment will also kick-start Denmark's flagship digital strategy through the adoption of legislation and the cybersecurity strategy, and the roll-out of high-speed connectivity for thousands of households. Lastly, the component to boost research in green solutions will see significant progress thanks to advancing research partnerships in various areas, including carbon capture and storage, green fuels, food production, plastic reduction, textile waste and the circular economy.

Supporting the green transition

Many measures already implemented contribute to the decarbonisation of the Danish economy. This is critical for fulfilling

Denmark's ambitious national objectives and reducing dependence on fossil fuels. As part of the first set of milestones already achieved, the entry into force of many elements of the green tax reform is a crucial step towards decarbonisation. This reform consists of four elements that support Danish businesses with the green transition. Elements that have already been agreed or adopted include an investment window to incentivise businesses to invest in green technologies and hardware, the accelerated depreciation of investments in fixed assets as well as higher emissions taxes on industry. In the second payment request, the Commission will assess the progress made in implementing these measures and use of the amended tax schemes. Furthermore, a set of measures to promote green research and development have been set in motion, which will support decarbonisation of the Danish economy. Areas that are benefitting from investments include research into carbon capture and storage and the use of CO₂, green fuels for transport and industry, and climate- and environmentally friendly agriculture and food production. Several milestones in the first and second payment requests that are relevant for the green transition of agriculture have already been achieved. Agriculture is an energy- and emissions-intensive sector that requires further decarbonisation efforts. The government has completed calls for applications for several projects. These include biorefineries converting agricultural by-products into biofuels and the re-wetting of carbon-rich soils.

In the face of high energy prices and insecurity of supply in Europe, improving energy efficiency is essential for Denmark. Under the first payment request, political agreements were adopted to fund subsidy schemes for replacing oil and gas burners and improving the energy efficiency and green heating of public and private buildings and in the industrial sector. The Commission will assess the implementation and success of these schemes in subsequent payment requests.

Denmark's plan includes several measures to promote sustainable mobility. These measures aim to lower

greenhouse gas emissions in the road transport sector by 2.1 megatonnes in 2030. The first payment request encompasses a total of five milestones related to these measures, including the amendment of legislation to allow for lower registration taxes for electric vehicles, political agreement on a test scheme for road pricing, analysis to optimise heavy haulage and an agreement for a subsidy scheme for green ferries. Upcoming investments will incentivise the transition towards green modes of transport, including a cash grant for scrapping diesel cars, investments in bike lanes and electric bike charging stations and car sharing.

Circular economy and waste management policies remain an important challenge, which is partially supported by the Danish plan. The first payment request includes the selection of a roadmap to research and develop solutions in order to reduce and reuse plastics and textile waste in all steps of the value chain. Under the second payment request, it is expected that private-public research partnerships will be selected and receive funding.

Accelerating the digital transition

Investments in the digital transition are ongoing and include a flagship digital strategy. As part of the first set of milestones already achieved, Denmark has introduced a depreciation scheme under the green tax reform that encourages digital investments. It allows companies to claim a tax deduction for undertaking investments that can help accelerate their digital transition. Denmark has also implemented digital solutions in the health sector. Starting from the second payment request, substantial reforms are expected from the new digital strategy. It aims to improve the digitalisation of public administration (for instance through artificial intelligence) and prepare the society for new challenges with the new and more ambitious cybersecurity strategy adopted in 2021. The Danish government unveiled its digital strategy in May 2022. In addition, ultra-fast internet broadband coverage is being

rolled out in rural areas that were previously not covered.

solutions for patients will be implemented and a report on the effects of COVID-19 vaccines will be published.

A more resilient and digitalised healthcare system

Measures aimed at strengthening the resilience of the healthcare system were implemented in 2021 and 2022 and seem on track for the forthcoming payment requests. The COVID-19 pandemic revealed the need to ensure stocks of critical medical products, provide fast and reliable reporting of health events and more investments in the digitalisation of the health sector. As assessed in the first payment request, Denmark has monitored and ensured adequate stocks of critical medicines in the secondary healthcare sector to anticipate medicine needs and ensure the right levels of storage capacity for critical medicines. Digital solutions have been put in place, including the expansion of online consultations for health anxiety triggered by COVID-19, and further development of the Kontakt Læge app. The aim is to increase the use of telemedicine and patient involvement in the healthcare system. Furthermore, Denmark has implemented an IT system for reporting side effects of COVID-19 vaccines and other medicines, available to all general practice clinics in the country. As part of the second and third payment requests, further digital

Box 2:

Key deliverables under the RRP in 2023-2024

- Publish a study on the effects and side effects of COVID-19 vaccines
- Complete a feasibility study on carbon capture and storage
- Agree on the next steps within the green tax reform in line with the conclusions of the report produced by the expert group for a uniform CO₂ tax regulation
- The law on green tax reform, including higher emissions taxes on industry, will be adopted by the Danish Parliament and 36 000 diesel cars scrapped thanks to the cash grant.
- At least 50% of the measures in the digital strategy will be implemented in relevant regulatory and legislative acts
- At least 550 small and medium-sized enterprises (SMEs) will receive funding for digital projects
- 500 firms will have used the tax deductions for R&D

FURTHER PRIORITIES AHEAD

Beyond the challenges addressed by the RRP, Denmark faces additional challenges not sufficiently covered in the plan.

These concern in particular accelerating the green transition, reducing dependence on fossil fuels (47% of electricity production came from combustible fuels in 2021), improving the electrification of transport, creating a more circular economy and improving waste management policies, addressing labour supply shortages and skills mismatches, as well as improving the functioning of the housing market. Addressing these challenges will also help make further progress in achieving the SDGs where Denmark currently shows room for further improvement, namely SDG 13 (Climate action), SDG 12 (Responsible consumption and production), SDG 11 (Sustainable cities and communities and SDG 4 (Quality of education).

Paving the way for an increasingly green economy

Denmark has committed to ambitious decarbonisation objectives, but risks not achieving them.

Its climate policy aims to reduce greenhouse gas emissions by 70% by 2030 compared to 1990 and achieve climate neutrality by 2045 at the latest, including a commitment to phasing out coal completely by 2028. However, the assessment by the Danish Council on Climate Change indicates risks in achieving these targets in relation to carbon capture, utilisation and storage, emissions from agriculture, and the pace of expansion of renewable energy capacity.

Denmark is a front runner in the uptake of renewable energy (44% of the energy mix in 2021) and clean tech, in particular wind production.

The country is a global leader in integrating wind power into the

electricity grid. It is also a leading player in the large-scale (including solar) district heating market and performs well on eco-innovation⁽¹³⁾ and share of green patents⁽¹⁴⁾. It aims to quadruple its electricity production from solar and onshore wind turbines by 2030 compared to 2021 levels⁽¹⁵⁾. Today, 2.3 GW of offshore wind capacity is installed in the Danish seas, with another 350 MW achieved by the end of 2023 and 1 GW at the latest by 2027. Furthermore, a total of 6 GW of new offshore wind farms and 3 GW of offshore wind from energy island⁽¹⁶⁾ Bornholm are in the pipeline for 2030.

Faster commissioning of projects and simplified permitting rules are essential to achieve national ambitions for offshore and onshore wind capacity.

Several initiatives intend to streamline permitting procedures and shorten delays. The expansion of offshore wind, the 'open-door' permitting scheme is currently being reviewed. On offshore wind farms, a service check and evaluation to remove unnecessary legislative barriers and shorten approval time, in line with applicable legislation, have been put in motion. A 'renewable travel team' was also set up to deliver key renewable energy projects in municipalities (see Annexes 7 and 12). In order to increase the speed of the green transition and to become independent from Russian fossil fuel, Denmark has furthermore established a national energy crisis staff (NEKST) that must ensure faster action on acute green challenges.

⁽¹³⁾ Eco-innovation Index, [Eco-Innovation \(europa.eu\)](https://ecoinnovation.europa.eu)

⁽¹⁴⁾ Overall Strategic Analysis of Clean Energy Technology in the European Union, JRC (2022).

⁽¹⁵⁾ Faktaark – [Firedobling af VE på land](#) (2022).

⁽¹⁶⁾ Energy islands serve as hubs that gather electricity from the surrounding offshore wind farms and distribute it to the electricity grid in Denmark as well as directly to other countries

Better energy connectivity, including energy islands in the Baltic Sea and North Sea, will facilitate cross-country energy interconnection but require sufficient grid expansion planning at transmission and distribution level.

Renewable energy, particularly wind, provides the bulk of electricity generation (81%) in Denmark (see Annex 6). The plan to construct two energy islands (an artificial one in the North Sea and one in Bornholm) illustrates that Denmark's geographical location is particularly promising for energy linkages to other countries. The signature of two important declarations in 2022 (Esbjerg offshore wind in May and Marienborg in August) as well as Ostend in 2023 strengthens the expected role of Denmark as an exporter of electricity. In this respect, preparing integrated system planning for future grid expansion would be needed to respond to demand and flexibility needs both at transmission and distribution levels. This planning could also include backbones and storage for hydrogen and CO₂ in view of Denmark's growing ambitions on Power-to-X⁽¹⁷⁾ and carbon capture, utilisation and storage.

Boosting energy efficiency measures in buildings that combine insulation measures and the roll-out of decarbonised heating sources could further reduce dependency on fossil fuels.

Scaling up energy efficiency measures to reduce dependence on fossil fuels in public buildings could be further supported by easing budget limitations on municipalities for green projects. Additional measures to support energy efficiency in private buildings would help reduce high energy costs in Denmark. The country had the second highest household energy bills in the EU in 2022, which increased by 49% between 2019 and 2022 due to higher energy prices (from EUR 3 350/year to EUR 5 500/year).

⁽¹⁷⁾ Conversion, storage and reconversion of the surplus of electric power from renewable sources, X standing for the type of energy (e.g. hydrogen, fuel cells) into which the electricity surplus is being converted.

Domestic industrial activities offer potential for energy efficiency improvements, especially by exploiting surplus heat in district heating.

In recent years, Denmark has introduced a new set of rules improving conditions for channeling surplus heat from high-temperature industrial processes into the district heating grid⁽¹⁸⁾. By the 1st of January 2021, the levy electricity-based surplus heat from selected premises (e.g. data centers, supermarkets) was lifted, and a price cap on surplus heat supporting the use of surplus heat entered into force by the 1st of January 2022. Domestic industrial sectors are already suppliers of surplus heat to the district heating grid, but the use of surplus heating can be increased further by exploiting the potential of energy-intensive processes such as Power-to-X.

Denmark could accelerate its transition to zero- and low-emission mobility.

While the construction of public charging stations is speeding up in Danish cities and along the state road network, charging infrastructure remains a challenge for car owners living in dense urban areas, especially in Copenhagen, due to a lacking availability of publicly accessible charging points. Charging infrastructure is also not sufficient for heavy duty vehicles, where incentives until 2025 remain lower than for light vehicles. From 2025, a new kilometre based and CO₂-differentiated road toll will be imposed for lorries that will provide higher incentives within the framework of directive (EU) 2022/362. In addition, companies permit their employees to use company cars running on fossil fuel. To incentivize the uptake of zero- and low-emission vehicles, a reform from 2021 included in the Danish RRP introduced lower registration taxes on zero and low emission vehicles.

Some decarbonisation challenges remain for Denmark to reach its ambitious climate goals, especially on agriculture.

Significant decarbonisation challenges also face in Denmark's agricultural sector. In 2021,

⁽¹⁸⁾ Agreement on Increased Use of Surplus Heat 2019, Climate Agreement for Energy and Industry 2020 and Follow-up Agreement with reference to Climate Agreement on Surplus Heat 2021

the sector was the largest source of Denmark's greenhouse gas emissions under the EU Effort Sharing Regulation (38.4%), more than twice the EU average. The Danish government plans to introduce a carbon tax applying to the agricultural sector after the "Expert Group for a Green tax reform" will have published its findings. As regards carbon removals, the country will focus on measures for rewetting of organic soils (peatland) and the government intends planting 250,000 hectares of new forest.

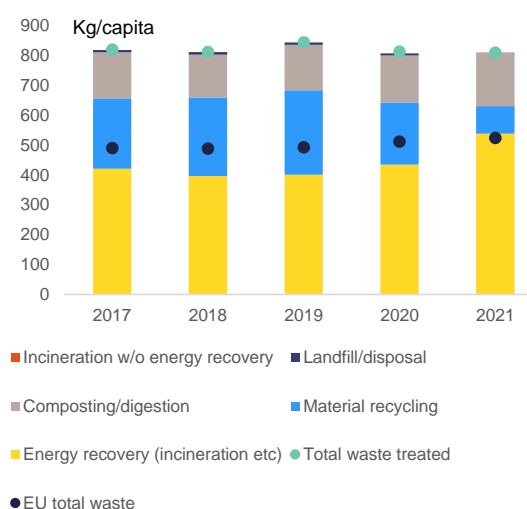
REPowerEU provides a unique opportunity to scale up and support green measures to further boost the country's decarbonisation objectives. Focusing on measures to speed up the expansion of renewable energy wind capacity, especially on grid expansion planning, could greatly benefit the country's clear commitment to renewable energy sources. Upscaling measures aiming at phasing out fossil fuel at domestic level in the current RRP could help Denmark achieve its national 2030 targets. Furthermore, there is potential for (i) supporting the acquisition of green skills in the workforce; and (ii) reducing the country's fossil fuel footprint with pioneer bio carbon-capture technologies.

Strengthening the circular economy to mirror the green energy transition

Denmark continues to underperform in certain aspects of the circular economy, especially in (municipal) waste generation, recycling rates and food waste. Municipal waste generation in Denmark has been stable but fluctuating since 2014. In 2021 preliminary data shows 786 kg/year/inhabitant. This remains the highest in the EU (EU average 530 kg/year/inhabitant) although the coverage of municipal waste can include different waste streams in different countries complicating direct cross-national comparisons. This suggests that Denmark's economic growth is not yet decoupled from waste generation. Its revised waste management plan and waste prevention

programme of July 2021 also need to be implemented effectively (see Annex 9). On recycling, the country's performance is below the European average. The recycling rate in 2019 and 2020 has recently been revised significantly downwards due to the methodological changes used to measure recycling rate of municipal waste, which complicates the identification of a clear trend in Denmark's recycling rates. Denmark ranks second worst in the EU on food waste indicators, with more than 221 kg/capita/year.

Graph 3.1: Treatment of municipal waste



Source: Eurostat

Denmark has considerable investment needs in recycling municipal and packaging waste. According to a Commission study⁽¹⁹⁾, to meet the recycling targets for municipal waste and packaging waste, Denmark would need to invest an additional EUR 41.5 million per year between 2021-2027 in waste collection, recycling and reprocessing, biowaste treatment and waste sorting facilities. New policy instruments, including sharpening economic incentives, could make prevention, reuse and recycling more economically attractive. Policy efforts in this area are ongoing including through the implementation of the Agreement on climate plan for a green waste sector and circular economy (2020), which amongst other initiatives entails rolling out nationwide

⁽¹⁹⁾ European Commission, 2019, [Study on investment needs in the waste sector and on the financing of municipal waste management in Member States](#), p. 61.

collection requirements for municipal waste and structural changes to the roles of the municipal and private sectors in the treatment of waste.

Investing more in environmental protection and reducing environmentally harmful subsidies could further promote the circular economy. Of the 16 environmentally harmful subsidies in Denmark, 6 relate to transport (fossil fuels) and 10 to agriculture⁽²⁰⁾. Denmark has not yet delivered a final framework of priority actions for investments in Natura 2000 sites (see Annex 6).

Training the labour force, including for the green and digital transitions

Labour shortages continue to be a significant concern for Danish businesses, particularly SMEs. The biggest labour shortages are in industry, construction, healthcare and the services sector. Although labour shortages are easing in industry, the gap remains challenging. Having crossed the 40% threshold in Q2-2022, the share of employers that identified labour shortages as the main factor in limiting production in the industrial sector decreased to 21.2% in Q4-2022 (compared to the EU average of 25.9%). In the services sector, 39.0% of firms reported labour shortages in Q4-2022. Meanwhile, the healthcare sector is facing a growing need for labour (see Annex 14). While the number of vacancies decreased in Q3-2022 and Q4-2022, it is still at a significantly higher level than before the pandemic.

The green transition has created further demand for green skills in the context of labour shortages and skills mismatches. The number of jobs in the environmental goods and services sector grew by over 79 000 between 2015-2020, and the demand

for green skills is increasing further (see Annex 8). According to HBS Economics methodology⁽²¹⁾, 8.6% of job postings at the beginning of 2022 included requirements for green skills, with the highest demand in construction, where the share was 18%. In 2022, labour shortages were reported in Denmark for 60 occupations that required specific skills or knowledge for the green transition, including environmental engineers, environmental protection professionals and building architects⁽²²⁾. Online job advertisements in clean energy deployment sectors more than doubled between Q4-2021 and Q4-2022 (+112%), well above the already high increase in the EU (+49%; see Annex 7).

Upskilling and reskilling workers for the green transition is essential to ensure a smooth transition. In energy-intensive industries, the number of workers taking part in education and training declined from 24.6% in 2015 to 15.6% in 2021. However, it is still well above the EU average (8.9%). 32% of individuals believe they do not have the necessary skills to contribute to the green transition (EU: 38%; see Annex 8). Against the backdrop of the June 2022 green tax reform agreement, Danish political parties decided to allocate DKK 100 million in 2025 and 2026 for training and upskilling in support of the green transition. Funds will target the training of educators, investments in green equipment and the development of green learning pathways. These measures follow previous initiatives to support green training and reskilling, which run until 2025.

⁽²¹⁾ HBS Economics, 2022, [Newly developed method for calculating the demand for green skills](#).

⁽²²⁾ Data on shortages is based on the 2023 European Labour Authority EURES Report on labour shortages and surpluses 2022. National authorities report through a questionnaire, based on administrative data and other sources submitted by the EURES National Coordination Offices (definitions of shortages differ, therefore data is not comparable across countries and covers a wide range of sectors). Skills and knowledge requirements are based on the European Skills Competences and Occupations (ESCO) 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.

⁽²⁰⁾ European Commission, 2023, [Mapping objectives in the field of environmental taxation and budgetary reform: Environmentally harmful subsidies \(EHS\)](#).

Even though Denmark has a high level of digital literacy, the shortage of ICT specialists is a pressing concern for the digital transition. The share of firms that try to recruit ICT specialists and report difficulties in filling these vacancies is high, at 62% of firms with over 10 employees, increasing from 58% in 2020. The applicants' lack of relevant qualifications from education or training was the factor most often reported as a difficulty in filling the vacancies (57% of firms; see Annex 10).

The digitalisation strategy of May 2022 aims to improve and strengthen the digital skills of individuals, businesses and the public sector. The strategy seeks to improve the digital skills of individuals by increasing the use of digital tools and courses with relevant digital content, from primary education to higher education, and by developing the competences of teachers and educators. There is also a digital equipment fund for vocational education. The digital strategy is a key component of the Danish RRP to tackle skills gaps in the digital sector.

The government aims to increase the focus on young people not in education, employment, or training (NEET), and support admission to vocational education and training (VET). These measures are seen as vital to addressing the acute labour shortages in Denmark. Unemployment is highest among people without a formal education and among those with very little or no training. For young people aged 15-24, the NEET share was relatively low (8.8%) in Q4-2022. The admission to some VET programmes and their graduates do not follow the demand in some sectors of the labour market. Policies that help VET provide young people in the NEET category with relevant skills are of crucial importance for the twin transition and to ease labour shortages. The new government plan includes ambitions to strengthen VET, investing in vocational schools with a focus on labour market needs, including in relation to the green transition. Moreover, the government aims to improve opportunities for further education for those who choose VET, such as accessing higher

education without needing an upper secondary education first ⁽²³⁾.

Making the housing market more resilient

Affordable housing remains an important challenge for many households. Key issues include high prices for owner-occupied housing, a highly regulated rental market and long waiting times for social housing in the main urban areas. The percentage of households who report that housing costs pose a burden increased by 8 percentage points between 2021 and 2022, reaching 44% of households – its highest level since the start of the survey in 2004 ⁽²⁴⁾. While this higher burden is reported across all income quintiles, the lower income categories are more affected. The need for affordable housing is especially acute for households in densely populated areas like the Copenhagen region.

Policies to increase the supply of affordable housing units are required to address the needs of households. A political agreement was reached in 2021 to further increase the construction of affordable rental housing, primarily social housing, with a total budget of EUR 1.35 billion for 2022-2035. The agreement allocated EUR 0.67 billion for 2022-2031, while the remaining EUR 0.68 billion will be allocated at a later stage. As a result of the political agreement, several support schemes to promote the construction of affordable rental homes were operational by early autumn 2022. As the schemes have only been in effect for a limited time, the number of applications for most schemes has so far been modest. However, national authorities expect applications to start increasing in 2023. High inflation in 2022 and 2023 has a negative impact on the expected number of affordable rental homes that can be supported by the initiative as

⁽²³⁾ <https://www.stm.dk/statsministeriet/publikationer/regeringsgrundlag-2022/>

⁽²⁴⁾ Statistics Denmark, [Housing Burden](#).

grants are indexed in line with inflation for most support schemes, while the total appropriated budget was fixed at current prices. Following the November 2022 election, there is no longer a political majority behind the former political agreement on strengthening the construction of affordable rental homes. However, the support schemes already put in place are unaffected. The Danish government has announced that it will present a comprehensive housing policy proposal aimed at a housing market with a mixed supply of owner-occupied housing, social housing, cooperative housing and private letting.

A new property tax system, including new housing valuations, would improve the resilience and fairness of the housing market. The new system is expected to come into effect on 1 January 2024. It aims to end the long-standing cap on recurrent property taxes and is expected to lead to a fairer and more transparent system. The new system could lead to higher property taxes in the largest urban areas, while the opposite could hold for less densely populated areas. This would help level out the substantial price differences between small towns and large cities, especially Copenhagen and Aarhus. Additional delays could jeopardise this normalisation of the property tax system, including the fairer and more equal taxation effect.

Danish households have the highest mortgage debt levels in the EU in relation to GDP. This is due to several factors, including a unique mortgage financing system that provides low interest rates, significant pension savings, taxation policies, as well as certain idiosyncratic features of the Danish mortgage market. Mortgage owners can benefit from interest-only, deferred amortisation mortgage loans, expands their borrowing capacity and ability to plan consumption over lifetime. In addition, the tax system allows for one of the highest tax deductions for mortgage interest payments in the EU, incentivising debt financing of residential property. However, variable-rate mortgages as well as interest-only or deferred amortisation mortgages constitute potential

risks to some highly indebted households' financial position. Overall, Danish households are already the most indebted in the EU, which would call for faster amortisation, but they also hold high assets. Some homeowners risk significantly higher debt service costs if interest rates rise. The availability of interest only loans could lead to excessive risk taking by some highly indebted borrowers, although credit assessment by mortgage institutions is to be based on ability to afford a fixed rate mortgage with amortization. As higher interest rates tend to be linked to falling property prices, the risks could reinforce each other.

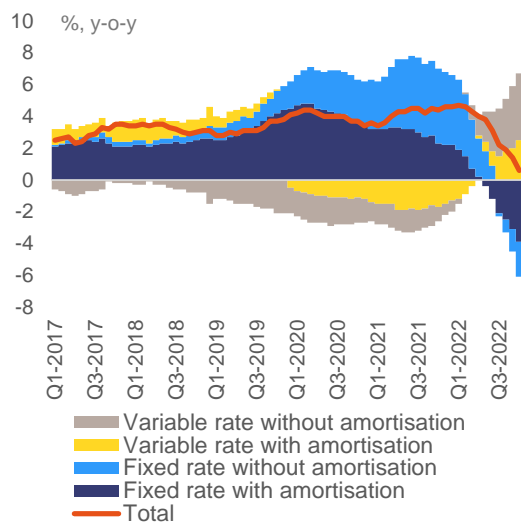
Households are increasingly vulnerable to interest rate hikes and house price declines. In 2022, the demand for mortgages continued to rise, albeit at a more moderate pace. The increase was partly due to decisions by households to refinance existing mortgages. A growing share of households have refinanced their fixed-rate mortgages and opted for variable-rate mortgages, of which an increasing proportion are with deferred amortisation (see Graph 3.1). This frequently resulted in a reduction in their overall debt. A significant portion of new lending taken out at a variable interest rate with deferred amortisation has a high loan-to-value ratio above 60%⁽²⁵⁾. Nonetheless, most refinancers remain robust even in severe scenarios. Although there are currently no clear signs of rising mortgage defaults and credit institutions' impairment rates (decrease or write-off of mortgage loans) remain low (see Annex 18), the Danish Systemic Risk Council observed in September 2022⁽²⁶⁾ that homeowners with variable-rate mortgages with deferred amortisation are particularly vulnerable to their mortgage payments rising significantly in the event of rising interest rates. Strengthening the resilience of heavily indebted highly mortgaged homeowners who opt for variable interest rates and deferred

⁽²⁵⁾ The Danish Systemic Risk Council reported in September 2022 that of the new lending in the first half of 2022, 37% of homeowners' mortgage debt taken out at a variable interest rate with deferred amortisation has a loan-to-value ratio above 60%.

⁽²⁶⁾ In June 2021, the Danish Systemic Risk Council already recommended limiting access to interest-only loans for borrowers who have a loan-to-value ratio above 60%, but the proposal was rejected by the then government.

amortisation to withstand declines in house prices or higher interest rates would help address the risks.

Graph 3.2: **Increase in variable-rate mortgage loans with deferred amortisation**



(1) Growth contribution to annual growth in total mortgage lending at nominal value.

Source: Nationalbank

KEY FINDINGS

Denmark's recovery and resilience plan includes measures to address a series of its structural challenges through:

- accelerating the green transition by supporting the implementation of a green tax reform, boosting investment in the energy efficiency of public and private buildings, and funding measures to reduce greenhouse gas emissions in transport, agriculture and other sectors;
- accelerating the digital transition following the adoption of the new digital strategy, modernising public administration, helping SMEs invest in digital technology and extending rural broadband coverage;
- promoting R&D investment and involving more companies in research activities, as well as supporting green research and development projects;
- increasing the resilience of the healthcare system, including digitalising healthcare, infrastructure and logistics support for critical medical products, and support for research on COVID-19 vaccines.

Denmark should continue the steady implementation of its recovery and resilience plan and swiftly finalise the REPowerEU chapter with a view to rapidly starting its implementation.

Beyond the reforms and investments in the RRP, Denmark would benefit from:

- reducing its dependence on fossil fuels and further decarbonising the economy by accelerating the deployment of renewable energies and building a supportive environment to increase investments in clean tech manufacturing, by streamlining and accelerating permitting procedures, upgrading energy transmission and distribution networks, increasing interconnections with neighbouring countries, improving energy efficiency to reduce energy consumption, and accelerating the electrification of transport;
- making further progress on the circular economy and waste management, in particular on the prevention, recycling and lower incineration of (municipal) waste, by adopting measures to curb greenhouse gas emissions from agriculture (the largest source of Denmark's greenhouse gas emissions under the EU Effort Sharing Regulation);
- addressing labour shortages, investing in re- and upskilling the labour force and increasing participation in vocational education and training, including to promote the green and digital transition;
- introducing the delayed new property tax system to ensure fairer property taxation and mitigate house price increases, addressing shortages in affordable housing in urban areas through new construction and increasing the financial resilience of heavily indebted borrowers by further limiting their reliance on variable interest rates and deferred amortisation mortgages.

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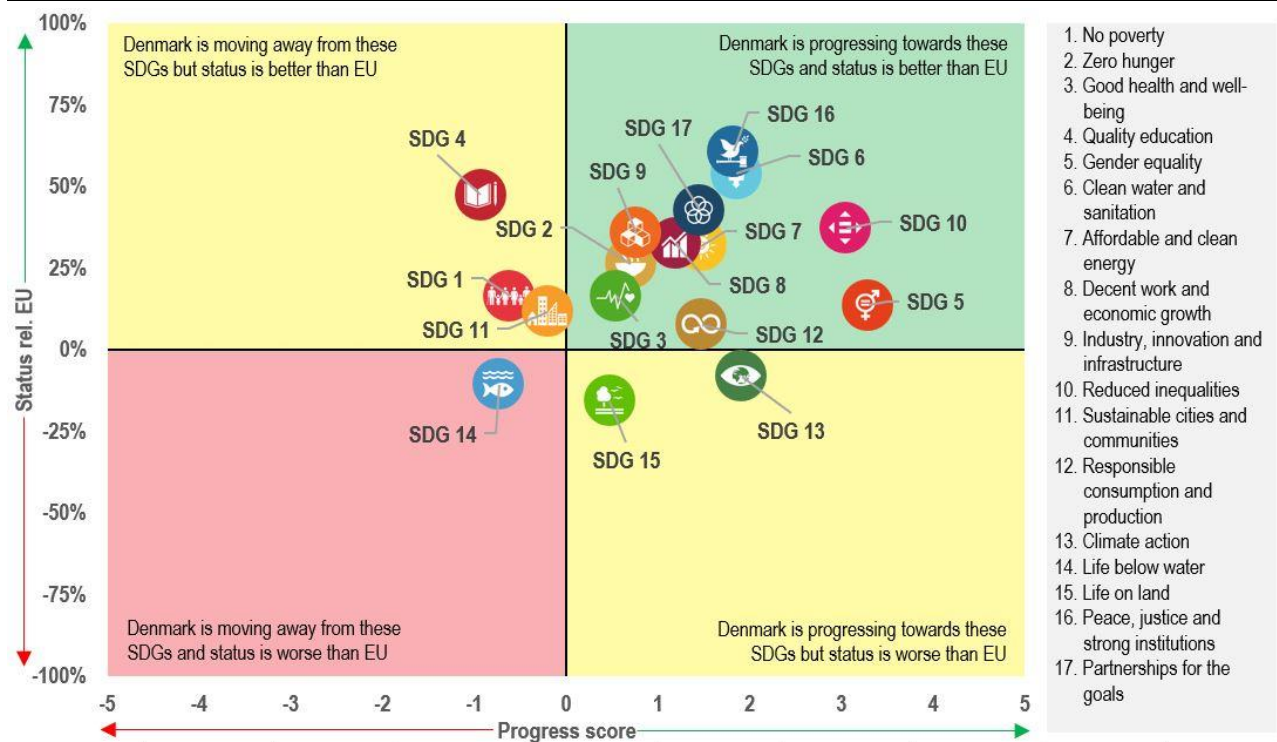


This Annex assesses Denmark’s progress on the Sustainable Development Goals (SDGs) along the four dimensions of competitive sustainability. The 17 SDGs and their related indicators provide a policy framework under the UN’s 2030 Agenda for Sustainable Development. The aim is to end all forms of poverty, 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.

Denmark performs well on most of the SDG indicators related to environmental sustainability (SDGs 2, 6, 7, 9, 11, 12), but still needs to catch up with the EU average on others (SDGs 13, 14, 15). It increased the

share of renewable energy in gross final energy consumption (SDG 7) from 31.7% in 2016 to 34.7% in 2021, which is well above the EU average (21.8% in 2021). Net greenhouse gas emissions (SDG 13) decreased from 9.7 tonnes per capita in 2016 to 7.8 tonnes per capita in 2021, moving closer to the EU average (7.4 tonnes per capita). However, net greenhouse gas emissions from land use and forestry (SDG 13) increased significantly from 43.9 tonnes CO₂ eq. per km² to 74.4 tonnes in 2021, much higher than the EU average (-50.1 tonnes CO₂ eq. per km²). On waste generation and management (SDG 12), the circular material use rate decreased from 8.0% to 7.8% between 2016 and 2021 and is below the EU average (11.7% in 2021). The recycling rate of municipal waste (SDG 11) is also much lower (34.3% in 2021) than the EU average (48.5% in 2021). The material footprint (SDG 12) increased from 21.3 tonnes per inhabitant to 24 tonnes between 2016 and 2021, and is significantly higher than the EU average (13.7 tonnes in 2021). In terms of SDG 14 (Life below water), Denmark is

Graph A1.1: Progress towards the SDGs in Denmark 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 early April 2023, except for the EU Labour Force Survey (LFS) indicators released on 27 April 2023. Data mainly refer to 2016-2021 or 2017-2022.

not only performing below the EU average on several indicators but is also moving away from the SDGs. The share of terrestrial protected areas (SDG 15) in Denmark is significantly below the EU average (14.9% compared to 26.0% in 2021). Measures included in Denmark's recovery and resilience plan (RRP) support its green transition and decarbonisation by ensuring the efficient production and use of energy, promoting sustainable transport and focusing on green research and innovation.

Denmark performs well on SDG indicators related to *fairness* (SDGs 3, 5, 7, 8, 10) but is moving away from the SDGs on others (SDGs 1, 4). The country performs above the EU average on most indicators related to poverty, gender equality, inclusive growth and inequality (SDGs 1, 5, 8, 10). In particular, the number of seats held by women in national parliaments and governments increased from 37.4% in 2017 to 42.5% in 2022 (EU average 32.5% in 2022). The EU and non-EU citizens' gap for early leavers from education and training also decreased from 8.6 percentage points in 2017 to 6.6 percentage points in 2021 (EU average: 17.6 percentage points in 2021). However, the share of people at risk of income poverty after social transfers (SDG 1) has increased from 11.9% in 2016 to 12.3% in 2021 and several quality education (SDG 4) indicators are moving away from the SDG targets.

Denmark performs well on most SDGs on *productivity* (SDGs 8, 9), but is moving away from the SDG on quality education (SDG 4). The share of households with a high-speed internet connection (SDG 9) increased significantly between 2016 and 2021 (from 58.1% to 94.9%) and is well above the EU average (70.2% in 2021). Denmark's gross domestic expenditure on R&D decreased from 3.09% of GDP in 2016 to 2.81% in 2021, but still remains above the EU average (2.26% of GDP in 2021). On SDG 4 (Quality education), Denmark performs above the EU average on most indicators, but several have shown negative trends. This is the case in particular for early leavers from education and training (up from 7.5% in 2017 to 9.8% in 2021) and the share of adult participation in learning (down from 28% in 2016 to 22.3% in 2021). The RRP includes measures to help tackle the remaining digitalisation challenges, in particular by promoting additional measures across the economy and society.

Denmark performs well on SDG indicators related to *macroeconomic stability* (SDGs 8, 16, 17). The country performs very well on peace and justice indicators, with a high level of trust in its institutions (SDG 16). The percentage of the Danish population with confidence in the European Parliament increased from 60% in 2017 to 64% in 2022 (EU average 50% in 2022). Denmark also performs above the EU average on indicators related to SDG 8 (Decent work and economic growth). Real GDP per capita (EUR 50 010 in 2021) is well above the EU average (EUR 27 880 in 2021). General government gross debt (SDG 17) fell from 37.2% of GDP in 2016 to 36.6% in 2021 (EU average 87.9% in 2021).

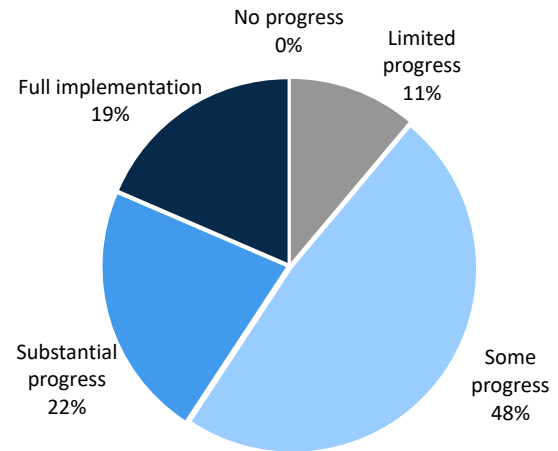
As the SDGs form an overarching framework, any links to relevant SDGs are either explained or depicted with icons in the other Annexes.



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

The Commission has assessed the 2019-2022 country-specific recommendations (CSRs) ⁽²⁷⁾ addressed to Denmark as part of the European Semester. These recommendations concern a wide range of policy areas that are related to 12 of the 17 Sustainable Development Goals (see Annexes 1 and 3). The assessment considers the policy action taken by Denmark to date ⁽²⁸⁾ and the commitments in its recovery and resilience plan (RRP) ⁽²⁹⁾. At this stage of RRP implementation, 89% of the CSRs focusing on structural issues from 2019-2022 have recorded at least 'some progress', while 11% recorded 'limited progress' (see Graph A2.1). As the RRP is implemented further, considerable progress in addressing structural CSRs is expected in the years to come.

Graph A2.1: Denmark's progress on the 2019-2022 CSRs (2023 European Semester)



Source: European Commission

⁽²⁷⁾ 2022 CSRs: [EUR-Lex - 32022H0901\(04\) - EN - EUR-Lex \(europa.eu\)](#)

2021 CSRs: [EUR-Lex - 32021H0729\(04\) - EN - EUR-Lex \(europa.eu\)](#)

2020 CSRs: [EUR-Lex - 32020H0826\(04\) - EN - EUR-Lex \(europa.eu\)](#)

2019 CSRs: [EUR-Lex - 32019H0905\(04\) - EN - EUR-Lex \(europa.eu\)](#)

⁽²⁸⁾ Including policy action reported in the national reform programme and in Recovery and Resilience Facility (RRF) reporting (twice a year reporting on progress in implementing milestones and targets and resulting from the payment requests assessment).

⁽²⁹⁾ 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 RRP. 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

Denmark	Assessment in May 2023*	RRP coverage of CSRs until 2026**	Relevant SDGs
2019 CSR 1	Some progress		
<i>Focus investment-related economic policy on education and skills,</i>	Some progress		SDG 4
<i>research and innovation to broaden the innovation base to include more companies,</i>	Some progress	Relevant measures being implemented as of 2021, planned as of 2022	SDG 9
<i>and on sustainable transport to tackle road congestion.</i>	Some progress	Relevant measures being implemented as of 2021 and 2022, planned as of 2024	SDG 11
2019 CSR 2	Some progress		
<i>Ensure effective supervision and the enforcement of the anti-money laundering framework</i>	Some progress		SDG 8, 16
2020 CSR 1	Substantial progress		
<i>Take all necessary measures, in line with the general escape clause of the Stability and Growth Pact, to effectively address the COVID-19 pandemic, sustain the economy and support the ensuing recovery. When economic conditions allow, pursue fiscal policies aimed at achieving prudent medium-term fiscal positions and ensuring debt sustainability, while enhancing investment.</i>	Not relevant anymore	Not applicable	SDG 8, 16
<i>Enhance the resilience of the health system, including by ensuring sufficient critical medical products and addressing the shortage of health workers.</i>	Substantial progress	Relevant measures being implemented as of 2021	SDG 3
2020 CSR 2	Substantial progress		
<i>Front-load mature public investment projects and</i>	Substantial progress	Relevant measures being implemented as of 2021, planned as of 2022	SDG 8, 16
<i>promote private investment to foster the economic recovery.</i>	Substantial progress	Relevant measures being implemented as of 2021, planned as of 2022, 2023	SDG 8, 9
<i>Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy,</i>	Some progress	Relevant measures being implemented as of 2021, planned as of 2025	SDG 7, 9, 13
<i>sustainable transport</i>	Substantial progress	Relevant measures being implemented as of 2021, planned as of 2022, 2024	SDG 11
<i>as well as research and innovation.</i>	Substantial progress	Relevant measures being implemented as of 2021, planned as of 2025	SDG 9
<i>Support an integrated innovation strategy with a broader investment base.</i>	Some progress	Relevant measures being implemented as of 2021, planned as of 2022	SDG 9
2020 CSR 3	Some progress		
<i>Improve the effectiveness of anti-money laundering supervision and effectively enforce the anti-money laundering framework.</i>	Some progress		SDG 8, 16
2021 CSR 1	Substantial progress		
<i>In 2022, maintain a supportive fiscal stance, including the impulse provided by the Recovery and Resilience Facility, and preserve nationally financed investment.</i>	Some progress	Not applicable	SDG 8, 16
<i>When economic conditions allow, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions and ensuring fiscal sustainability in the medium term.</i>	Full implementation	Not applicable	SDG 8, 16
<i>At the same time, enhance investment to boost growth potential.</i>			
<i>Pay particular attention to the composition of public finances, both on the revenue and expenditure sides of the budget, and to the quality of budgetary measures, to ensure a sustainable and inclusive recovery. Prioritise sustainable and growth-enhancing investment, notably supporting the green and digital transition.</i>	Full implementation	Not applicable	SDG 8, 16
<i>Give priority to fiscal structural reforms that will help provide financing for public policy priorities and contribute to the long-term sustainability of public finances, including by strengthening the coverage, adequacy, and sustainability of health and social protection systems for all.</i>	Full implementation	Not applicable	SDG 8, 16

(Continued on the next page)

Table (continued)

2022 CSR 1	Some progress		
<i>In 2023, ensure prudent fiscal policy, in particular by limiting the growth of nationally financed primary current expenditure below medium-term potential output growth, taking into account continued temporary and targeted support to households and firms most vulnerable to energy price hikes and to people fleeing Ukraine. Stand ready to adjust current spending to the evolving situation.</i>	Some progress	Not applicable	SDG 8, 16
<i>Expand public investment for the green and digital transitions, and for energy security taking into account the REPowerEU initiative, including by making use of the Recovery and Resilience Facility and other Union funds.</i>	Full Implementation	Not applicable	SDG 8, 16
<i>For the period beyond 2023, pursue a fiscal policy aimed at achieving prudent medium-term fiscal positions.</i>	Full Implementation	Not applicable	SDG 8, 16
<i>Implement the new property tax system in order to restore the link between market prices and taxes and ensure fairer taxation.</i>	Some progress		SDG 8, 10, 12
<i>Stimulate investment in construction of affordable housing to alleviate the most pressing needs.</i>	Some progress		SDG 8
<i>Increase the financial resilience of highly indebted borrowers.</i>	Limited progress		SDG 8
2022 CSR 2			
<i>Proceed with the implementation of its recovery and resilience plan, in line with the milestones and targets included in the Council Implementing Decision of 13 July 2021.</i>	RRP implementation is monitored by assessing RRP payment requests and analysing reports published twice a year on the achievement of the milestones and targets. These are to be reflected in the country reports.		
<i>Swiftly finalise the negotiations with the Commission of the 2021-2027 cohesion policy programmes and proceed with their implementation.</i>	progress on the cohesion policy programming documents is monitored under the EU cohesion policy.		
2022 CSR 3	Limited progress		
<i>Strengthen circular economy and waste management policies including by promoting waste prevention and reuse, increasing recycling, and gradually shifting away from incineration of municipal waste to greener sources of heat generation.</i>	Limited progress	Relevant measures being implemented as of 2021	SDG 6, 12, 15
2022 CSR 4	Some progress		
<i>Reduce overall reliance on fossil fuels. Further diversify energy supply and</i>	Limited progress	Relevant measures being implemented as of 2021	SDG 7, 9, 13
<i>help decarbonise the economy by accelerating the deployment of renewables, including by introducing reforms to simplify and expedite administrative and permitting procedures,</i>	Some progress		SDG 7, 8, 9, 13
<i>upgrading energy transmission networks, increasing interconnections with neighbouring countries</i>	Substantial progress		SDG 7, 9, 13
<i>and improving energy efficiency.</i>	Some progress	Relevant measures being implemented as of 2021, planned as of 2025	SDG 7

Note:

* See footnote (28).

** 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.

Source: European Commission



ANNEX 3: RECOVERY AND RESILIENCE PLAN - OVERVIEW

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 2). Denmark submitted its current recovery and resilience plan (RRP) on 30 April 2021. The Commission’s positive assessment on 17 June 2021 and Council’s approval on 13 July 2021 paved the way for disbursing EUR 1.55 billion in grants under the RRF over the 2021-2026 period.

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 Denmark was moreover updated on 30 June 2022 to an amount of EUR 1.43 billion in grants. No revision was submitted at the time of publication of this country report yet.

Table A3.1: Key elements of Denmark’s RRP

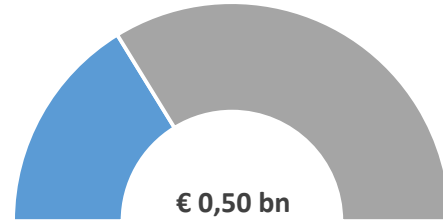
Scope	Initial plan
CID adoption date	13 July 2021
Total allocation	EUR 1 551 million in grants (0.5% of 2021 GDP)
Investments and reforms	29 investments and 5 reforms
Total number of milestones and targets	77

Source: Recovery and Resilience Scoreboard

Denmark’s progress in implementing its plan is published in the Recovery and Resilience Scoreboard ⁽³⁰⁾. 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

of the milestones and targets to be reached by Denmark and subsequently assessed as satisfactorily fulfilled by the Commission.

Graph A3.1: 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

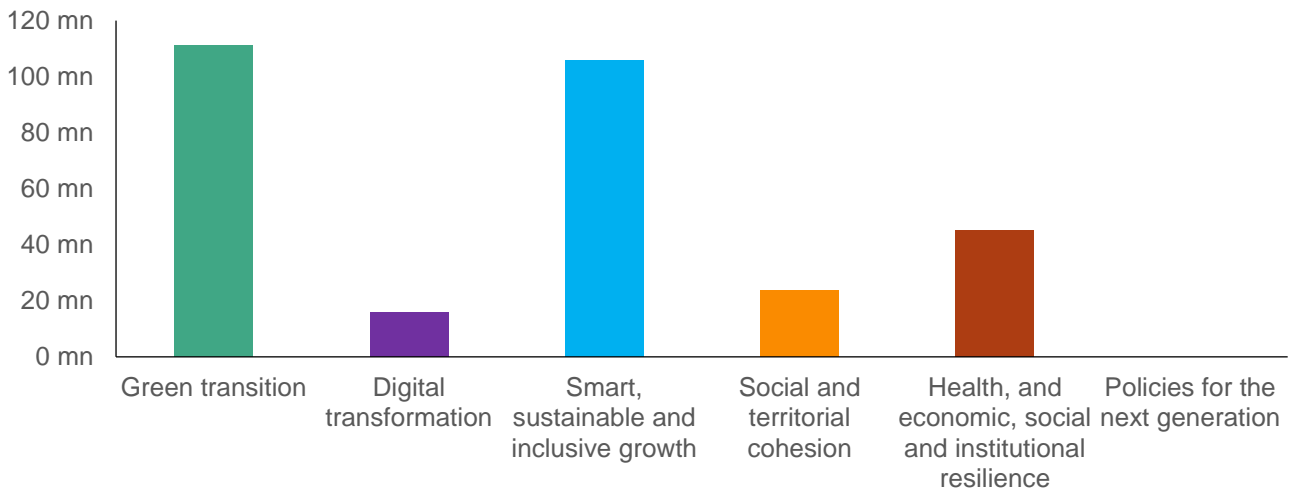
https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html

EUR 503 million has so far been disbursed to Denmark under the RRF.

The Commission disbursed EUR 202 million to Denmark in pre-financing on 2 September 2021, equivalent to 13% of the financial allocation. Denmark’s first payment request was positively assessed by the Commission, taking into account the opinion of the Economic and Financial Committee, leading to EUR 301 million being disbursed in financial support (net of pre-financing) on 27 April 2023. The related 23 milestones and 2 targets cover reforms and investments in decarbonisation of agriculture, digitalisation of healthcare, green tax reform, emission taxes on industry, vehicle taxation, sustainable mobility, as well as research, development, and innovation.

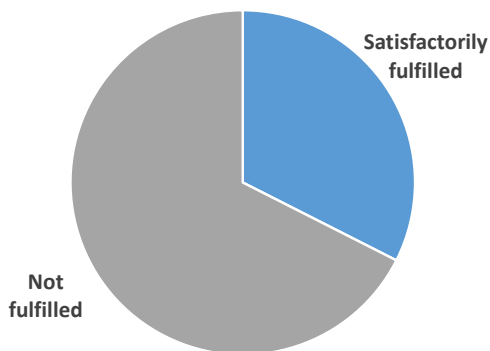
⁽³⁰⁾ https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html

Graph A3.2: **Disbursement per pillar**



Note: Each disbursement reflects progress in the implementation of the RRF, across the six policy pillars. This graph displays how disbursements under the RRF (excluding pre-financing) relate to the pillars. The amounts were calculated by linking the milestones and targets covered by a given disbursement to the pillar tagging (primary and secondary) of their respective measures.
Source: Recovery and Resilience Scoreboard https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html

Graph A3.3: **Fulfilment status of milestones and targets**

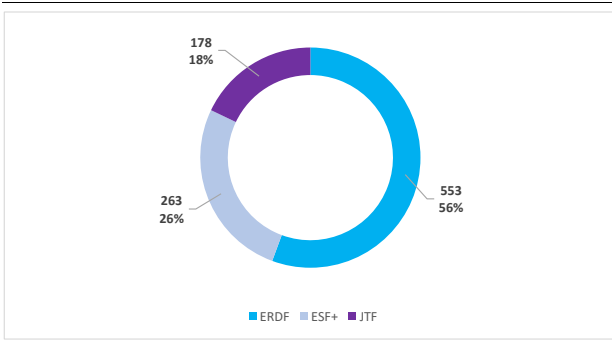


Note: This graph displays the share of satisfactorily fulfilled milestones and targets. A milestone or target is satisfactorily fulfilled once a Member State has provided evidence to the Commission that it has reached the milestone or target and the Commission has assessed it positively in an implementing decision.
Source: Recovery and Resilience Scoreboard https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/country_overview.html



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 Denmark: 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 Denmark, cohesion policy funds⁽³¹⁾ will invest EUR 314 million in the green transition and EUR 69 million in the digital transformation as part of the country’s total allocation of EUR 953 million.

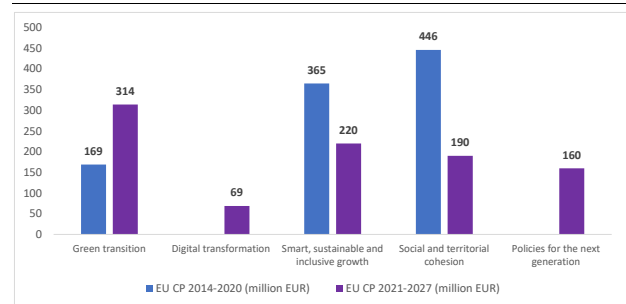
In particular, the European Regional Development Fund (ERDF) will boost the competitiveness of more than 8 000 Danish enterprises by helping them to innovate and develop new technologies for the green transition of the entire Danish society. Providing access to the necessary digital tools will play an important role. Companies plan to reduce their annual CO₂ emissions by 290 000 tonnes and to transform over 40 000 tonnes/year of waste into raw material. Focus will also be given to ensuring that enterprises have access to the right skills to enable them to meet their objectives. The Just Transition Fund (JTF) will finance further technological developments for the transition. It will support the economic diversification of the carbon intensive value chain in the areas most affected and promote the up- and reskilling of workers necessary for a successful transition. This support will help Denmark fulfil its commitment to reduce its GHG emissions by 70% by 2030. Under the European

⁽³¹⁾ European Regional Development Fund (ERDF), European Social Fund+ (ESF+), Just Transition Fund (JTF), excluding Interreg programmes. The total amount includes national and EU contributions. Data source: [Cohesion Open Data](#).

Social Fund Plus (ESF+), Denmark allocates EUR 111 million to education and skills. Benefits of this funding will include: (i) strengthening green and digital skills by supporting up- and reskilling; (ii) adapting vocational education and training (VET) and higher education to labour market demand; and (iii) supporting self-employment, with a focus on vulnerable groups.

Of the investments mentioned above, EUR 104 million was dedicated to REPowerEU under the 2014-2020 budget, which contributed to improving energy efficiency.

Graph A4.2: Synergies between Cohesion policy funds and RRF six pillars in Denmark



(1) million EUR in current prices; (total amount including EU and national co-financing)

Source: European Commission

In 2014-2020, cohesion policy funds made EUR 629 million available to Denmark⁽³²⁾, with an absorption of 63%⁽³³⁾. Including national financing, the total investment amounts to EUR 1 billion - around 0.1% of GDP for 2014-2020.

Denmark 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 Assistance for Cohesion and the Territories of Europe instrument (REACT-EU)⁽³⁴⁾ under NextGenerationEU provides EUR 210.5 million on top of the 2014-2020 cohesion policy allocation for Denmark. REACT-EU aims to help almost 4 000 SMEs adapt and

⁽³²⁾ Cohesion policy funds include the ERDF, 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. Total amount includes national and EU contributions. Data source: [Cohesion Open Data](#).

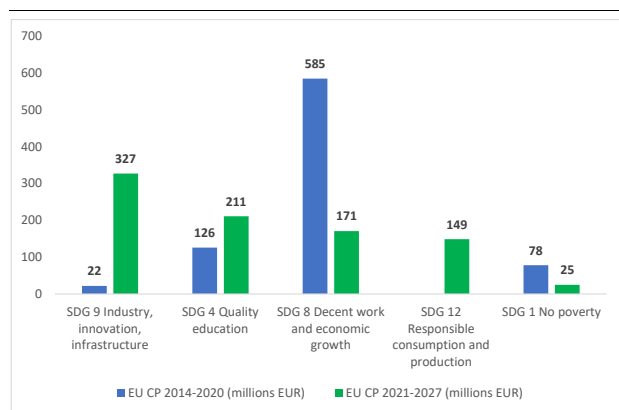
⁽³³⁾ 2014-2020 Cohesion policy EU payments by MS is updated daily on [Cohesion Open Data](#).

⁽³⁴⁾ REACT-EU allocation on [Cohesion Open Data](#).

maintain jobs while building the bridge for their future green transition through development of new, green technologies. In addition, EUR 275 million was provisionally allocated to Denmark under the Brexit Adjustment Reserve (BAR). With SAFE (Supporting Affordable Energy), the 2014-2020 cohesion policy funds may also be mobilised by Denmark 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 8 of the 17 SDGs, notably SDG 9 'Industry, innovation and infrastructure' and SDG 4 'Quality education' ⁽³⁵⁾.

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



(1) 5 largest contributions to SDGs in million (EUR) current prices

Source: European Commission

Other EU funds make significant support available to Denmark. The common agricultural policy (CAP) made available EUR 8.6 billion in 2014-2022 and will keep supporting Denmark with EUR 4.8 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

⁽³⁵⁾ Other EU funds contribute to the implementation of the SDGs, in 2014-2022 this includes both the European Agricultural Fund for Rural Development (EARD) and the European Maritime and Fisheries Fund (EMFF).

made EUR 208 million available to Denmark in 2014-2020 and the European Maritime, Fisheries and Aquaculture Fund allocates EUR 201 billion in 2021-2027.

Denmark 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 462.6 million to 17 specific projects on strategic transport networks. Similarly, Horizon Europe has so far allocated nearly EUR 360 million to Danish R&I on top of the EUR 1.8 billion earmarked under the previous programme (Horizon 2020). The Public Sector Loan Facility set up under the Just Transition Mechanism makes EUR 6.75 million of grant support from the Commission available for projects located in Denmark for 2021-2027, which will be combined with EIB loans to support investments by public sector entities in just transition regions.

The Technical Support Instrument (TSI) supports Denmark in designing and implementing growth-enhancing reforms, including those set out in its recovery and resilience plan (RRP). Denmark has received significant support since 2020. Examples ⁽³⁶⁾ include support to develop resilient, innovative, and human-centric digital government services and to digitalise the monitoring of the East Atlantic Flyway.

⁽³⁶⁾ Country factsheets on reform support are available [here](#).



This Annex illustrates Denmark’s relative resilience capacities and vulnerabilities using the Commission’s resilience dashboards (RDB) (37). 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 (38) and capacities (39) 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 Denmark and the EU-27 (40).

According to the set of resilience indicators under the RDB, Denmark generally displays a lower level of vulnerabilities than the EU average. Denmark shows low vulnerabilities in the social and economic and the digital dimensions of the RDB, medium-low vulnerabilities in the green dimension and medium vulnerabilities in the geopolitical dimension. Compared to the EU average, Denmark’s vulnerabilities are of similar level or lower in all areas of the four dimensions. Specifically, it exhibits lower vulnerabilities in all areas of the social and economic and the digital dimensions, but also in the areas related to ‘climate change mitigation and adaptation’, ‘financial globalisation’, and in ‘security and demography’.

Compared to the EU average, Denmark shows an overall similar yet somewhat higher level of capacities across all RDB indicators. It has high resilience capacities in the social and

economic and the digital dimensions, medium-high capacities in the green dimension and medium capacities in the geopolitical dimension. Denmark shows stronger capacities than the EU average in all areas of the digital dimension, as well as in the areas ‘inequalities and social impact of the transitions’, ‘health, education and work’, ‘climate change mitigation and adaptation’, ‘ecosystems, biodiversity, sustainable agriculture’ and ‘value chains and trade’. However, its capacities in the areas ‘sustainable use of resources’, ‘raw material and energy supply’ and ‘security and demography’ are below the EU level.

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

Dimension/Area	Vulnerabilities		Capacities	
	DK	EU-27	DK	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				

Vulnerabilities Index

- High
- Medium-high
- Medium
- Medium-low
- Low
- Not available

Capacities Index

- High
- Medium-high
- Medium
- Medium-low
- Low
- Not available

(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

(37) 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).

(38) 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.

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

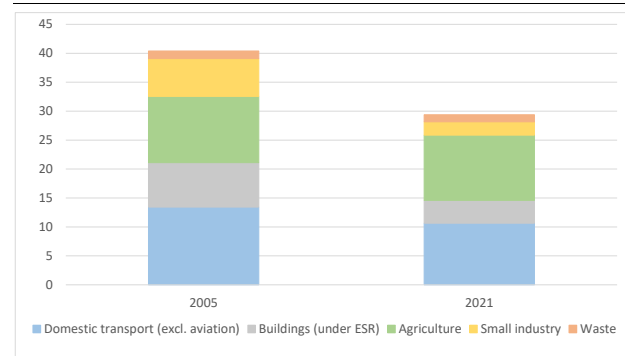
(40) This Annex is linked to Annex 1 on SDGs, Annex 6 on the green deal, Annex 8 on the fair transition to climate neutrality, Annex 9 on resource productivity, efficiency and circularity, Annex 10 on the digital transition and Annex 14 on the European pillar of social rights.

Denmark’s green transition requires continued action on several aspects, including renewable energy and energy efficiency, sustainable transport, and climate adaptation. Implementation of the European Green Deal is underway in Denmark; this Annex provides a snapshot of the key areas involved ⁽⁴¹⁾.

Denmark has not yet defined all the climate policy measures it needs to reach its 2030 climate target for the effort sharing sectors ⁽⁴²⁾. Data for 2021 on Denmark’s greenhouse gas emissions in these sectors are expected to show the country generated less than its annual emission allocations ⁽⁴³⁾. Current policies in Denmark are projected to reduce these emissions by 37% relative to 2005 levels in 2030, not a sufficient reduction to reach the effort sharing target even before the target was raised to meet the EU’s 55% objective, let alone Denmark’s new target to reduce emissions by 50% ⁽⁴⁴⁾. In its recovery and resilience plan, Denmark has allocated 59 % of its Recovery and Resilience Facility grants to key reforms and

investments to attain climate objectives ⁽⁴⁵⁾. To meet Denmark’s own economy-wide greenhouse gas emission reduction target to cut by -70% by 2030, achieve climate neutrality by 2045 and cut carbon emissions by 110% by 2050 (relative to 1990 levels), it will be necessary to step up reforms and investments significantly across the economy.

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



Source: European Environmental Agency.

Denmark is not on track to meet its 2030 net carbon removals target for its land use sector. In 2021, the sector generated 4.95 % of Denmark’s greenhouse gas emissions. This is driven by its relatively small forest area and high emissions from agricultural soil. Net emissions from land use increased slightly between 2016 and 2021. Denmark’s 2030 target for the land use, land use change and forestry (LULUCF) sector is to decrease LULUCF emissions by 441 ktCO₂eq compared to the average net emissions in the years 2016, 2017 and 2018 (see Table A6.1) ⁽⁴⁶⁾. Preserving the carbon stored in Denmark’s soils and expanding its forest area will be key to meet the target.

⁽⁴¹⁾ 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.

⁽⁴²⁾ 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.

⁽⁴³⁾ Denmark’s annual emission allocations for 2021 were some 31.7 Mt CO₂eq, and its approximated 2021 emissions were 29.4 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).

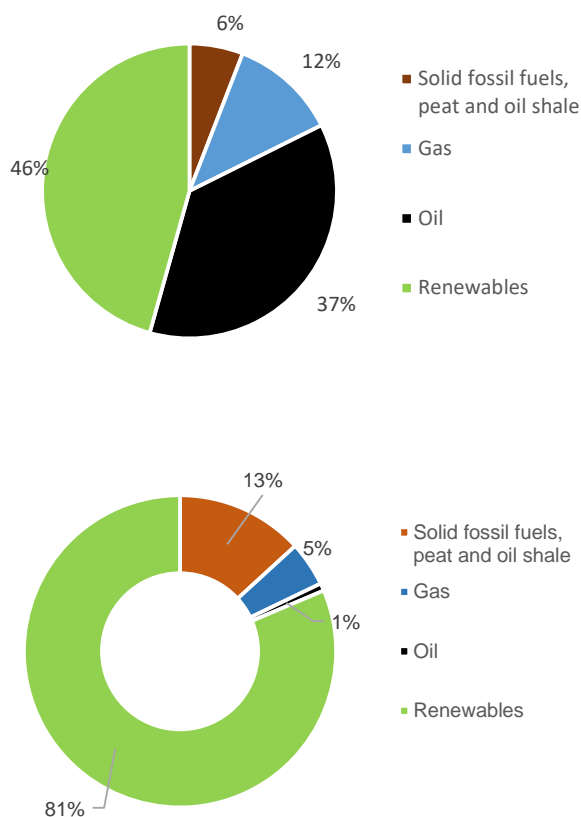
⁽⁴⁴⁾ See the information on the distance to the 2030 climate policy target in Table A6.1. Existing and additional measures as of 15 March 2022.

⁽⁴⁵⁾ The green measures amount to EUR 923 million (59%) of the total plan. The two largest single green investments/reforms are the investment window (EUR 163 million) of the green tax reform component and reprioritisation of the registration tax of vehicles and low electricity tax on charging vehicles (EUR 141 million), in the sustainable transport component. Together with the research programme on green solutions (EUR 94 million) and measures related to carbon rich soils (EUR 89 million), these four investments and reforms make up over half of all the green investments in the RRP. Energy efficiency measures will account for EUR 235 million. For REPowerEU, see Annex 7.

⁽⁴⁶⁾ This value is indicative and will be updated in 2025 (as mandated by Regulation (EU) 2023/839).



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

Source:

In terms of its energy mix, Denmark is a frontrunner in the uptake of renewable energy (44% renewable share in energy mix), serving as an important source of inspiration at European level. Although Denmark is taking rapid action on decarbonisation, in 2021 fossil fuels still accounted for 56% of its energy mix. Of this, oil and petroleum products made up 39%, natural gas made up 11% and coal and coal products made up 6%. Since 2019, Denmark's 2021 energy mix has seen an increase in the share of solid fossil fuels – from 5% to 6% of the energy mix – while the share of natural gas decreased from 14 to 12%. The consumption of oil and petroleum products has also declined, down to 37% in 2021 from 44% in 2019. In 2021, Denmark regained its position as the country with the greenest electricity mix in the EU-27 with over

80% generated by renewables. Wind power alone generates almost 50% of Denmark's electricity mix, while renewable fuels and solar generated 27.3% and 4%. Fossil fuels provided 19% of the electricity mix – mainly solid fossil fuels (13%) and natural gas (5%).

Renewable energy plays a central role in decarbonising Denmark's energy system and reducing dependence on fossil fuels.

Denmark managed to meet the rising energy demand following the post-pandemic recovery of manufacturing by increasing renewable energy capacity. Denmark's target, included in its NECP, to ensure that the share of its energy from renewable sources in gross final energy consumption will be 55% by 2030 was considered by the COM 2020 assessment as sufficiently ambitious. Denmark is invited to consider a further strengthening of its renewable energy target in the updated NECP if it wishes to make an even stronger contribution to the more ambitious EU climate and energy targets in the Fit for 55 Package and in the REPowerEU Plan. Denmark has made renewable energy development a high priority, and the flagship programme 'Denmark can do more II' will speed up permitting process for onshore and offshore renewable energy installations and aims to quadruple the total volume of electricity generated by solar energy and onshore wind by 2030. As part of 'Denmark Can Do More II', the government also proposed action to install an additional 4 GW offshore wind by the end of 2030, which is part of the 6 GW of new offshore wind. Alongside domestic action, Denmark is pursuing a multilateral approach to step up regional cooperation in the North and Baltic Seas and pave the way for further offshore wind power expansion. Among other benefits, this is expected to contribute to large-scale onshore and offshore production of green hydrogen.

Despite the increase in energy consumption in 2021, the situation on energy efficiency performance in Denmark is relatively positive.

The country might be able to contribute more to the EU's energy efficiency target for 2030 than planned in its previous national energy and climate plan. In the Commission's assessment of 2020 Denmark's NECP targets for primary and final (PEC and FEC) energy consumption were considered of very low ambition. Based on the energy consumption trajectory for 2018-2021, Denmark is expected to be on track to meet its 2030 target for PEC and for FEC, as these were

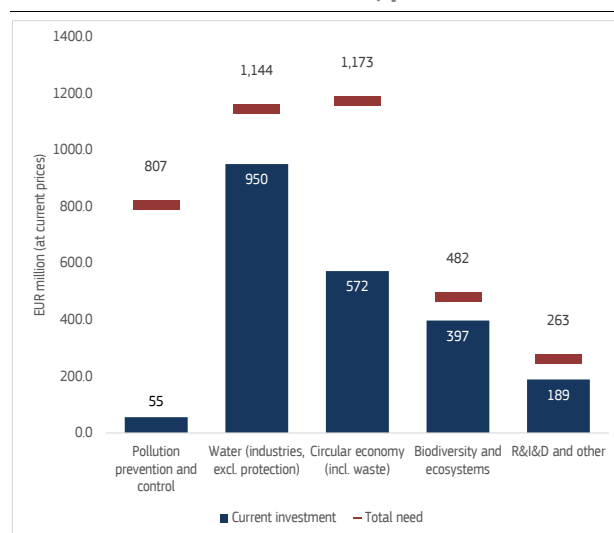
notified in its NECP⁽⁴⁷⁾. Denmark's reported savings to fulfil the Energy Savings Obligation for 2014-2020 under Article 7 of the Energy Efficiency Directive significantly exceeded the savings target. Under the recovery and resilience plan, Denmark intends to complete the rollout of district heating by 2028 and achieve completely renewable gas heating by 2030⁽⁴⁸⁾ as well as support the energy performance of private-sector buildings and public-sector buildings, and to foster the efficiency of the industrial sector, with a focus on small and medium enterprises.

Denmark's results on sustainable mobility are mixed. It is among the EU frontrunners in terms of zero-emission passenger cars as a share of new registrations and as a share of its fleet. However, compared to many other EU Member States, the electrification of the railway network is underdeveloped as a result of the long-term strategic de-prioritisation of rail infrastructure and rolling stock and subsequent underinvestment. The rail infrastructure manager is running a major programme to electrify the railways over the period 2014-2027.

Denmark would benefit from investing more in environmental protection, tackling pollution, improving waste management and promoting circular economy, and better protecting biodiversity. Between 2014 and 2020, the environmental investment needs⁽⁴⁹⁾ were estimated to be at least EUR 3.9 billion, while investment was at about EUR 2.2 billion, leaving a gap of at least EUR 1.7 billion per year (see Graph A6.3)⁽⁵⁰⁾. Denmark has a small EU Natura 2000 network, which covers 8.3% of its land⁽⁵¹⁾. It has not yet allocated sufficient resources to protecting

and managing these areas. The share of habitats in poor or bad status has increased, and Denmark has not yet provided a final framework of prioritised actions showing investment needs. Investing sufficient resources in sustainable agriculture would help maintain recent improvements in ground and surface water quality. There is potential for Denmark to use innovative fiscal instruments to reduce ammonia emissions, such as systems of tradable livestock rights. Denmark was in non-compliance with its ammonia reduction commitment in 2020 and has received a Commission warning on 26 January 2023⁽⁵²⁾. Denmark also has the potential to rely more on environmental taxes to promote waste reduction and further internalise the costs of air pollution⁽⁵³⁾ (see Annex 19).

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



Source: European Commission.

Denmark's climate adaptation plan is not up to the challenges of climate change. To tackle the impacts of climate change in all sectors of the economy, notably from heavier rainfall, droughts, increased storm intensity and storm surges, speedy adoption and implementation of a revised climate adaptation plan is of the essence.

Denmark provides fossil fuel and other environmentally harmful subsidies that could be considered for reform, while ensuring food and

⁽⁴⁷⁾ 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.

⁽⁴⁸⁾ Government of Denmark 2022 – [Danmark kan mere II](#).

⁽⁴⁹⁾ 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 Denmark](#))

⁽⁵⁰⁾ When also accounting for needs estimated at EU level only (e.g. water protection, higher circularity, biodiversity strategy).

⁽⁵¹⁾ In 2021, Denmark had 14.9% terrestrial protected areas (Natura 2000 and nationally designated areas), against the EU average of 26.4% (European Environment Agency, 2023, [Natura 2000 Barometer](#)).

⁽⁵²⁾ Environmental Implementation Review 2022 – [country report Denmark](#), p. 18

⁽⁵³⁾ European Commission, 2021, Green taxation and other economic instruments – Internalising environmental costs to make the polluter pay, [Ensuring that polluters pay](#).

energy security and mitigating social effects. Denmark has reduced fossil fuel subsidies slightly since 2016. Environmentally harmful subsidies have been identified, via an initial assessment, in the agriculture, forestry and fishing, transportation and storage, services and manufacturing sectors. Examples of such subsidies include taxation of privately used company cars, 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 or the reimbursement of excise duty on diesel used in freight and other categories of passenger transport⁽⁵⁴⁾. Company cars account for about one third of annual new registrations⁽⁵⁵⁾. A reform in 2021 brought in an environmental surcharge based on vehicles CO2 emissions. A mapping of all environmentally harmful subsidies by Denmark would help prioritise candidates for reform.

⁽⁵⁴⁾ 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.

⁽⁵⁵⁾ European Commission, 2022, [Mapping objectives in the field of environmental taxation and budgetary reform: Environmentally harmful subsidies \(EHS\)](#).

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

								'Fit for 55'			
			2005	2017	2018	2019	2020	2021	2030 target/value	Distance WEM	Distance WAM
Progress to policy targets	Greenhouse gas emission reductions in effort sharing sectors ⁽¹⁾	Mt CO2eq. %; pp	40.08	-18%	-17%	-20%	-23%	-	-50%	-13	-13
	Net carbon removals from LULUCF ⁽²⁾	kt CO2eq	5,144	1,880	3,785	2,953	3,102	2,420	5338	n/a	n/a
									National contribution to 2030 EU target		
	Share of energy from renewable sources in gross final consumption of energy ⁽³⁾	%	16%	34%	35%	37%	32%	35%	55%		
Energy efficiency: primary energy consumption ⁽³⁾	Mtoe	19.4	17.4	17.4	16.8	15.3	16.2	42.7			
Energy efficiency: final energy consumption ⁽³⁾	Mtoe	15.5	14.6	14.6	14.3	13.1	13.8	35.2			
			Denmark					EU			
Fiscal and financial indicators	Environmental taxes (% of GDP)	% of GDP	3.9	3.7	3.6	3.3	3.2	2.9	2.4	2.2	2.2
	Environmental taxes (% of total taxation) ⁽⁴⁾	% of taxation	8.6	8.0	8.2	7.0	6.8	6.0	5.9	5.6	5.5
	Government expenditure on environmental protection	% of total exp.	0.8	0.8	0.8	0.8	0.8	0.7	1.7	1.6	1.6
	Investment in environmental protection ⁽⁵⁾	% of GDP	-	-	-	-	-	-	0.4	0.4	0.4
	Fossil fuel subsidies ⁽⁶⁾	EUR2021bn	0.6	0.6	0.5	0.5	0.4	-	53.0	50.0	-
Climate protection gap ⁽⁷⁾	score 1-4					0.0	1.0			1.5	
Climate	Net greenhouse gas emissions	1990 = 100	72.0	71.0	70.0	65.0	58.0	58.0	76.0	69.0	72.0
	Greenhouse gas emission intensity of the economy	kg/EUR10	0.33	0.32	0.32	0.29	0.29	-	0.31	0.30	-
	Energy intensity of the economy	kgoe/EUR10	0.07	0.06	0.06	0.06	0.06	-	0.11	0.11	-
Energy	Final energy consumption (FEC)	2015=100	102.5	103.0	103.0	101.1	92.5	97.5	102.9	94.6	101.1
	FEC in residential building sector	2015=100	103.2	101.3	100.2	98.9	96.5	101.7	101.3	101.3	106.8
	FEC in services building sector	2015=100	102.7	105.0	103.6	100.6	95.1	105.8	100.1	94.3	100.7
Pollution	Smog-precursor emission intensity (to GDP) ⁽⁸⁾	tonne/EUR10	4.8	4.9	5.2	5.1	3.6	-	0.9	0.9	-
	Years of life lost due to air pollution by PM2.5	per 100,000 inh.	324.4	257.7	404.9	322.8	193.2	-	581.6	544.5	-
	Years of life lost due to air pollution by NO ₂	per 100,000 inh.	44.2	32.5	35.5	22.8	7.3	-	309.6	218.8	-
	Nitrates in ground water	mg NO3/litre	-	-	-	-	-	-	21.0	20.8	-
Biodiversity	Land protected areas	% of total	14.8	16.3	-	14.8	14.8	14.9	26.2	26.4	26.4
	Marine protected areas	% of total	18.2	-	-	18.7	-	18.7	10.7	-	12.1
	Organic farming	% of total utilised agricultural area	7.8	8.6	9.8	11.1	11.5	11.6	8.5	9.1	-
			2017	2018	2019	2020	2021	2022	2020	2021	2022
Mobility	Share of zero-emission vehicles ⁽⁹⁾	% in new registrations	0.3	0.7	2.5	7.2	7.6	18.2	5.4	8.9	10.7
	Number of AC/DC recharging points (AFIR categorisation)		-	-	-	3653	6029	11739	188626	330028	432518
	Share of electrified railways	%	25.4	26.1	32.3	-	n/a	34.1	56.6	n/a	56.6
	Hours of congestion per commuting driver per year		24.6	25.2	25.8	25.7	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 2022.

(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, Denmark had no exposure to direct gas imports from Russia but was exposed through exports via Germany⁽⁵⁶⁾. In response to the energy crisis, a reform package to accelerate the energy transition entitled 'Denmark Can Do more II' was agreed at the end of June 2022. This Annex⁽⁵⁷⁾ sets out actions carried out by Denmark 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⁽⁵⁸⁾.

The redevelopment of existing gas facilities will make Denmark self-sufficient and make it a net exporter. In 2021, Denmark produced a large share of its natural gas domestically (1.5 billion cubic metres (bcm) of annual 3 bcm demand), with natural gas representing 22% of the energy mix, below the EU average of 24%. According to the Danish Energy Agency, Danish gas production is expected to exceed consumption from 2024 until around 2042, and Denmark plans to be a net exporter after the reopening of Tyra (see below).

On 27 September 2022, the Baltic Pipe was opened, providing a key route to carry gas from Norway through Denmark to Poland and neighbouring countries. Fully operational since 30 November 2022, it will enable up to 10 bcm of gas to be transported annually from Norway to Poland and 3 bcm of gas from Poland to Denmark. The restarting of Tyra – Denmark's largest gas production field – is expected to happen gradually in the Winter 2023-2024. A major contribution to Denmark's self-sufficiency is also expected from increasing biomethane production, which already covers 34% of domestic gas consumption.

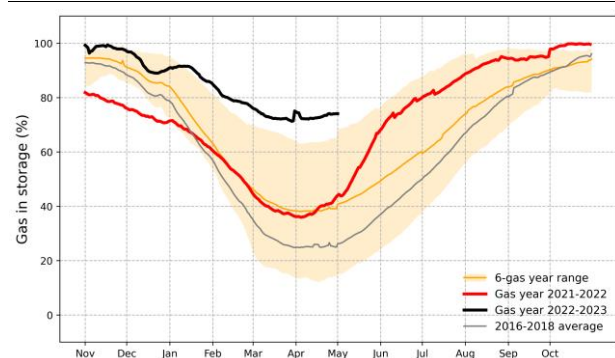
⁽⁵⁶⁾ Ørsted contract with Gazprom unilaterally halted on 31 May 2022

⁽⁵⁷⁾ 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.

⁽⁵⁸⁾ in line with the Green Deal Industrial Plan COM(2023) 62 final, and the proposed Net-Zero Industry Act COM(2023) 161 final

The country's existing and planned infrastructure ensure the security of its gas and oil supply, but alternative short-term options are available if necessary. In fulfilment of its gas storage obligations under EU law, it reached 99.27% by 1 November 2022, and ended the heating season with a gas storage filling at 72,4% on 15 April 2023⁽⁵⁹⁾. It operates⁽⁶⁰⁾ with a combined capacity of 1 bcm, corresponding to approximately 40% of Danish consumption (2.89 bcm). Denmark has no operational liquefied natural gas (LNG) terminal, although the possibility of installing a temporary LNG terminal has been discussed at government level. Alternative short-term options to increase oil and gas production from the North Sea are available. This includes opening the Xana gas field in the North Sea (5 years before gas production can start) or the one in Svane. However, both options come with technological and economic challenges.

Graph A7.1: **Underground gas storage levels in Denmark**



Source: JRC calculation based on AGSI+ Transparency Platform, 2022 (Last update 2 May 2023)

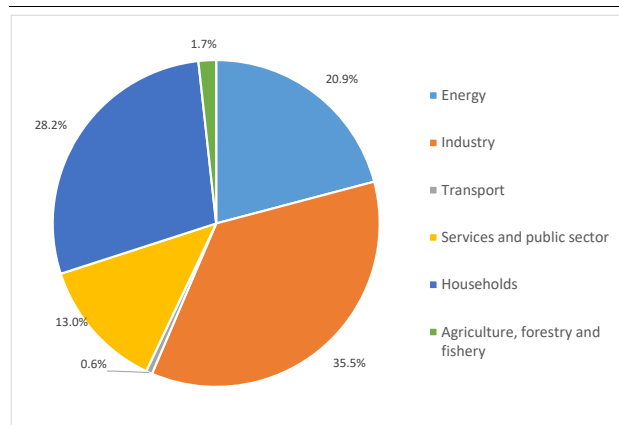
To improve the security of its supply, Denmark has implemented demand reduction measures and improved its energy savings. To mitigate the risk of curtailment of the national gas supply and in addition to 'Denmark Can Do More II', Denmark has put in place several emergency measures. To improve security of supply, it has also focused on increasing energy

⁽⁵⁹⁾ Regulation of the European Parliament and of the Council amending Regulations (EU) 2017/1938 and (EC) No 715/2009 with regard to gas storage and Implementing Regulation (EU) 2022/2301 of 23 November 2022 setting the filling trajectory with intermediary targets for 2023 for each Member State with underground gas storage facilities on its territory and directly interconnected to its market area.

⁽⁶⁰⁾ Denmark has a gas storage facility at Lille Torup and another one at Stenlille managed by Gas Storage Denmark.

efficiency. By combining short-term measures with the implementation of its national long-term renovation strategy Denmark can tap into its considerable energy efficiency potential, as the building sector represents a substantial share – approximately 40% – of its overall final energy consumption. As part of these efforts, Danish authorities are also actively encouraging waste heat recovery as a way of making industry more energy-efficient. Over the period August 2022 – March 2023, 25% of gas consumption has been saved in Denmark compared to the previous 5-years average. Denmark is carrying out a relatively low number of checks on products covered by ecodesign and energy labelling. This generates concerns with respect to the level playing field among economic operators and uncertainty as to the compliance levels of the concerned products, and therefore missed energy and CO2 savings ⁽⁶¹⁾.

Graph A7.2: **Share of gas consumption per sector, 2021**



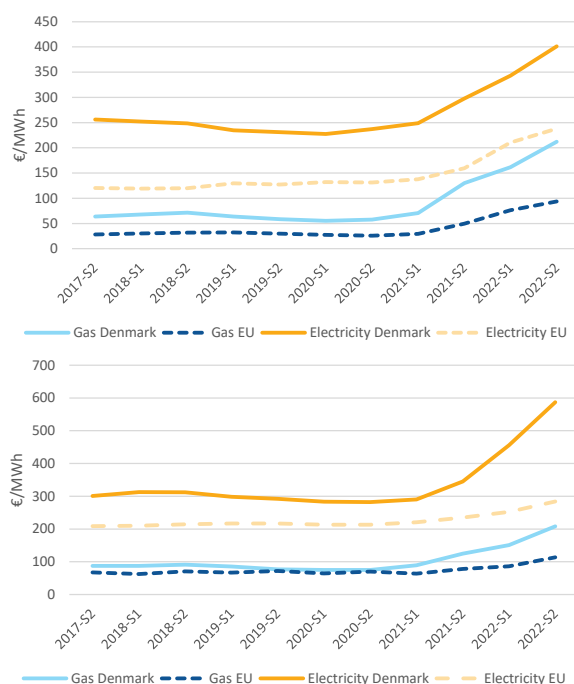
Source: Eurostat

The Danish electricity system is already very much centred on renewable energy, with further investments in flexible solutions are in the pipeline. The Danish electricity system relies heavily on renewable energy (Annex 6), making it possible for Denmark to have little recourse to fossil fuels. The security of the country’s electricity supply can be further bolstered by the positive growth trajectory of biomethane directly injected into the grid. Denmark is committed to phase out oil and gas-based electricity and aims for 100% renewable power generation by 2030. As part of these efforts, Denmark is shifting its attention to sector coupling and demand-side flexibility, including by

⁽⁶¹⁾ The internet-supported information and communication system for the pan-European market surveillance

using new technologies and prioritising the digitalisation of its electricity system. Thanks to the national measures it has put in place, Denmark is a smart grid hub. Further investments in flexibility solutions can enable it to fully harness the large-scale uptake of renewable energy in the electricity system. Secure power generation also depends on the availability of hydropower imports from Norway and Sweden, to which Denmark is connected through the synchronous grid of northern Europe.

Graph A7.3: **Denmark’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

With the surge in gas prices across the EU peaking last summer, Denmark intervened to shelter customers from unprecedented energy costs. In 2021, it experienced a steep increase in wholesale gas prices, going from EUR 19.67/kilowatt hours (KWh) to EUR 118.03/KWh, a hefty 500% increase. Throughout 2022, prices settled at around EUR 80/90/KWh in January, February and May, as in the rest of the EU, progressively reaching all-time highs, notably in August when the fear of a cold winter loomed large. Although their impact was lessened by government intervention, retail gas prices increased steadily between 2021 and 2022, increasing from EUR 31/KWh in January 2021 to

EUR 74.06/KWh in October 2021, equivalent to 138% growth year-on-year. As Danish gas supply is used in both industry and households, the 2022 surge in gas prices triggered a swift state-led response to help customers cope with higher energy prices.

Renewable energy plays a central role in energy security at national level in both gas and electricity supply.

This makes Denmark one of the EU-27's most energy-independent countries. The ambitious reform package 'Denmark Can Do More II', agreed at the end of June 2022, is testament to the intention of fast-tracking the energy transition in response to the much changed geopolitical context. In addition to its far-reaching ambitions for wind and green gas uptake (Annex 6), 'Denmark Can Do More' aims to simplify permit-granting, by framing renewable energy projects as being of overriding public interest⁽⁶²⁾, accelerating calls for tenders for offshore wind power, quadrupling solar and onshore wind energy by 2030, and facilitating dialogue between the government and municipalities. Lowering the thresholds for renewable-based investments has opened up new opportunities for both private and public investors and enabled Denmark to make good on its commitment to contribute to building up regional wind and hydrogen offshore capacity, a commitment made in the context of the Esbjerg Offshore Wind Declaration, the Marienborg Declaration and the Dublin North Sea Energy Cooperation Joint Statement of 2022. Against this backdrop, the Danish Energy Agency is leading the construction of two energy islands – one artificial one in the North Sea and one off the coast of Bornholm in the Baltic Sea – with the aim of expanding renewable energy supply for Danish and foreign electricity systems initially by a minimum of 6 GW, with a combined long-term expansion potential of 13 GW⁽⁶³⁾. In addition, Denmark's goal is to build 4 to 6 GW of electrolysis capacity by 2030.

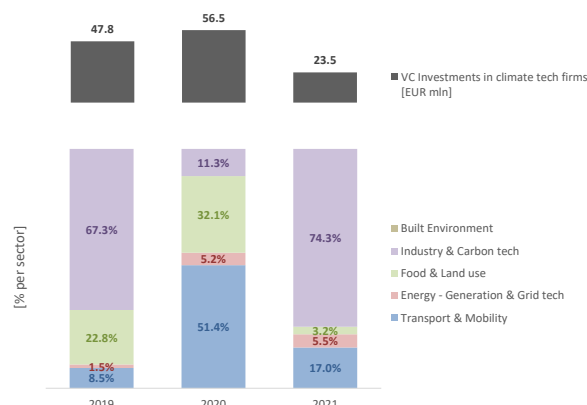
Denmark has the ambition to continue transforming its energy system to achieve climate neutrality by 2045 (and -70% greenhouse gases by 2030). The transition to clean energy is mineral intensive, requiring

⁽⁶²⁾ Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy, OJ L 335, 29.12.2022, p. 36.

⁽⁶³⁾ Danish Energy Agency, webpage on Denmark's energy islands.

Denmark to secure raw materials to ramp up its efforts to roll out renewable energy, keep a foothold in clean technology research and preserve the competitiveness of its industry. The green innovation champion performs strongly both in absolute number of patents and in the share of green patents in the overall innovation portfolio. Patents per million habitants in Denmark have increased by 73% between 2014 and 2019. Denmark plans to become a hub for carbon capture and storage, with the potential of storing up to 22 billion tons of CO2. Denmark plans to become a European hub for carbon capture and storage, and has as of early 2023 awarded the first exploration permits to projects in the North Sea. Ensuring security of supply of critical raw materials is also crucial for creating an enabling investment environment to attract further venture capital investment in climate tech start-ups, especially following the slowdown between 2019 and 2021 in investments in clean industry and carbon tech solutions.

Graph A7.4: **Venture capital investments in climate tech start-ups and scale-ups - Denmark**



(1) 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: JRC elaboration based on PitchBook data (06/2022)

Denmark, a global leader in producing wind-based electricity, aims to remain at the forefront of the development of clean new energy technologies. Generally, it has a traditionally strong manufacturing base of low-carbon technologies and components, especially in the wind energy sector, where it continues to be the global leader in integrating wind power into the electricity grid. Despite not having domestic producers of large solar collectors, the country is the leading player in the large-scale solar district heating market in the EU in terms of total installed

capacity and system size. Favourable policy and market conditions have led to booming sales of heat pumps, a trend that is likely to continue with the implementation of the REPowerEU plan. In 2019, over 40% of Danish renewable energy jobs were in manufacturing and export sales were an important source of wind jobs. In the strong manufacturing sector, labour shortages were significant in 2021-2022: more than 60% of businesses reported labour shortages at their peak in Q3 2021. However, shortages seemed to have eased as of Q4 2022 dropping below the EU average level. While online job advertisements in clean energy deployment relevant sector have strongly increased at EU level between Q4 2021-Q4 2022 (49%), in Denmark more than doubled (112%)

Table A7.1: Key Energy Indicators

		DENMARK				EU				
		2018	2019	2020	2021	2018	2019	2020	2021	
ENERGY DEPENDENCE	Import Dependency [%]	23%	39%	45%	33%	58%	61%	57%	56%	
	of Solid fossil fuels	102%	154%	75%	13%	44%	44%	36%	37%	
	of Oil and petroleum products	18%	45%	55%	31%	95%	97%	97%	92%	
	of Natural Gas	-38%	-7%	37%	28%	83%	90%	84%	83%	
	Dependency from Russian Fossil Fuels [%]									
	of Hard Coal	68%	88%	97%	90%	40%	44%	49%	47%	
	of Crude Oil	7%	6%	12%	16%	30%	27%	26%	25%	
of Natural Gas	0%	0%	0%	0%	40%	40%	38%	41%		
		2015	2016	2017	2018	2019	2020	2021	2022	
ELECTRICITY	Gross Electricity Production (GWh)	28941	30538	31023	30370	29517	28729	33049	-	
	Combustible Fuels	14185	16994	15473	15500	12387	11201	15669	-	
	Nuclear	0	0	0	0	0	0	0	-	
	Hydro	18	19	18	15	17	17	16	-	
	Wind	14133	12782	14780	13902	16150	16330	16054	-	
	Solar	604	744	751	953	963	1181	1309	-	
	Geothermal	0	0	0	0	0	0	0	-	
	Other Sources	0	0	0	0	0	0	0	-	
	Net Imports of Electricity (GWh)	5912	5057	4563	5224	5811	6883	4869	-	
	As a % of electricity available for final consumption	18.6%	15.8%	14.1%	16.4%	18.1%	21.8%	14.5%	-	
Electricity Interconnection (%)			50.6%	49.7%	49.0%	51.0%	45.8%	42.7%		
		2015	2016	2017	2018	2019	2020	2021	2022	
DIVERSIFICATION OF GAS SUPPLIES	Gas Consumption (in bcm)	3.2	3.2	3.1	3.0	2.8	2.8	3.0	2.7	
	Gas Imports - by type (in bcm)	0.7	0.7	0.5	0.4	1.1	2.7	2.5	n.a.	
	Gas imports - pipeline	0.7	0.7	0.5	0.4	1.1	2.7	2.5	n.a.	
	Gas imports - LNG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n.a.	
	Gas Imports - by main source supplier (in bcm) (1)									
	Germany	0.1	0.2	0.1	0.1	1.0	2.7	2.5	n.a.	
	Not specified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n.a.	
	Norway	0.5	0.5	0.4	0.3	0.1	0.0	0.0	n.a.	
			2019	2020	2021	2022				
	DIVERSIFICATION OF GAS SUPPLIES	LNG Terminals								
Number of LNG Terminals (2)		0	0	0	0					
LNG Storage capacity (m3 LNG)		0	0	0	0					
Underground Storage										
Number of storage facilities	2	2	2	2						
Operational Storage Capacity (bcm)	1.1	1.1	0.9	1						
		2019	2020	2021	2022					
CLEAN ENERGY	VC investments in climate tech start-ups and scale-ups (EUR Mln) (3)	47.8	56.5	23.5	n.a.					
	as a % of total VC investments in Denmark	6.9%	6.5%	1.1%	n.a.					
	Research & Innovation spending in Energy Union R&I priorities (2)									
	Public R&I (EUR mln)	94.2	111.0	169.2	n.a.					
	Public R&I (% GDP)	0.031%	0.036%	0.050%	n.a.					
	Private R&I (EUR mln)	1268.7	n.a.	n.a.	n.a.					
Private R&I (% GDP)	0.41%	n.a.	n.a.	n.a.						

(1) The ranking of the main suppliers is based on the latest available figures (for 2021)

(2) FSRU included

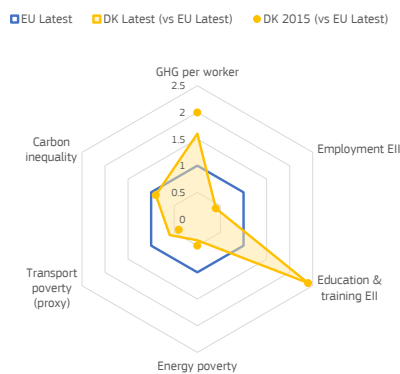
(3) Venture Capital investments include Venture Capital deals (all stages) and Private Equity Growth/Expansion deals (for companies that have previously been part of the portfolio of a VC investment firm).

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 Denmark’s progress in ensuring a fair transition towards climate neutrality and environmental sustainability, notably for workers and households in vulnerable situations. The number of jobs in the green economy is rising as Denmark aims to reach 70% greenhouse gas emission (GHG) reductions by 2030. To ensure a fair green transition in line with the Council Recommendation (), and to achieve the successful implementation of REPowerEU, the participation of the workforce in upskilling and reskilling is key and is relatively high in Denmark although declining in recent years. Under the country’s recovery and resilience plan (RRP), a green tax reform will accelerate the decarbonisation of the economy and is one of the plan’s landmark initiatives. The Cohesion Policy Funds contribute further to creating new jobs, notably the European Social Fund Plus (ESF+) and Just Transition Fund (JTF) have particular focus on skills for the green transition and circular economy.

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



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

Employment in Denmark’s sectors most affected by the green transition remains stable, and the green economy is expanding.

The greenhouse gas emissions intensity of Denmark’s workforce declined from 27.5 to 21.5 tonnes per worker between 2015 and 2021, but is still well above the EU average of 13.7 tonnes (see Graph A8.1 and Table A8.1). Employment in Denmark’s energy-intensive industries (EII) represented a stable share of 1.3 % of total employment in 2021 (in 2020: 1.2% vs 3.0% in the EU). Employment in mining and quarrying has not changed since 2015 (around 4 000 workers) while coal and lignite mining has declined in Denmark. Total jobs in the environmental goods

and services sector grew by 8.3% (to 79,340) during 2015–20 (EU: +8.3%), reaching 2.7% of total employment, slightly above the EU average (2.2%). The job vacancy rate increased in construction, and stood at 3.2% (2022) vs. 4.0% in the EU⁽⁶⁴⁾. However, the Danish Construction Federation estimates that 6 000 jobs in the construction sector remain unfilled, despite the fact that many companies have changed strategy towards the green transition.⁽⁶⁵⁾

Upskilling and reskilling in declining and transforming sectors is high but decreasing significantly.

Skills are key for creating new jobs in the green economy, smooth labour market transitions, and preserving jobs in transforming sectors. In energy-intensive industries, the participation of workers in education and training has slightly increased from 24.6% in 2015 to 25.0% in 2022; it is well above the EU average (10.4%). In Denmark, 32% of citizens believe they do not have the necessary skills to contribute to the green transition (EU: 38%)⁽⁶⁶⁾. Investment under the ESF+, together with national investment, funds measures such as those targeting up- and reskilling and lifelong learning. Companies’ demand for skilled labour will be met both by raising the formal education level of the workforce (vocational education/training and higher education) and through targeted up- and reskilling of unemployed and employed people. The 2022 Green Tax reform allocated DKK 100 million yearly in 2025 and 2026 for training and up-skilling in support of and to ensure the green transition. Around 15 000 people are expected to improve their qualifications linked to the green transition through support from the ESF+. Furthermore, the Just Transition Fund (JTF) also supports training and up- and reskilling of workers in regions most affected by the transitions.

In recent years, before the spike in energy prices, energy poverty indicators improved slightly.

The share of the population unable to keep their homes adequately warm decreased from 3.6% in 2015 to 2.8% in 2021 (below the EU

⁽⁶⁴⁾ Eurostat (JVS_A_RATE_R2)

⁽⁶⁵⁾ [Virksomheder i fuld gang med grøn omstilling mangler 10.000 medarbejdere - DI \(danskindustri.dk\)](https://www.danskindustri.dk/virksomheder-i-fuld-gang-med-gron-omstilling-mangler-10.000-medarbejdere)

⁽⁶⁶⁾ Special Eurobarometer 527. Fairness perceptions of the green transition (May – June 2022).



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

Indicator	Description	DK 2015	DK Latest	EU Latest
GHG per worker	Greenhouse gas emissions per worker - CO2 equivalent tonnes	27.5	21.5 (2021)	13.7 (2021)
Employment EI1	Employment share in energy-intensive industries, including mining and quarrying (NACE B), chemicals (C20), minerals (C23), metals (C24), automotive (C29) - %	1.3	1.3 (2020)	3 (2020)
Education & training EI1	Adult participation in education and training (last 4 weeks) in energy-intensive industries - %	24.6	25 (2022)	10.4 (2022)
Energy poverty	Share of the total population living in a household unable to keep its home adequately warm - %	3.6	2.8 (2021)	6.9 (2021)
Transport poverty (proxy)	Estimated share of the AROP population that spends over 6% of expenditure on fuels for personal transport - %	16.5	22.5 (2023)	37.1 (2023)
Carbon inequality	Average emissions per capita of top 10% of emitters vs bottom 50% of emitters	4.6	4.7 (2020)	5 (2020)

Source: Eurostat (env_ac_ainah_r2, nama_10_a64_e, ilc_mdcs01), EU Labour Force Survey (break in time series in 2021), EMPL-JRC GD-AMEDI/AMEDI+ projects and World Inequality Database (WID).

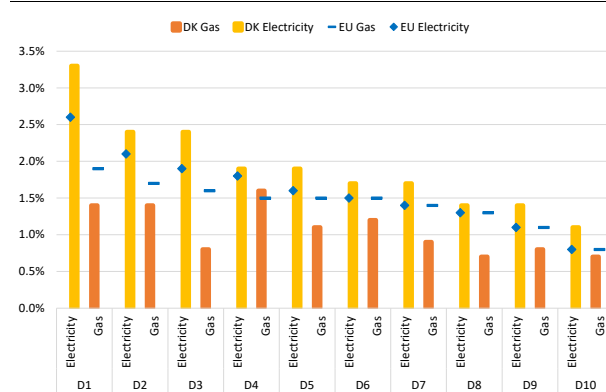
average of 6.9% in 2021)⁽⁶⁷⁾. In particular, 8.9% of the population at risk of poverty (AROP) were affected in 2021 (EU: 16.4%), and 2.4% of lower middle-income households (in deciles 4-5) (EU: 8.2%). Before the energy price hikes, an estimated 28.4% of the total population and 52.8% of the (expenditure-based) AROP population had residential expenditure budget shares on electricity, gas, and other fuels⁽⁶⁸⁾ above 10% of their household budget (above the estimated EU average of 26.9% and 48.2% respectively).

The increased energy prices in 2021-2023 negatively affect 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 fraction of individuals living in households which spend more than 10% of their budget on energy would have increased by 17.5 pps for the whole population and by 26.0 pps among the (expenditure-based) AROP population, more than the EU-level increases (16.4 pps and 19.1 pps, respectively)⁽⁶⁹⁾.

Expenditure shares of low and lower-middle income groups would increase the most, which is most pronounced for electricity, 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⁽⁷⁰⁾ above 6% stood at 25.8% in January 2023 (vs. 37.9% in the EU), but would have increased more than the EU average (6.5 pps vs 4.8 pps) due to the increase in transport fuel

prices. Denmark's recovery and resilience plan (RRP) allocated EUR 923 million towards green measures by improving energy efficiency in private and public buildings through renovation and by supporting energy efficiency in small and medium-sized firms.

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.

Access to public transport displays an urban-rural divide. Citizens perceive public transport to be relatively available (54% vs 55% in the EU) and of good quality (60%, same as EU average), though slightly less affordable than the EU average (49% vs 54%). As regards these perceptions, rural areas in Denmark perform worse than urban areas and lie below the EU average for rural areas⁽⁷¹⁾. The average carbon footprint of the top 10% of emitters among the population in Denmark is about 4.7 times higher than that of the bottom 50% (see Graph A8.1), i.e. slightly less pronounced than the EU average (5.0 times).

⁽⁶⁷⁾ 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](#).

⁽⁶⁸⁾ Products defined according to the European Classification of Individual Consumption according to Purpose (ECCOICOP):P045.

⁽⁶⁹⁾ [EMPL-JRC GD-AMEDI/AMEDI+](#); see details in the related technical brief.

⁽⁷⁰⁾ CP0722; cf. footnote (21).

⁽⁷¹⁾ 35% vs 46% in EU for availability, 35% vs 48% in EU for affordability, 44% vs 56% in EU for quality. Special Eurobarometer 527.

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.

Denmark’s circular economy transition is insufficient and needs accelerating to meet the EU’s circular economy goals. The EU’s 2020 circular economy action plan (CEAP) aims at doubling circular material use by 2030 vs 2020. Denmark’s circular use of material declined from 8% in 2016 to 7.8% in 2021, in both years falling below the EU average. The CEAP also aims to significantly decrease the EU’s material footprint. In 2020, Denmark’s material footprint was 25.6 tonnes/head, well above the 2020 EU average of 13.7 tonnes/head, and confirms the upward trend since 2016. The labour market benefits of the circular transition are not being realised; direct circular jobs have decreased since 2016.

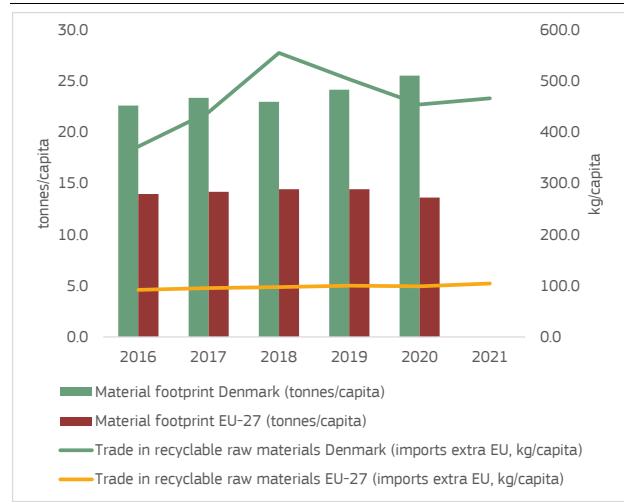
Denmark adopted a national action plan for circular economy running up to 2032 ⁽⁷²⁾, as already mentioned in the 2021 country report. The plan focuses on three areas with significant environmental and climate impacts: biomass, construction and plastics. The 2022 annual report on progress ⁽⁷³⁾ indicates that of the 129 initiatives in the plan, 27 have been completed, 88 are on schedule and 14 are delayed.

Denmark had milestones in 2022 in its recovery and resilience plan on mission roadmaps for circular economy: plastic and textile waste and for climate and environment-friendly agriculture and food production, and in 2023 has obtained support for a technical support instrument on industrial ecosystems.

⁽⁷²⁾ Danish Environment Ministry, 2021, [Action plan for circular economy - National plan for prevention and waste management 2020-2032](#)

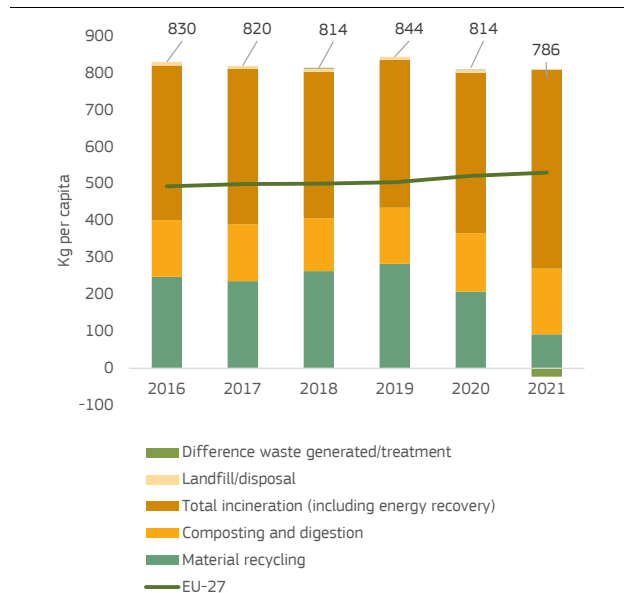
⁽⁷³⁾ Danish Environment Ministry, June 2022

Graph A9.1: Trend in material use



Source: Eurostat

Graph A9.2: Treatment of municipal waste



Source: Eurostat

Denmark has made efforts to improve its recycling performance, but this is not yet reflected in the data. As part of implementing the action plan for circular economy, laws were introduced in 2022 for: (i) a [framework for commercial waste treatment](#) and (ii) [new sorting and collection requirements for household and commercial waste](#) in 10 waste fractions. However, Denmark still has the highest municipal waste per head in the EU with 786 kg/year/head in 2021 (EU average 530 kg/year/head in 2021); furthermore, there is no national target for overall waste reduction. Denmark also needs to make substantial efforts to meet the EU 2025 recycling target for municipal and packaging waste; it fell



below the EU average of 48.5% in 2021. Denmark also relies on waste incineration, with over 53% of its municipal waste being incinerated in 2020 compared to the EU average of around 26% (2019 average). These trends show Denmark is challenged to meet its own set target of a 30% reduction in incineration capacity by 2030 vs 2020. As a part of the Climate Plan, the Danish government has in 2023 proposed a law that implies greater competition in the Danish waste incineration sector. The law is expected to be presented in parliament in the 2nd quarter of 2023. The estimate is that the law, if introduced, will decrease national waste incineration with 0.6 million tonnes in 2030.

The industrial system in Denmark is relatively static. The economy, particularly industry, is less efficient at using materials than the EU average, with a resource productivity of 1.7 PPS per kg in 2021 vs 2.3 for the EU (see also Annex 5). Thus, there is a missed opportunity to boost repair, reuse and the use of secondary raw materials. Denmark's consumption footprint and material input dependency are well above the EU average, which can threaten its competitive sustainability. Regarding the environmental sustainability of SMEs, Denmark is performing worse than the EU average. The mandatory use of ecolabels and the introduction of total cost of ownership (TCO) in public procurement are set to take place in 2023; Denmark is a frontrunner on

green public procurement (with a 2020 strategy).

The built environment system provides an opportunity to increase resource efficiency.

The recovery rate of construction and demolition waste has increased since 2016 and is above the EU average (97% vs 89%). Denmark has rules on selective demolition, imposed limits for embodied GHG in buildings of 12 kg CO₂ eq/m²/year starting in 2023 inside its [2021 National Strategy for Sustainable Construction](#), and uses Building Informatic Modelling.

The agri-food system has yet to design out food waste. The food waste in Denmark in 2020 at 221 kg per head was well above the EU average; reduction targets for food waste still need to be met and a sustainable food labelling framework introduced. On the other hand, Denmark's composting and anaerobic digestion per head is better than the EU average.

There remains a financing gap in the circular economy, including waste management requiring additional investments. The financing gap was estimated at EUR 601 million per year between 2014 and 2020. Over this period, investment needs were estimated to be at least EUR 1.2 billion per year, while investment baselines were EUR 572 million per year (Annex 6).

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)	22.7	23.4	23.0	24.2	25.6	-	13.7	2020
YoY growth in persons employed in the circular economy (%) ¹	-1.4	0.0	2.2	-2.9	-	-	2.9	2019
Water exploitation index plus (WEI+) (%)	6.1	5.5	4.4	2.7	-	-	3.6	2019
Industry								
Resource productivity (purchasing power standard (PPS) per kilogram)	1.5	1.6	1.6	1.6	1.7	1.7	2.3	2021
Circular material use rate (%) ²	8.0	7.9	8.1	7.6	7.5	7.8	11.7	2021
Recycling rate (% of municipal waste)	48.3	47.6	49.9	51.5	45.0	34.3	49.6	2021
Built environment								
Recovery rate from construction and demolition waste (%) ³	90.0	-	97.0	-	97.0	-	89.0	2020
Soil sealing index (base year = 2006) ⁴	103.3	-	107.7	-	-	-	108.3	2018
Agri-food								
Food waste (kg per capita) ⁵	-	-	-	-	221.0	-	131.0	2020
Composting and digestion (kg per capita)	153.0	154.0	143.0	152.0	158.0	178.0	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. N.B. Denmark informed the Commission 19/01/2023, the 2021 recycling rate reported figure was not accurate and an update would follow from Denmark. **Sources:** Eurostat, European Environment Agency

Digital transformation is key to ensuring a resilient and competitive economy. In line with the Digital Decade Policy Programme, and in particular with the targets in that Programme for digital transformation by 2030, this Annex describes Denmark'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). Denmark allocates 25% of its total RRP budget to digital (EUR 0.4 billion) ⁽⁷⁴⁾.

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 ⁽⁷⁵⁾. 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 ⁽⁷⁶⁾. Digital technologies, infrastructure and tools all play a role in the fundamental transformation needed to adapt the energy system to the current structural challenges ⁽⁷⁷⁾.

The shortage of ICT specialists is a persistent challenge for Denmark in relation to digital skills. The country scores well above the EU average in basic and above basic digital skills and

the percentage of ICT specialists is only slightly above the EU average and Danish enterprises report difficulties in hiring ICT specialists ⁽⁷⁸⁾.

Denmark remains a leader when it comes to digital infrastructure/connectivity ensuring wide coverage of fast broadband internet. Denmark scores significantly above the EU average in terms of very high capacity network (VHCN), fibre to the premises and 5G coverage (overall and on 3.4-3.8 GHz spectrum band).

Danish companies embrace digital technologies. 89% of SMEs have at least a basic level of digital intensity, which is 20 percentage points higher than the EU average. Twice as many companies use big data and cloud technologies as the EU average. Danish enterprises remain the EU leader in using artificial intelligence.

Denmark is one of the leading countries in the EU in terms of ensuring wide availability of digital public services. The country scores above EU average for digital public services for both citizens and businesses. Denmark has two eID schemes notified under the eIDAS regulation and scores well above the EU average regarding access to electronic health records.

⁽⁷⁴⁾ The share of financial allocations that contribute to digital objectives has been calculated using Annex VII of the RRF Regulation.

⁽⁷⁵⁾ 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.

⁽⁷⁶⁾ See for example OECD (2019): OECD Economic Outlook, Digitalisation and productivity: A story of complementarities, [OECD Economic Outlook, Volume 2019 Issue 1 | OECD iLibrary \(oecd-ilibrary.org\)](https://www.oecd-ilibrary.org/publications/oecd-economic-outlook-volume-2019-issue-1).

⁽⁷⁷⁾ 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).

⁽⁷⁸⁾ Eurostat : Eurostat – European Union Survey on ICT Usage and eCommerce in Enterprises.

Table A10.1: Key Digital Decade targets monitored by DESI indicators

	Denmark			EU	Digital Decade target by 2030 (EU)
	DESI 2021	DESI 2022	DESI 2023	DESI 2023	
Digital skills					
At least basic digital skills	NA	69%	69%	54%	80%
% individuals		2021	2021	2021	2030
ICT specialists ⁽¹⁾	5.3%	5.6%	5.6%	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	94%	95%	96%	73%	100%
% households	2020	2021	2022	2022	2030
Fibre to the Premises (FTTP) coverage ⁽²⁾	70%	74%	78%	56%	-
% households	2020	2021	2022	2022	2030
Overall 5G coverage	80%	98%	98%	81%	100%
% populated areas	2020	2021	2022	2022	2030
5G coverage on the 3.4-3.8 GHz spectrum band	NA	NA	75%	41%	-
% populated areas			2022	2022	2030
Digitalisation of businesses					
SMEs with at least a basic level of digital intensity	NA	NA	89%	69%	90%
% SMEs			2022	2022	2030
Big data ⁽³⁾	27%	27%	27%	14%	75%
% enterprises	2020	2020	2020	2020	2030
Cloud ⁽³⁾	NA	62%	62%	34%	75%
% enterprises		2021	2021	2021	2030
Artificial Intelligence ⁽³⁾	NA	24%	24%	8%	75%
% enterprises		2021	2021	2021	2030
Digitalisation of public services					
Digital public services for citizens	NA	83	84	77	100
Score (0 to 100)		2021	2022	2022	2030
Digital public services for businesses	NA	89	89	84	100
Score (0 to 100)		2021	2022	2022	2030
Access to e-health records	NA	NA	95	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



This Annex provides a general overview of the performance of Denmark's research and innovation (R&I) system, which is essential for delivering the twin green and digital transition.

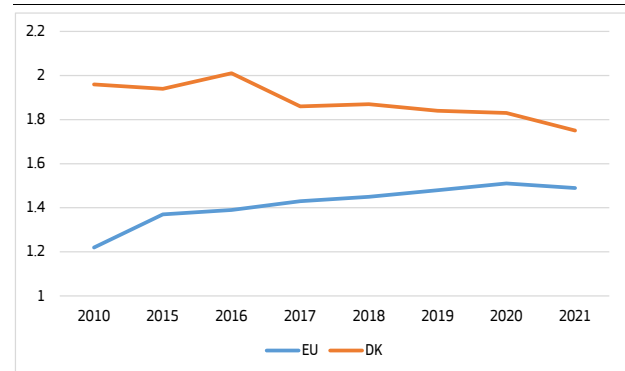
Thanks to a very strong R&D system, Denmark is among Europe's 'innovation leaders'. According to the 2022 edition of the European Innovation Scoreboard ⁽⁷⁹⁾, Denmark is an innovation leader with performance at 134.8% of the EU average. Denmark has a very strong R&D system, underpinned by significant investment. Denmark's R&D intensity (R&D expenditure as a percentage of GDP), at 2.81% in 2021, is significantly above the EU average and delivers excellent scientific, technological and innovation outputs. In particular, its solid public science base is a key asset and Denmark continues to rank high in the EU in terms of both public R&D intensity (public expenditure on R&D as a percentage of GDP) and the share of scientific publications that are highly-cited, an indicator of scientific excellence.

Denmark's Recovery and Resilience Plan (RRP) enables it to further mobilise the strengths of its R&D system to accelerate the twin transitions. The Danish RRP has a strong R&D focus, with more than 17% of the total spending earmarked for R&D projects. In the plan, green R&I investments account for 56.2% of overall R&I investment, while 19.4% of total R&I investment is directed towards digital-related R&I areas. A key measure aimed at mobilising R&I for the twin transition is the setting-up of mission-based R&D partnerships, which will focus on solutions for achieving Denmark's ambitious climate goals. This will enable Denmark to mobilise its existing strength in green innovation, as reflected in the share of environment-related patents in total patent applications – at 26%, double the EU average.

The decline in business R&D intensity is a key challenge to Denmark's position as innovation leader. Since 2016, business R&D intensity has been on a decreasing trend (from 2.01% of GDP in 2016 to 1.75% in 2021). As

noted in the Horizon Policy Support Facility (PSF) review of the Danish R&I system ⁽⁸⁰⁾, strengths in science could be leveraged more by attracting foreign companies to tap into existing knowledge pools through R&D investments in Denmark. This is currently happening only to a limited degree and could allow Denmark to take full advantage of the globalisation of R&D.

Graph A11.1: **Business enterprise expenditure on R&D (BERD) as % of GDP**



Source: Eurostat 2022

Addressing the growing productivity gap between large and small companies requires broadening the innovation base. The growing productivity gaps between large and small companies suggest weaknesses in the diffusion of technological advances. The PSF review of the Danish R&I system pinpointed the high concentration of R&D investment in a small number of large companies and the need to broaden the innovation base and involve more companies in R&D activities to promote innovation diffusion ⁽⁸¹⁾. The Danish Business Development Board can help here, by strengthening small and medium-sized enterprises' (SMEs) motivation and capacity for innovation. As indicated in the smart specialisation strategy for Denmark ⁽⁸²⁾, its activities have been focused on supporting greater insight into market trends, innovative processes and the capacity to develop and implement innovative products and processes. Moreover, in order to boost business R&D investment, the

⁽⁷⁹⁾ 2022 European Innovation Scoreboard, Country profile: Denmark [ec_rtd_eis-country-profile-dk.pdf](https://ec.rtd.eis-country-profile-dk.pdf) (europa.eu). The EIS provides a comparative analysis of innovation performance in the EU countries, including the relative strengths and weaknesses of their national innovation systems (also compared to the EU average).

⁽⁸⁰⁾ Peer review of Danish R&I system, Horizon 2020 Policy Support Facility, 2019 (p. 55) [PSF Denmark Final report \(europa.eu\)](https://psf-denmark.europa.eu/).

⁽⁸¹⁾ Peer review of Danish R&I system, Horizon 2020 Policy Support Facility, 2019 (pp. 30-33, p. 54) [PSF Denmark Final report \(europa.eu\)](https://psf-denmark.europa.eu/).

⁽⁸²⁾ Business Development in Denmark 2020-23, Danish Business Development Board (in Danish) [Erhvervsfremme i Danmark 2020-2023 \(erhvervsfremmebestyrelsen.dk\)](https://erhvervsfremme.dk/).

Danish RRP contains a temporary increase in R&D tax deductibility for all companies.

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

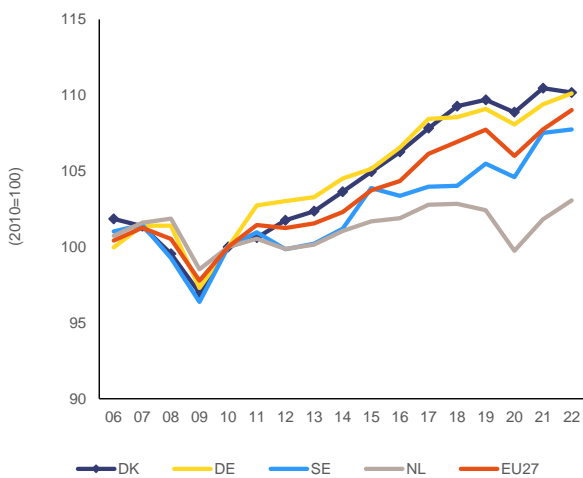
Denmark	2010	2015	2019	2020	2021	EU average (1)
Key indicators						
R&D intensity (GERD as % of GDP)	2,92	3,05	2,94	2,97	2,81	2,26
Public expenditure on R&D as % of GDP	0,95	1,11	1,09	1,13	1,05	0,76
Business enterprise expenditure on R&D (BERD) as % of GDP	1,96	1,94	1,84	1,83	1,75	1,49
Quality of the R&I system						
Scientific publications of the country within the top 10% most cited publications worldwide as % of total publications of the country	14,7	14,2	13,7	:	:	9,8
Patent Cooperation Treaty patent applications per billion GDP (in PPS)	6,3	6,3	6,2	:	:	3,3
Academia-business cooperation						
Public-private scientific co-publications as % of total publications	12,2	11,9	12,6	12,3	12,5	7,1
Public expenditure on R&D financed by business enterprise (national) as % of GDP	0,028	0,027	0,022	:	:	0,054
Human capital and skills availability						
New graduates in science & engineering per thousand pop. aged 25-34	15,8	17,1	19,6	18,9	:	16
Public support for business enterprise expenditure on R&D (BERD)						
Total public sector support for BERD as % of GDP	0,07	0,089	0,093	:	:	0,194
R&D tax incentives: foregone revenues as % of GDP	0,003	0,02	0,031	:	:	0,1
Green innovation						
Share of environment-related patents in total patent applications filed under the Patent Cooperation Treaty (%)	23,2	21	26	:	:	13,3
Finance for innovation and economic renewal						
Venture capital (market statistics) as % of GDP	0,045	0,028	0,08	0,094	0,143	0,074
Employment in fast-growing enterprises in 50% most innovative sectors	6,5	4,5	5,7	:	:	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 EPO's Patent Statistical database), Invest Europe

Productivity in Denmark is among the highest in the EU, but the gap between large and small firms is growing. At 142% of the EU average in 2022, labour productivity (GDP per hour worked) is comparatively high. Hourly productivity growth slowed over a longer period but had picked up in the years leading up to the pandemic, especially in industry. A significant part of this can be attributed to higher total factor productivity (TFP) growth, especially within larger and more internationalised firms⁽⁸³⁾ (see also Annex 11). TFP remains ahead of its peers and also above the euro area average (see Graph A12.1). Denmark is an innovation leader in the European Innovation Scoreboard and also performs well on indicators measuring human capital, absorptive capacity and technology diffusion. Productivity was strongly affected by the COVID-19 pandemic, causing significant fluctuations in 2020 and 2021. In 2022, the soaring costs for energy and other inputs caused further disruptions, leading to a decline in productivity. However, productivity is expected to recover in 2023-2024 and to grow again above the euro area average.⁽⁸⁴⁾

Graph A12.1: Total factor productivity



Source: European Commission.

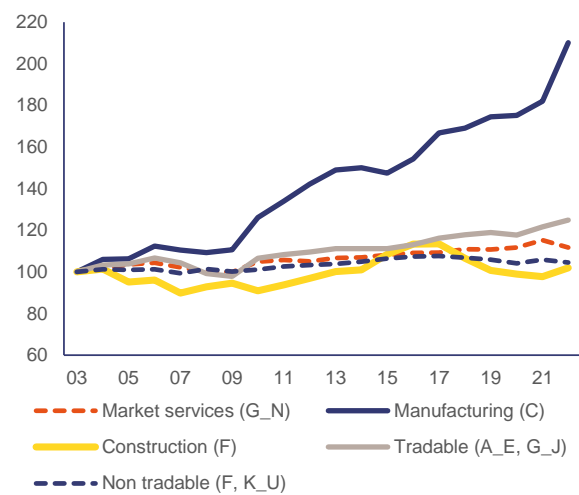
Denmark has a strong manufacturing sector, but skills shortages and soaring costs are dampening productivity growth. Denmark has a strong manufacturing sector, with productivity considerably above the EU average and also ahead of some of the other Nordic countries. Within the services sector, information and

⁽⁸³⁾ Report from the Danish Economic Council, which constitutes the National Productivity Board of Denmark, "Productivity 2022", <https://dors.dk/vismandsrapporter/produktivitet-2022>

⁽⁸⁴⁾ European Commission, Autumn 2022 Economic Forecasts.

communication services have had a particularly high contribution to productivity growth in the tradables sector (see Graph A12.2). Denmark is a frontrunner in clean technology and digitalisation, but SMEs are facing specific challenges.⁽⁸⁵⁾ In particular, many SMEs have difficulties finding qualified staff, which is a major obstacle for investment and affects the green and digital transition. Skills shortages affect nearly all sectors, in particular the construction sector, and firms increasingly have to refuse new orders or postpone investments due to the lack of staff. While innovation levels remain high⁽⁸⁶⁾, business R&D intensity has been on a decreasing trend and is increasingly concentrated in large companies and few sectors, whereas SMEs' innovation activity is modest (see also Annex 11).

Graph A12.2: Labour productivity by sector



Source: European Commission.

The soaring costs for energy and other inputs weighed considerably on business sentiment. Corporate investment had held up well in 2021 and represented 5.2% of Denmark's GDP, well above the EU average of 3.2%. However, towards the end of 2022, business sentiment dropped to its lowest level in over two years due to the increased geopolitical uncertainty and soaring

⁽⁸⁵⁾ SME Performance Review 2021/2022 and country fact sheet for Denmark, 20.6.2022, https://single-market-economy.ec.europa.eu/smes/sme-strategy/sme-performance-review_en

⁽⁸⁶⁾ EIBIS 2022, [EIB Investment Survey 2022 - EU overview](https://www.eib.org/press/eib-investment-survey-2022-eu-overview)
In 2021, innovation levels were highest among firms in Finland (52%), followed by those in Ireland and Denmark (50% in both countries).

costs,⁽⁸⁷⁾ indicating stark pessimism among Danish businesses, which is affecting investment. Manufacturing output and new orders also dropped, and business started to expect a decline also in employment.⁽⁸⁸⁾ The number of bankruptcies increased during the last months in 2022, particularly in construction and retail industries. The Danish government has adopted several measures to help households and businesses through the crisis, including the latest winter aid package adopted in September, and encouraged citizens and firms to further reduce energy consumption (see also Annex 7).

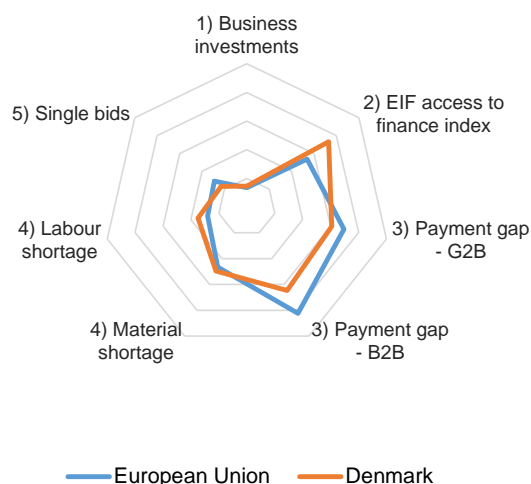
Supply shortages have started to fall, and firms are adapting their supply chains.

Following the pandemic, Danish manufacturing firms have also been grappling with supply problems for key raw materials and components, but the situation has since started to improve. In the last quarter of 2022, 50% of firms reported shortages of important materials and primary products, which was still above the EU average (32%). Regarding critical raw materials, Denmark's import concentration index is in line with the EU average. Dependencies exist for a broad range of raw materials and components, including critical raw materials necessary for the green and digital transition. Danish industry would benefit from further strengthening the resilience of strategic supply chains.

Denmark provides a stable and favourable business environment, but skills shortages are a major obstacle for investment. Denmark leads the 2022 IMD World Competitiveness Ranking⁽⁸⁹⁾, overtaking Switzerland, in particular due to its good performance in digitalisation but also due to a clear focus on sustainability and an agile and innovative business sector. Denmark performs well on digitalisation, including in respect to connectivity, and firms benefit from easy access to digital public services (see also Annex 10). The biggest long-term barrier to investment cited by Danish firms is the availability of skilled

staff (86%)⁽⁹⁰⁾. Indicators on labour shortages in industry are considerably above the EU average.

Graph A12.3: **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.

While many companies are created in Denmark, start-ups and small and innovative companies struggle to grow and scale up.

Denmark has a favourable business environment for firms and entrepreneurs and is among the countries with the highest share of green start-ups.⁽⁹¹⁾ Denmark has been the birthplace for 11 new “unicorns” since 2010, but many have later moved their headquarters. Access to capital and challenges in recruiting qualified staff are crucial factors for start-ups and often determine whether firms stay in Denmark or relocate elsewhere.⁽⁹²⁾ Equity financing is less pronounced than in some of the other Nordic countries but has further improved and is better than the EU average (see also Annex 11). Late payments can be a problem for certain small companies and the rate of SMEs

⁽⁸⁷⁾ In November 2022, the business sentiment index stood at minus 14.0, the lowest in over two years. [Sentiment indicators for business - Statistics Denmark \(dst.dk\)](https://www.dst.dk)

⁽⁸⁸⁾ Danish Chamber of Commerce, “*Comment: Business now expects declining employment*”, 29.11.2022 <https://www.danskerhverv.dk>

⁽⁸⁹⁾ IMD, World Competitiveness Rankings, <https://www.imd.org/centers/world-competitiveness-center/rankings/world-competitiveness/>

⁽⁹⁰⁾ EIB Investment Survey 2022

⁽⁹¹⁾ OECD 2022, The New Green Economy, [Green growth and sustainable development - OECD](https://www.oecd.org/green/growth-and-sustainable-development/)

⁽⁹²⁾ Danish Chamber of Commerce, new analysis about tech start-ups in Denmark: ‘Denmark: A Unicorn Factory – but why do they leave?’ 14.9.2022 <https://www.danskerhverv.dk>

whose bank loans' applications were refused or rejected is above the EU average.

Denmark still has scope for further improvement in enforcing Single Market rules. Denmark is closely integrated into the Single Market. Its trade integration for both goods and services is above the EU average. Overall the country performs relatively well in the Single Market Scoreboard,⁽⁹³⁾ but still has scope for further improvement, including in respect to ongoing infringement cases relevant for the Single Market, e. g. on transport, environment or energy. For the third consecutive year, Denmark managed to decrease its number of pending cases. While its average case duration increased over the last years, it remains below the EU average.⁽⁹⁴⁾ An ongoing project by the Single Market Enforcement Taskforce (SMET) aims to further reduce the length of planning and permitting procedures for renewable energy projects (see also Annex 7).

In regulated professions, regulatory restrictiveness in Denmark is lower than or in line with the EU average, except for real estate agents. For real estate agents, restrictiveness is above the EU average⁽⁹⁵⁾. The duration of mandatory qualification requirements for real estate agents could be reassessed. Moreover, lawyers in Denmark are subject to legal form requirements, incompatibility rules and multidisciplinary restrictions, which could affect the potential of this sector to innovate and roll out digital solutions and new business models.

⁽⁹³⁾ Single Market Scoreboard, https://single-market-scoreboard.ec.europa.eu/performance-overview_en

⁽⁹⁴⁾ European Commission, Single Market Scoreboard, Country data: Denmark, https://single-market-scoreboard.ec.europa.eu/countries/denmark_en

⁽⁹⁵⁾ European Commission, Communication on updating the reform recommendations for regulation in professional services, COM(2021)385.

Table A12.1: Industry and the Single Market

POLICY AREA		INDICATOR NAME	2018	2019	2020	2021	2022	EU27 average (*)
Economic Structure		Net private investment, level of private capital stock, net of depreciation, % GDP ⁽¹⁾	4.5	3.6	4	4.9	6.7	3.7
		Net public investment, level of public capital stock, net of depreciation, % GDP ⁽¹⁾	0.8	0.6	1	0.9	0.9	0.4
		Real labour productivity per person in industry (% yoy) ⁽²⁾	0.5	0.9	-1.2	4.3	11.9	1.4
Cost competitiveness		Nominal unit labour cost in industry (% yoy) ⁽²⁾	0.4	1.7	3.7	-1.2	-7.6	2.9
	Shortages	Material shortage (industry), firms facing constraints, % ⁽³⁾	8	4	7	28	50	47
Labour shortage using survey data (industry), firms facing constraints, % ⁽³⁾		11	8	4	24	35	28	
Vacancy rate (business economy) ⁽⁴⁾		1.9	2	1.8	2.9	3.4	3.1	
Strategic dependencies		Concentration in selected raw materials, Import concentration index based on a basket of critical raw materials ⁽⁵⁾	0.16	0.15	0.16	0.16	0.16	0.18
		Installed renewables electricity capacity, % of total electricity produced ⁽⁶⁾	45.9	45.9	46.5	49.4	n.a.	50.9
SINGLE MARKET	Single Market integration	EU trade integration, % ⁽⁷⁾	26.9	27.4	26.1	28.4	31.6	45.8
	Restrictions	EEA Services Trade Restrictiveness Index ⁽⁸⁾	0.04	0.03	0.04	0.04	0.04	0.05
	Public procurement	Single bids, % of total contractors ⁽⁹⁾	11	13	15	18	23	29
BUSINESS ENVIRONMENT - SMES	Investment obstacles	Impact of regulation on long-term investment, % of firms reporting business regulation as major obstacle ⁽¹⁰⁾	7.8	5.9	5.8	5.3	6.2	29.6
	Business demography	Bankruptcies, Index (2015=100) ⁽¹¹⁾	187.4	228.2	152.3	236	221.8	86.8
		Business registrations, Index (2015=100) ⁽¹¹⁾	142.8	141.7	123.3	119.4	100.9	121.2
	Late payments	Payment gap - corporates B2B, difference in days between offered and actual payment ⁽¹²⁾	3	3	20	12	11	13
		Payment gap - public sector, difference in days between offered and actual payment ⁽¹²⁾	2	5	25	10	14	15
		Share of SMEs experiencing late payments in past 6 months, % ⁽¹³⁾	n.a.	38.7	24.9	35.1	39.3	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⁾	0.22	0.18	0.2	0.23	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⁾	0.47	0.23	0.29	0.46	n.a.	0.23	

(*) Last available year

Source: (1) AMECO, (2) Eurostat: NAMA_10_LP_A21, (3) ECFIN BCS, (4) Eurostat: jvs_a_rate_r2, (5) COMEXT, (6) Eurostat: nrg_inf_epc, (7) Eurostat: BOP_C6_A, (8) OECD, (9) Single Market Scoreboard, (10) EIB survey, (11) Eurostat: sts_rb_a, (12) Intrum, (13) SAFE Survey, (14) EIF SME Access to Finance Index.



This Annex outlines the performance of Denmark's public administration, which is essential for providing services and carrying out reforms. The Danish public administration has consistently been one of the most effective in the EU and has seen its position further improve, as reflected in the government effectiveness indicator in 2021⁽⁹⁶⁾. Denmark typically scores above the EU average on most indicators related to public administration, but scores below the EU average in the field of policymaking, and specifically in the use of *regulatory impact assessments* and stakeholder consultation (Graph A13.2). Denmark's recovery and resilience plan aims to strengthen institutional resilience and prepare the public administration for future challenges by adopting digital technologies.

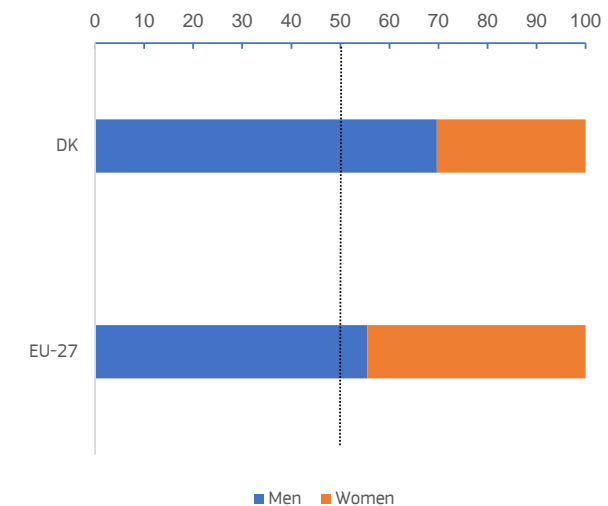
Denmark has a relatively young and skilled civil service. The ratio of those aged 25–49 compared to 50–64 year-olds is above the EU average. The share of civil servants with higher education is well above the EU average, as is the share of those in adult learning. However, despite improvements in recent years, the gender balance in senior positions in the public administration remains relatively poor by EU-27 standards (Graph A13.1).

Denmark is the EU's best performer in terms of digital public administration. 98% of all services are offered online. The share of e-government users has remained above 92% since 2017 (EU: 65%)⁽⁹⁷⁾. Most people (81%) login using their eID (67% for the EU). Denmark outperforms the EU average in the provision of digital services for all life events, apart from a few areas such as the transparency of services for regular business operations or starting a cross-border small claims procedure (in the field of justice).

Denmark's performance on evidence-based policymaking is around the EU average. There are gaps in how it carries out *ex ante* evaluations and stakeholder consultations, which could reduce the quality of legislation in the future (Graph A13.2). Denmark however, performs above the EU average when it comes to *ex post* evaluation of both primary and secondary legislation, despite a drop in its performance since 2017. Of the four

dimensions of the OECD iREG indicators, Denmark's performance compared to the EU-27 is weakest in the category of oversight and quality control, followed by the transparency dimension (Graph A13.2).

Graph A13.1: Denmark. Public administration. Share of women and men in senior positions.



(1) 2022 data

Source: European Institute for Gender Equality

The justice system works efficiently overall.

The clearance rate for civil and commercial litigation fell to 97.6% in 2021 from 111.1% in 2020. The overall quality of the justice system is good. However, there are some challenges in terms of human and financial resources of the justice system, which have increasingly negatively impacted the length of proceedings, notably in civil and criminal cases. The level of digitalisation is advanced. Despite a few gaps, digital tools are widely used in courts, including an electronic case management system, distance communication technology and a secure remote working environment for court staff. No systemic deficiencies in judicial independence have been reported⁽⁹⁸⁾.

⁽⁹⁶⁾ Worldwide Governance Indicators, 2022. In 2021, Denmark scored 2.004 on a scale between -2.5 and +2.5.

⁽⁹⁷⁾ E-government benchmark report, 2023, forthcoming.

⁽⁹⁸⁾ For a more detailed analysis of the performance of the justice system in Denmark, see the 2023 [EU Justice Scoreboard](#) (forthcoming) and the country chapter for Denmark in the 2023 [Rule of Law Report](#) (forthcoming).

Table A13.1: Public administration indicators

DK 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 (%)	91.7	93.5	94.1	91.8	93.2	n/a	64.8
2 E-government benchmark overall score ⁽³⁾	n/a	n/a	n/a	85.4	84.3	85.1	72.9
3 Open data and portal maturity index	n/a	0.4	0.8	1.0	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, %)	58.1 (b)	59.3	61.6	62.3	64.7 (b)	67.3	52.0
5 Participation rate of public administration employees in adult learning (%)	33.3 (b)	28.5	32.8	24.8	29.0 (b)	32.9	16.9
6 Gender parity in senior civil service positions ⁽⁴⁾	50.6	52.6	39.6	40.0	47.2	39.4	11.0
7 Ratio of 25-49 to 50-64 year olds in NACE sector O	1.6 (b)	1.7	1.8	2.0	1.8 (b)	1.8	1.5
Public financial management							
8 Medium term budgetary framework index	0.6	0.6	0.6	0.6	0.6	n/a	0.7
9 Strength of fiscal rules index	1.0	1.0	1.0	1.0	1.0	n/a	1.5
Evidence-based policy making							
10 Regulatory governance	1.61	n/a	n/a	n/a	1.61	n/a	1.7

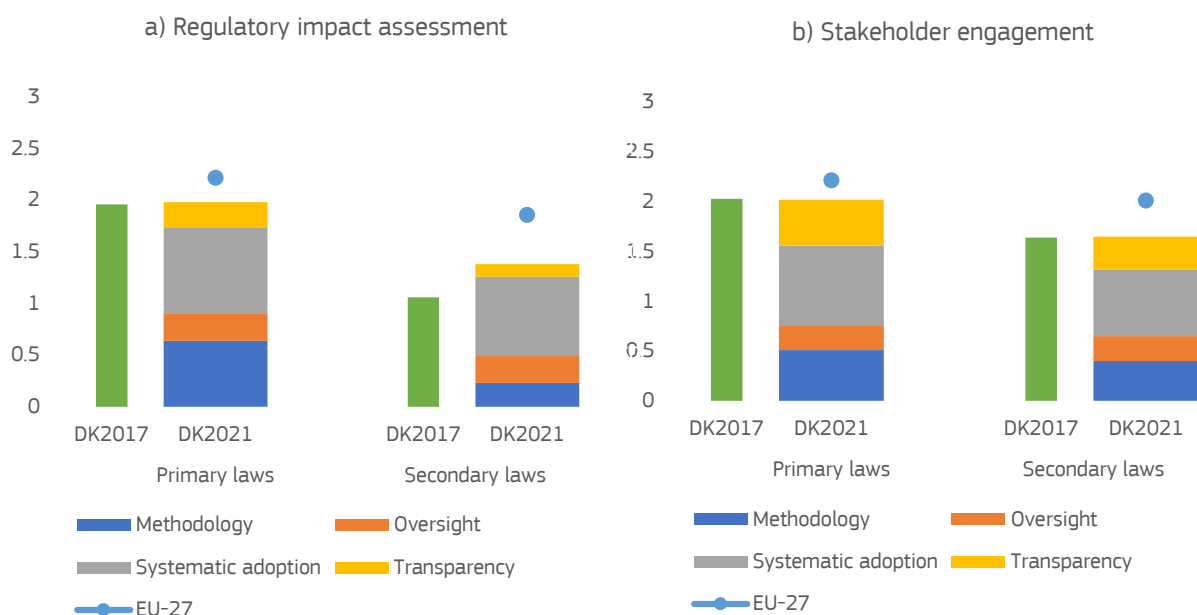
⁽¹⁾ High values denote a good performance, except for indicator # 6. ⁽²⁾ 2022 value. If not available, the 2021 value is shown.

⁽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).

Graph A13.2: a) Regulatory impact assessment and b) Stakeholder engagement



Source: Indicators of Regulatory Policy and Governance Surveys 2017 and 2021 (<http://oe.cd/ireg>).

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 Denmark’s progress in implementing the Pillar’s 20 principles and EU headline and national targets for 2030 on employment, skills and poverty reduction.

Table A14.1: Social Scoreboard for Denmark

Policy area	Headline indicator	Value
Equal opportunities and access to the labour market	Early leavers from education and training (% of population aged 18-24, 2022)	10
	Share of individuals who have basic or above basic overall digital skills (% of population aged 16-74, 2021)	68.65
	Youth NEET rate (% of population aged 15-29, 2022)	7.9
	Gender employment gap (percentage points, 2022)	5.4
	Income quintile ratio (S80/S20, 2021)	3.93
Dynamic labour markets and fair working conditions	Employment rate (% of population aged 20-64, 2022)	80.1
	Unemployment rate (% of active population aged 15-74, 2022)	4.5
	Long term unemployment (% of active population aged 15-74, 2022)	0.5
	GDHI per capita growth (2008=100, 2021)	116.07
Social protection and inclusion	At risk of poverty or social exclusion rate (% of total population, 2021)	17.3
	At risk of poverty or social exclusion rate for children (% of population aged 0-17, 2021)	14
	Impact of social transfers (other than pensions) on poverty reduction (% reduction of AROP, 2021)	53.93
	Disability employment gap (percentage points, 2021)	7.9
	Housing cost overburden (% of total population, 2021)	15.5
	Children aged less than 3 years in formal childcare (% of population under 3-years-old, 2021)	69.1
	Self-reported unmet need for medical care (% of population 16+, 2021)	1.3

(1) 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.

Despite the unstable economic environment, the Danish labour market is performing well, with employment and unemployment rates hitting record values. The employment rate settled at 80.1% in 2022, reaching its highest peak since 2005, higher than the EU average of 74.6%. As a result, Denmark has reached its national employment rate target of 80.0% by

2030. Similarly, the unemployment rate hit a record low of 4.5% in 2022. Also the long-term unemployment rate of 0.5% was the lowest in the EU, where the average was 2.4%.

Denmark managed to substantially improve the labour market integration of young people and persons with disabilities, while the gender employment gap remains stable.

The unemployment rate among young people aged 15-29 was 8.6% in 2022, against the EU average of 11.3%. After rising from 2006 (4.7%) until 2020 (10.2%), the share of young people not in education, employment or training (NEET) reached pre-pandemic levels in 2020 (8.3%) and settled at 7.9% in 2022 (9.6% in 2019). The disability employment gap, which had been higher than 16 percentage points (pps) since 2014, was halved to 7.9 pps in 2021. The employment gap fell for people with only some activity limitations (from 11.5 pps in 2019 to 5.2 pps in 2021) and for people with severe activity limitations (from 37.4 pps in 2019 to 20.9 pps in 2021). Furthermore, the gender employment gap has been stable at around 7 pps since 2011 and stood at 5.4 pps in 2022 (vs. EU: 10.7 pps). The inactivity trap for second earners is one of the highest in the EU, above 50%, and is a considerable disincentive for second earners to take up paid work.

Labour shortages reached unprecedented peaks in 2022 and are still at a particularly critical level in the service sector.

After crossing the 40% threshold in Q2-2022, the share of employers who identified labour shortages as the main factor limiting production in the industrial sector settled at 21.2% in Q4-2022 (vs. EU: 25.9%), up from 6.4% in Q4-2019. In the service sector, this figure was still as high as 39.0% in Q4-2022 (vs. EU: 30.2%), which is more than double of what it was in 2019 (16.2% in Q4-2019). The job vacancy rate in the business economy stood at 3.4% in Q3-2022 (vs. EU: 3.1%), up from 2.0% in Q3-2019. Based on this indicator, the most affected sectors were administrative and support service activities (4.9%), accommodation and food service activities (4.2%), and electricity, gas, steam, and air-conditioning supply (4.2%). The highest job vacancy rate was in the capital region (3.9%), and the lowest was in northern (2.5%) and central Denmark (2.9%). Moreover, small businesses with



nine or less employees (3.7%) had the highest rate, and medium-sized businesses with 50-99 employees (2.7%) had the lowest.

More efforts are needed to reduce the number of early leavers from education and training and raise the level of digital skills.

The share of people aged 18-24 who did not complete their education or training has been broadly stable since 2000 and stood at 10.0% in 2022. Meanwhile, the EU average has been declining since 2002 (from 16.9% to 9.6% in 2022). The share of individuals who have basic or above basic overall digital skills has been declining since 2016 (78%) and reached 68.7% in 2021. Although this is still above the EU average (54%), more efforts in this area would help alleviate skilled labour shortages. The European Social Fund Plus (ESF+) includes measures to raise the workforce's formal education level and to upskill and reskill employed and unemployed people. These measures will further contribute to reaching the national target of 60% of adults participating in training every year by 2030. Despite different governments continued focus on admission and graduates from VET-programmes, the numbers remain low. For the two biggest VET-programmes, which provide labour to the health care sector where there is also a shortage, the tendency is the same. The shortage is very likely to continue and a shortage of around 16,000 healthcare assistants and helpers is expected in 2030⁽⁹⁹⁾. Besides providing the labour market with a skilled workforce, VET has a significant role in supporting the green and digital transition. The already well-established tripartite system identifying educational needs in the education sector also helps recognizing needs for new skills linked to the green and digital transition in the VET sector. It could further support VET providers' capacity in the development and adaptation of the training and education to reduce systemic delays, particularly as regards the matching between the educational system and the needs for new skills

In 2021, social transfers managed to cushion the impact of a deteriorating social situation.

Denmark's real gross disposable household income (GDHI) per capita, fell from 117.2 (2020) to 116.1 (2021) (2008=100). While the pandemic was an important factor, the government took different measures to among other things help the citizens and vulnerable families. In the same

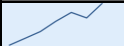

period, real GDHI per capita in the EU increased from 108.0 (2020) to 109.8 (2021). The share of people at risk of poverty or social exclusion increased from 16.8% (2020) to 17.3% (2021). The number of people living in households with very low work intensity in absolute terms increased from 414 400 (2019) to 429 300 (2021). The pandemic was also a factor for this. Nonetheless, social transfers in 2021 managed to reduce the risk of poverty by 53.9% (EU: 37.1%). This reverses a long-term negative trend as the impact of social transfers on reducing poverty constantly decreased from 2005 (60.5%) to 2019 (47.3%). Minimum income adequacy and coverage are both excellent: Denmark is one of the few Member States where adequacy is above 80% of the poverty threshold and coverage is close to 100% of the population at risk of poverty. It is also the only Member State, apart from Belgium, where the duration of entitlement to unemployment benefits extends to 2 years or more. The ESF+ contains measures to increase employment for people excluded from the labour market, and 6 400 people are expected to benefit. This should contribute to achieving the national target of 30 000 fewer people living in households with very low work intensity by 2030 (compared to 2019).

There is a shortage of affordable housing in some areas, especially in bigger cities, resulting in very high housing costs.

In 2021, the share of the Danish population living in households where housing costs represent more than 40% of the total disposable household income was 15.5%, up from 14.1% in 2020 (vs. EU: 8.3%). The housing cost overburden rate is extremely high for single people (41.0% vs. 9.8% for couples) and for tenants paying rent at market prices (30.3%, compared to 4.6% for homeowners paying a mortgage). It is also disproportionately high for people living in cities (21.9%, against 10.5% in rural areas) and for non-EU citizens (21.9% among those aged 18 and over, against 17.1% for Danish citizens). The former government proposed an initiative to combat the increases in rent for some private housing contracts, legislated in fall 2022 which introduces a 2-year ceiling to the increases in rent to a maximum of 4% yearly as regards private rental contracts.

⁽⁹⁹⁾ [Om bare 8 år kan vi mangle 16.000 SOSU'er \(kl.dk\)](#)

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

Indicators	Latest data	Trend (2015-2021)	National target by 2030	EU target by 2030
Employment (%)	79.1 (2021)		80	78
Adult learning ¹ (%)	50.4 (2016)		60	60
Poverty reduction ^{2,3} (thousands)	+15 (2021)		-30	-15,000

Adult Education Survey, adults in learning in the past 12 months

EU headline target set in terms of number of persons at risk of poverty or social exclusion

Denmark expresses its national target as a reduction in the number of persons liv

(1) Adult Education Survey, adults in learning in the past 12 months.

(2) EU headline target set in terms of number of persons at risk of poverty or social exclusion (AROPE), reference year 2019.

(3) Denmark expresses its national target as a reduction in the number of persons living in households with very low work intensity (VLWI), reference year 2019.

Source: Eurostat, DG EMPL.

This Annex outlines the main challenges for Denmark'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.

Denmark faces difficulties in attracting and training enough teachers. Teacher shortages and a lack of fully trained teachers is a challenge. For instance, the goal of the 2014 Folkeskole reform was that 95% of teachers should, by 2020, have teaching competencies in the subjects they teach. This has been postponed to 2025. Too few young people are attracted to initial teacher training programmes, and many drop out during training⁽¹⁰⁰⁾. Continued teacher training is not compulsory in Denmark and, in an international comparison, teachers are less satisfied with their training opportunities⁽¹⁰¹⁾.

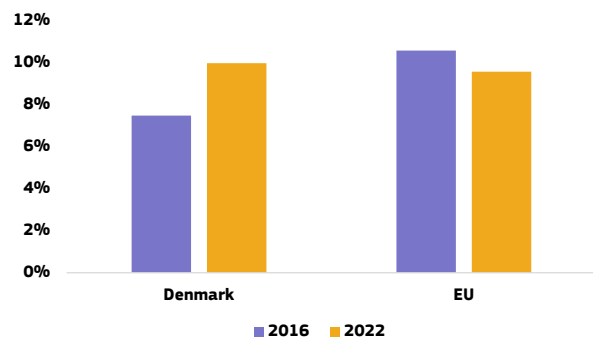
Denmark has a high participation rate in early childhood education and care (ECEC). The share of children between 3 years and the age of compulsory education in ECEC was 97.6% in 2020, above the 96% EU-level target and 3.7 pps above the EU average. The government is taking measures to improve ECEC quality⁽¹⁰²⁾.

In Denmark, while equity remains high schools differ in teaching time and quality and pupils with a migrant background achieve significantly worse education outcomes. Students in disadvantaged schools have less access to class teaching time than their peers in advantaged schools; class teaching time also differs between private and public schools⁽¹⁰³⁾. According to the OECD PISA 2018 isolation index⁽¹⁰⁴⁾, Danish young people with a migrant background tend to attend schools in which most of their classmates have a similar background. In addition, the distribution of comprehensively educated teachers varies throughout the country, with educated teachers

favouring cities over rural areas. Educated teachers are also more likely to work in private than in public schools. These differences may affect education outcomes. Overall, pupils in Denmark have, on average, good ability in mathematics, reading and science. However, according to PISA 2018, pupils with a migrant background perform considerably worse in reading (-65 score points) than native-born pupils. Even after taking account of socio-economic disadvantage, the gap stands at -34 score points, about twice the EU average (18.3). The share of young people failing to reach a sufficient level in reading among foreign-born pupils is also very high, 38.3%, against only 13.3% among native-born.

Early school leaving is increasing in contrast to overall decreasing trends in the EU. At 10% in 2022, the rate of young people leaving education and training prematurely remained above the 9% EU-level target, with a 0.2 pps increase compared with 2021. Since 2015, the rate has increased by 1.9 pps in Denmark while the EU average decreased by 1.5 pps.

Graph A15.1: **Early leavers from education and training (18-24) in 2016 and 2022 (%)**



Source: Eurostat

Denmark is one of the frontrunners on digitalisation in education, but more progress is needed in certain areas. In 2021, 80% of 16-19-year-olds considered themselves to have basic or above-basic digital skills, 11 pps above the EU average. Nevertheless, there are areas for improvement. Danish teachers in public schools report higher needs for ICT training and those who need more intensive training tend to be located more in rural areas than in cities⁽¹⁰⁵⁾.

⁽¹⁰⁰⁾European Commission/EACEA/Eurydice (2021), Teachers in Europe: Careers, Development and Well-being.

⁽¹⁰¹⁾European Commission, Education and Training Monitor 2021.

⁽¹⁰²⁾[Draft Finance Act for the financial year 2023 \(fm.dk\)](#)

⁽¹⁰³⁾OECD (2022) Mending the Education Divide: Getting Strong Teachers to the Schools That Need Them Most, TALIS, OECD Publishing, Paris.

⁽¹⁰⁴⁾The [isolation index](#) measures whether students of a certain type are more concentrated in some schools.

⁽¹⁰⁵⁾OECD (2022) Mending the Education Divide: Getting Strong Teachers to the Schools That Need Them Most, TALIS, OECD Publishing, Paris.

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

Indicator	Target	2015		2022			
		Denmark	EU27	Denmark	EU27		
¹ Participation in early childhood education (age 3+)	96%	98.0%	91.9%	97.6% ²⁰²⁰	93.0% ²⁰²⁰		
² Low achieving 15-year-olds in:	Reading	< 15%	15.0%	20.0%	16.0% ²⁰¹⁸	22.5% ²⁰¹⁸	
	Mathematics	< 15%	13.6%	22.3%	14.6% ²⁰¹⁸	22.9% ²⁰¹⁸	
	Science	< 15%	15.9%	21.1%	18.7% ²⁰¹⁸	22.3% ²⁰¹⁸	
Early leavers from education and training (age 18-24)	³ Total	< 9%	8.1%	11.0%	10.0%	9.6%	
	³ By gender	Men		9.9%	12.5%	12.1%	11.1%
		Women		6.2%	9.4%	7.8%	8.0%
	⁴ By degree of urbanisation	Cities		5.8%	9.6%	6.3%	8.6%
		Rural areas		11.3%	12.2%	15.3%	10.0%
		Native		8.0%	10.0%	9.9%	8.3%
	⁵ By country of birth	EU-born		: ^u	20.7%	: ^u	20.3%
Non EU-born			9.5% ^u	23.4%	12.0% ^u	22.1%	
⁶ Equity indicator (percentage points)		:	:	12.2 ²⁰¹⁸	19.3 ²⁰¹⁸		
⁷ Exposure of VET graduates to work based learning	Total	≥ 60% (2025)	:	:	65.3%	60.1%	
Tertiary educational attainment (age 25-34)	⁸ Total	45%	43.0%	36.5%	49.0%	42.0%	
	⁸ By gender	Men		34.6%	31.2%	40.0%	36.5%
		Women		52.0%	41.8%	58.3%	47.6%
	⁹ By degree of urbanisation	Cities		57.9%	46.2%	61.6%	52.2%
		Rural areas		26.3%	26.9%	32.8%	30.2%
		Native		41.9%	37.7%	49.1%	43.0%
¹⁰ By country of birth	EU-born		59.7% ^u	32.7%	59.9%	39.5%	
	Non EU-born		44.6% ^u	27.0%	42.5%	35.7%	
¹¹ Share of school teachers (ISCED 1-3) who are 50 years or over			33.2%	38.3%	32.9% 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 is 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.

Since 2015, Denmark has markedly improved its share of science, technology, engineering, and mathematics (STEM) graduates among all graduates, but it still lags behind the EU average.

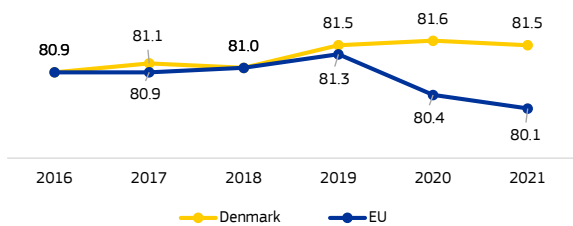
In 2022, tertiary education attainment stood at 49.% (0.7 pps less than in 2021), above the EU average (42%) and the EU-level target (45%). In 2020, compared with the EU, fewer students graduated in Denmark in STEM subjects. Their share was at 23%, 1.9 pps below the EU average. Nevertheless, the increase since 2015 is remarkable, when Denmark's share of STEM graduates among all graduates was the lowest in the EU. Danish graduates choose similar studies compared with other EU countries with, however, a smaller share of graduates in education (5.2% / 9.7%) and a larger one in ICT (5.4% / 3.9%).

Overall, Denmark has very good systems both for vocational education and training and for adult learning, but skills shortages do exist (see Annex 14).

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 Denmark.

Life expectancy in Denmark decreased only slightly from 81.6 years (2020) to 81.5 years (2021), which is still above the EU average of 80.1 years. Treatable mortality rates are well below the EU average. In 2020, leading causes of death were cancer and diseases of the circulatory system. Cancer mortality in Denmark was 271 per 100 000 population (2020), above the EU average of 242 (2020). In 2021 COVID-19 mortality slightly decreased compared to the year before. ⁽¹⁰⁶⁾

Graph A16.1: Life expectancy at birth, years



Source: Eurostat

Health spending relative to GDP in Denmark was 10.5%, slightly below the EU average of 10.9% (2020). Compared to the years before, health spending relative to GDP remained fairly constant. Per capita spending (in purchasing power standards) in 2020 was EUR 3 964, above the EU average of EUR 3 269. Outpatient care made up 34% of total current health expenditure, well above the EU average of 22.5%. Spending on inpatient care as a share of overall health expenditure (26.6%) is similar to the EU average of 26.4%. With 10.5%, the share of spending on medical goods (including medicines) was clearly lower than the EU average of 18.2%.

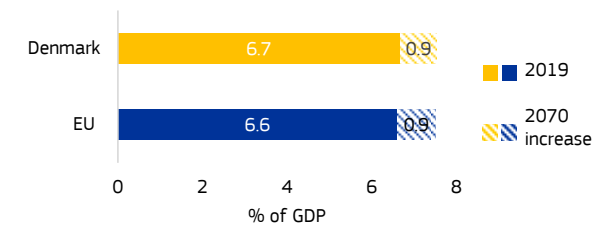
Denmark has increased the share of spending on prevention. In 2020, Denmark spent 3.2% of current health expenditure on prevention, compared to 2.2% in 2019. However, this is still below the EU average of 3.4% (2020). In absolute

⁽¹⁰⁶⁾Based on data provided directly by Member States to ECDC under the European Surveillance System (data current as of 13 April 2023).

terms, spending on prevention in Denmark increased by 50% between 2019 and 2020 (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 Denmark for epidemiological surveillance, risk and disease control programmes and immunisation programmes. The increase in costs for immunisation programmes is linked to the observed increased influenza vaccination in the population in 2020. Of further relevance to public health is the fact that the consumption of antimicrobials is well below the EU average.

Public spending on health is projected to increase by 0.9 percentage points of GDP by 2070, in line with the EU average. The public share of health expenditure was 84.9% (2020), above the EU average of 81.2% (2020).

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



AWG reference scenario

Source: European Commission / EPC (2021)

Denmark has more doctors and nurses than the EU average. There were 4.3 doctors per 1 000 population (2019), more than the EU average of 3.9 (2020). There were 10.1 nurses per 1 000 population (2019), more than the EU average of 8.3 (2020). However, more than 27% of the nursing workforce are older than 55 years (2017), which raises some concerns about the sustainability of workforce numbers. The Danish government agreed in 2022 on a reform which aims to strengthen the health system, including through improved medical coverage in areas with a shortage of doctors. ⁽¹⁰⁷⁾ The government also

⁽¹⁰⁷⁾See: https://commission.europa.eu/system/files/2023-05/2023-Denmark-NRP_en.pdf

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)	73.2	73.0	66.2	63.5	NA	91.7 (2020)
Cancer mortality per 100 000 population	284.7	279.8	282.5	271.0	NA	242.2 (2020)
Current expenditure on health, % GDP	10.1	10.1	10.1	10.5	NA	10.9 (2020)
Public share of health expenditure, % of current health expenditure	84.0	83.8	83.7	84.9	NA	81.2 (2020)
Spending on prevention, % of current health expenditure	2.4	2.3	2.2	3.2	NA	3.4 (2020)
Acute care beds per 100 000 population	254	254	249	NA	NA	387.4 (2019)
Doctors per 1 000 population *	4.1	4.2	4.3	NA	NA	3.9 (2020)
Nurses per 1 000 population *	10.0	10.1	10.1	NA	NA	8.3 (2020)
Consumption of antibacterials for systemic use in the community, daily defined dose per 1 000 inhabitants per day (total consumption for CY and CZ) **	14.3	13.6	13.4	12.5	12.6	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

established a “Resilience Commission” to look at staff shortages and recruitment issues. In 2023 the government announced an acute package to address challenges with increasing waiting lists and shortages of key staff. ⁽¹⁰⁸⁾.

Denmark is further stepping up policies to foster integrated care. Most recently, this was done by setting up ‘health clusters’ around the 21 acute care hospitals, optimising the delivery of care services based in the community ⁽¹⁰⁹⁾.

Through its recovery and resilience plan (RRP), Denmark plans to invest EUR 33 million (2.1% of the RRP's total value) in healthcare. The Danish RRP contains investments aimed at ensuring sufficient stocks of critical medicines and improving the emergency management and monitoring of these stocks. Furthermore, Denmark is working on strengthening digital solutions in the healthcare sector. Still pending is a clinical study on the long-term effect of COVID-19 vaccines.

⁽¹⁰⁸⁾ See: <https://eurohealthobservatory.who.int/monitors/health-systems-monitor/updates/hspm/denmark-2012/acute-package-to-address-waiting-lists-and-staff-shortages>.

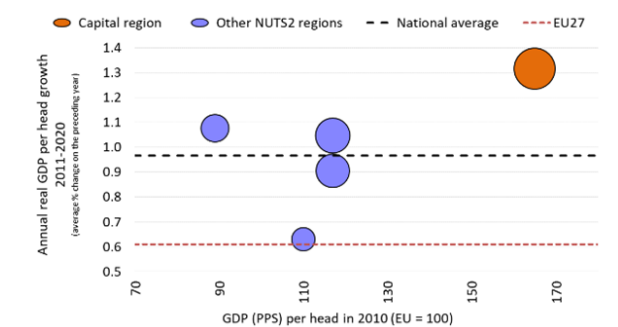
⁽¹⁰⁹⁾ See: <https://eurohealthobservatory.who.int/monitors/health-systems-monitor/updates/hspm/denmark-2012/health-clusters-now-mandatory-across-denmark>.

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

Denmark had the third highest GDP per capita in the EU in 2021, but regional disparities have slightly increased between the capital region and the rest of the country.

All Danish regions have performed largely above the EU average in terms of regional competitiveness. Hovedstaden is the motor of the Danish economy, accounting for 42% of the national GDP in 2020 and with GDP per capita at 178% above the EU average. Syddanmark, Midtjylland and Nordjylland had GDP per capita between 105% and 120% of the EU average. Sjælland is the only transition region in Denmark with GDP per capita below the EU average (89%).

Graph A17.1: **GDP per capita (2010) and GDP per capita growth (2011-2020)**

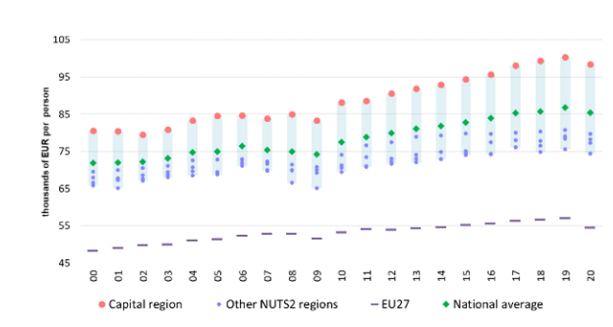


(1) Bubble sizes correspond to population size
Source: Eurostat, DG REGIO elaboration

Despite the COVID-19 pandemic, GDP grew slightly in all regions between 2019 and 2020. All regions had an annual real GDP per capita growth rate above the EU average (0.6%), although Nordjylland was close to the EU average. Nordjylland was also the only Danish region with real GDP growth below the long-term EU average.

Regional disparities in GDP per capita partly stem from variations in labour productivity. Labour productivity peaked in 2019 but was affected by the pandemic in 2020 (Graph A17.1). The gap between the capital region and the rest of the country remained the same in 2020 as all regions lost labour productivity.

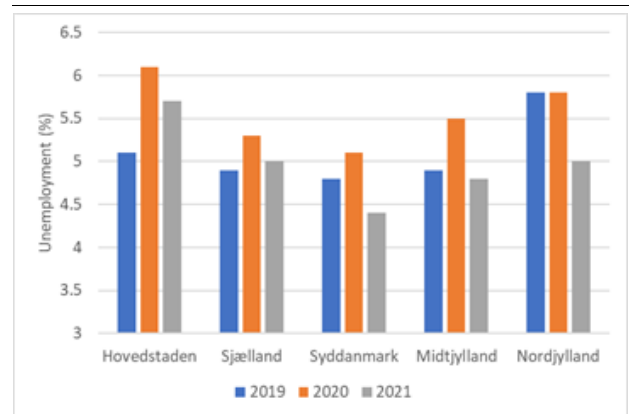
Graph A17.2: **Evolution of labour productivity in the Danish regions**



Real Gross Value Added in millions of euros (2015 prices) by employment in thousands of persons; The light red circles show the capital city region. The blue circles show the remaining NUTS 2 regions. The green diamond shows the national average. The purple line shows the EU-27 average.
Source: Eurostat

All Danish regions have a high level of employment and a low level of unemployment; however, the lack of a skilled workforce is a cause for concern. The average unemployment rate was 5% and was consistent across all the regions. This and population growth in all Danish regions contributed to the country's overall GDP growth.

Graph A17.3: **Unemployment in Danish regions in 2019-2021**



Source: Eurostat

The COVID-19 pandemic did not increase regional economic disparities. Unemployment rose in all regions during the first year of the COVID-19 crisis but fell back again in 2021 to pre-pandemic levels (Graph A17.3).

Hovedstaden was the third best performing region in the EU by the regional competitiveness index (RCI) in 2022. The index measures the ability of a region to offer an attractive and sustainable environment for firms



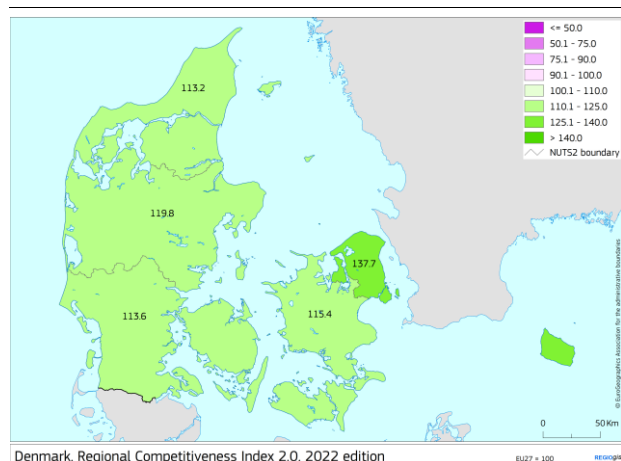
Table A17.1: Selected indicators at regional level - Denmark

NUTS region name	GDP per head (PPS)	GDP growth	GDP per head growth	Population aged 30-34 with high educational attainment	Early school leavers	R&D expenditure	R&D expenditure in the business enterprise sector (BERD)	Employment in high-technology sectors	Employment in knowledge-intensive services	Regional Competitiveness Index (RCI)	Green House Gas emissions	
	Index, EU27 = 100, 2021	Average % change on the preceding year, 2011-2020	Average % change on the preceding year, 2011-2020	% of population aged 30-34, 2021	% of population aged 18-24, 2021	% of GDP, 2019	% of GDP, 2019/2020	% of total employment, 2021	% of total employment, 2021	Index, EU27 = 100, 2019	tCO2 equivalent per head NUTS2 ref. year 2021	Percentage change (%) 1990-2021
EU	100	1	1	42	10	2	2	5	41	100		
Danmark	133	1.47	0.97	52.8	9.8	2.9	1.8	5.8	49.4	122.9		
Hovedstaden	178	2.24	1.32	68.1	8.6	4.6	3.1	10.4	58.2	137.7	3.04	-43.73
Sjælland	89	1.30	1.08	35.4	13.8	1.3	0.7	4.6	46.5	115.4	6.66	-26.42
Syddanmark	116	1.09	0.91	44.4	10.4	1.5	1.0	2.3	43.1	113.6	11.46	-60.99
Midtjylland	120	1.61	1.05	50.3	9.6	2.3	1.4	4.4	45.5	119.8	6.49	-33.34
Nordjylland	105	0.82	0.63	40.3	8.9	2.0	0.4	2.7	46.2	113.2	10.27	-21.62

Source: Eurostat, EDGAR database

and residents to live and work. The RCI of the other Danish regions was lower but still largely above the EU average. (Map A17.1, Table A17.1).

Map A17.1: Regional Competitiveness Index - Denmark



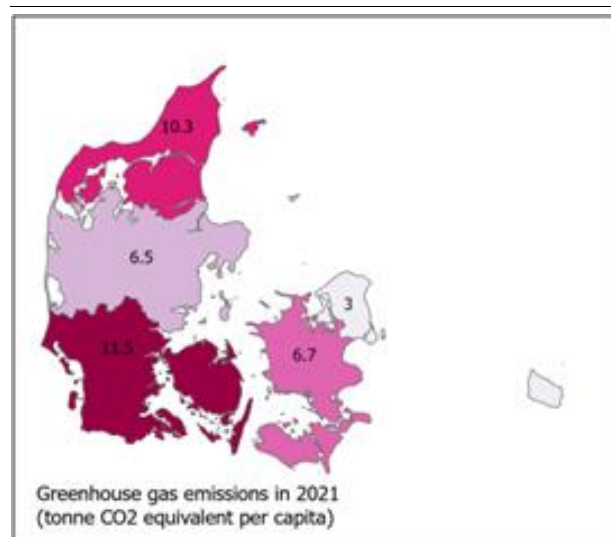
Hovedstaden outperformed other regions in terms of employment in high-technology sectors, knowledge-intensive services, and high educational attainment. In Syddanmark, only 2.2% of the total workforce was employed in high-technology sectors (compared with 10% in Hovedstaden) and employment in knowledge-intensive services was more than 10% less in all the other regions than in Hovedstaden. In Sjælland and Nordjylland, the share of the population aged 30-34 with a high level of educational attainment was below the EU average. Sjælland also had a relatively high share of early school leavers (13.8% of the population aged 18-24) compared with the national average of 9.8%. (Table A17.1)

Hovedstaden also stands out in terms of overall R&D expenditure used. All other regions

show R&D expenditure in the business enterprise sectors (BERD) below the EU average and the share of overall R&D expenditure of GDP either below or around the EU average. (Table A17.1)

Denmark has succeeded to reduce its greenhouse gas emissions substantially, but with variation between the regions. In 2021 Denmark produced 49% less greenhouse gas than it did in 1990, with a variation between 22 and 61% in the regions. With an average emission of 6.8 tonne per capita (Map A17.1), it has one of the lowest carbon footprints in the EU.

Map A17.2: Greenhouse gas emissions per capita in Danish regions in 2021



Denmark has a reasonably well developed and solvent banking sector. Danish banks' capital-adequacy ratio was not affected by the pandemic and it continues to exceed the EU average (22.5% vs an EU average of 18.6% in Q3-2022). The stress test conducted by Denmark's central bank in June 2022 showed that, although banks have sufficient capital to withstand a severe-recession scenario, a few systemically important banks would come close to breaching excess capital requirements under a severe-recession scenario (a severe economic downturn coupled with an increase in interest rates). Also, during a hypothetical one-year period of financial stress and limited possibility of issuing new debt instruments, several systemically important credit institutions and some non-systemically important banks could face difficulties in meeting their total minimum requirement for own funds and eligible liabilities (MREL). This is particularly important because some institutions already need to refinance maturing debt issuances, either to accumulate capital or to issue new debt in order to meet the MREL requirement. To increase banks' resilience, and following the Danish Systemic Risk Council recommendation, the countercyclical buffer has been increased to 2.5% as of March 2023.

The Danish banking sector is stable overall and has weathered the uncertainties of the past few years relatively well, but vulnerabilities remain. Banks' liquidity positions are sound, but both higher market volatility and customers' increased need for liquidity have had a depressing effect. Loan-to-deposit ratio has decreased slightly, but the values are still elevated mainly due to a high market funding ratio, as mortgages are backed by bonds. Profitability has decreased considerably since 2021, with annualised return-on-equity (ROE) reaching 1% at Q3 2022 (vs 8.2% in 2021), which could be due to negative value adjustments resulting from large fluctuations in the financial markets and price declines. High inflation generated soaring staff costs that depressed banks' efficiency, with costs-to-income reaching 81.1% in Q3-2022 (vs 60.6% at EU level). In the future, increased interest rates are expected to generate higher net interest income to some extent. At the same time, higher interest rates, elevated inflation and the prospect of reduced economic activity may affect customers' debt-service capacity, and this would

likely be reflected in new impairment charges. Thus, although the non-performing-loan (NPL) ratio is at a historically low level (1.5% in Q3-2022), increases in the NPL ratio should not be ruled out. Credit to non-financial corporations (NFCs) increased in 2021, driven by: (i) government support schemes; (ii) strong economic activity in several industries; (iii) stockpiling; and (iv) more accommodative credit standards. However, starting in Q3-2022, banks began to signal tighter credit conditions. Coupled with slowing customer demand and increasing risks, these tighter credit conditions could put pressure on banks' profits. Among NFCs, the most vulnerable ones are the small and medium-sized enterprises (SMEs), which have lower liquidity and solvency ratios, and which are primarily financed by medium-sized banks (SMEs account for about 65% of banks' corporate-loan portfolio) that in turn face higher risks of losses.

The demand for mortgages continued to rise in 2022, although at a slower pace, while house prices began decreasing. The house prices have risen steadily in the last 2 years, especially in the greater Copenhagen area. Nevertheless, the growth has slowed since mid-2021, and reversed from Q2 2022. At the same time, the overall mortgage lending growth continued, but it has moderated. As prices are expected to decrease further in 2023, the risk of technical insolvency rises, primarily among highly indebted recent borrowers. A noticeable trend has been the larger number of households taking out variable-rate mortgage loans, of which an increasing proportion are with deferred amortisation, making them vulnerable to both interest-rate hikes and house-price declines. However, these borrowers generally have a lower debt-service ratio than customers with other type of loans. The preference for variable-interest-rate mortgages is also often due to a decision by home owners to refinance their loans, which frequently results in a reduction in their overall debt.



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

	2017	2018	2019	2020	2021	2022	EU	Median
Total assets of the banking sector (% of GDP)	363.0	349.4	384.6	402.0	370.6	375.0	276.8	207.9
Share (total assets) of the five largest banks (%)	65.7	64.5	66.2	67.1	65.6	-	-	68.7
Share (total assets) of domestic credit institutions (%) ¹	93.0	93.0	92.9	93.4	93.0	93.9	-	60.2
NFC credit growth (year-on-year % change)	-	-	-	-	-	-	-	9.1
HH credit growth (year-on-year % change)	-	-	-	-	-	-	-	5.4
Financial soundness indicators:¹								
- non-performing loans (% of total loans)	2.5	2.3	1.9	1.9	1.8	1.5	1.8	1.8
- capital adequacy ratio (%)	22.1	21.6	22.4	23.2	22.8	22.5	18.6	19.8
- return on equity (%) ²	10.8	8.0	8.7	4.5	8.2	1.3	6.1	6.6
Cost-to-income ratio (%)¹	51.2	57.7	61.0	63.3	58.3	81.1	60.6	51.8
Loan-to-deposit ratio (%)¹	228.7	240.7	248.9	215.8	222.3	205.5	88.6	78.0
Central bank liquidity as % of liabilities	0.1	0.1	0.0	0.1	0.1	-	-	2.9
Private sector debt (% of GDP)	216.7	215.3	221.2	221.3	214.7	-	-	120.7
Long-term interest rate spread versus Bund (basis points)	15.9	5.8	6.8	15.0	31.3	33.7	-	93.3
Market funding ratio (%)	44.8	42.4	41.4	40.2	38.2	-	50.8	40.0
Green bonds issued to all bonds (%)	0.3	0.4	1.1	1.3	2.5	4.3	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.

Pension companies and life-insurance companies are generally solvent and well capitalised, but there are vulnerabilities in the market.

Life insurance and pension companies, representing around 35% of the financial market, are generally solvent and well capitalised. Until end 2021, pension funds' assets have increased considerably in recent years, mainly due to sizeable returns from investments and large pension contributions by people paying into pension plans. Insurers have benefited from the rise in risk-free rates, which drove down the value of their liabilities. However, insurers (and especially non-life insurers) have been affected by the rise in inflation. At the same time, due to volatile markets and higher interest rates, pension and life-insurance companies have experienced an increasing need for liquidity to pay variation margins on their derivatives contracts. Danish insurers and pension companies have sufficient liquid assets to handle an interest-rate hike, but their cash holdings are still limited. Furthermore, the exemption from the requirement to provide cash for variation margin calls as part of the implementation of the European Market Infrastructure Regulation ends in June 2023, and this could generate additional needs for liquidity. Work is ongoing with the banking sector to develop a framework that would give pension funds and insurers access to centrally cleared repo transactions via banks. Another potential vulnerability of pension companies could stem from the value loss recorded in 2022 on bonds and interest-rate derivatives. These losses could generate lower pay-outs to pension savers and

thus raise the risk of negative public perception of the business.

This Annex provides an indicator-based overview of Denmark's tax system. It includes information on the tax structure (the types of tax that Denmark 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.

Denmark's tax revenue is relatively high in relation to its GDP. It is well-balanced between different tax types in a growth friendly way. Table A19.1 shows Denmark's revenues from different tax types as a percentage of GDP. Denmark's total tax revenue as a percentage of GDP was the highest in the EU in 2021. Revenues from labour, consumption and environmental taxation were comparatively high relative to other EU countries as a percentage of GDP (see Table A19.1). While labour taxes as a share of GDP were higher in Denmark compared to the EU as a whole, labour taxes as a share of total taxes were lower in Denmark (50.5%) than in the EU as a whole (51.4%) (see Graph A19.1). Denmark's tax structure is characterised by comparatively high consumption and environmental tax revenues as a share of total taxation compared to the EU aggregate. Recurrent taxes on property were among the highest in the EU both as a percentage of GDP and of total tax revenues. However, Denmark also has one of the

highest mortgage interest payment tax deductions in the EU, which incentivises the financing of residential property through debt. The Danish authorities have been facing challenges in implementing a new property tax system to address the debt incentive and increase fairness. The new system is based on new and improved information for each property and allows for the property owner to add more data. Adjustments have also been made to the system to assure the quality of the appeal procedure. After several delays the system is expected to be fully implemented by 2024.

Denmark's Recovery and Resilience Plan focuses on a fair transition towards greener energy sources and digitalising services. It includes a Green Tax reform that comprises several policies to accelerate decarbonisation in a wide range of sectors. In the short-term, the reform accelerates depreciations to provide an investment window that incentivises business, including small and medium-sized enterprises, to invest in the green transition.

Table A19.1: **Taxation indicators**

		Denmark					EU-27				
		2010	2019	2020	2021	2022	2010	2019	2020	2021	2022
Tax structure	Total taxes (including compulsory actual social contributions) (% of GDP)	45.0	47.1	47.3	48.1	42.3	37.9	39.9	40.0	40.6	
	Labour taxes (as % of GDP)	22.7	23.3	24.2	24.3		20.0	20.7	21.3	20.9	
	Consumption taxes (as % of GDP)	14.6	13.6	13.9	13.4		10.8	11.1	10.7	11.2	
	Capital taxes (as % of GDP)	7.7	10.1	9.2	10.4		7.1	8.1	8.0	8.5	
	Total property taxes (as % of GDP)	2.5	2.7	2.7	2.5		1.9	2.2	2.2	2.2	
	Recurrent taxes on immovable property (as % of GDP)	2.0	2.0	2.0	1.9		1.1	1.2	1.2	1.1	
	Environmental taxes as % of GDP	4.0	3.3	3.2	2.9		2.4	2.4	2.2	2.2	
Progressivity & fairness	Tax wedge at 50% of average wage (Single person) (*)	31.2	30.4	30.2	30.4	30.8	33.9	32.3	31.9	32.1	31.7
	Tax wedge at 100% of average wage (Single person) (*)	35.9	35.5	35.3	35.4	35.5	41.0	40.1	39.9	39.6	39.7
	Corporate income tax - effective average tax rates (1) (*)		20.3	20.3	20.0			19.5	19.4	19.1	
	Difference in Gini coefficient before and after taxes and cash social transfers (pensions excluded from social transfers) (2) (*)	12.2	11.3	11.2	12.0		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 %) (*)		8.4	8.1				31.6	40.7		
	VAT Gap (% of VAT total tax liability, VTTL)		8.5	5.0				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

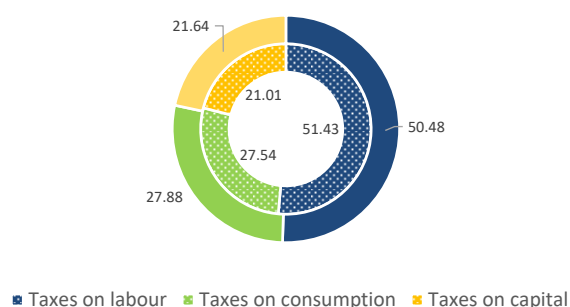
For more data on tax revenues as well as the methodology applied, see European Commission, Directorate-General for Taxation and Customs Union, *Taxation trends in the European Union: data for the EU Member States, Iceland, Norway and United Kingdom: 2021 edition*, Publications Office of the European 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>.

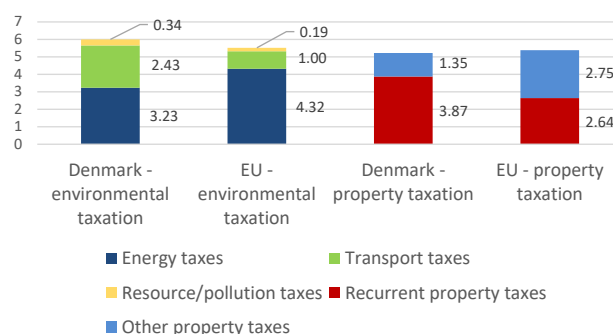
Source: European Commission, OECD.

Graph A19.1: Tax revenues from different tax types as % of total taxation

Tax revenue shares in 2021, Denmark (outer ring) and the EU (inner ring)



Environmental and property taxation as % of total tax revenue, Denmark and the EU



Note: Values for EU are GDP-weighted EU averages (EU aggregates)

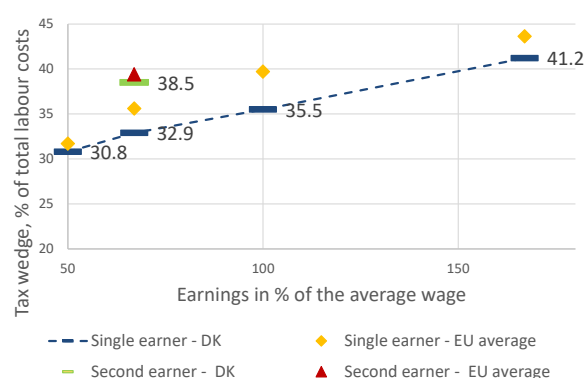
Source: European Commission

Denmark's labour tax burden is lower than the EU average across the income distribution. Graph A19.2 shows that the labour tax wedge for Denmark in 2022 was below the EU average for single people at all wage levels. The tax wedge for second earners at 67% of the average wage, whose spouses earn the average wage, is around the EU average. However, the difference between the tax wedge of second and single earners at 67% of the average wage was much wider for Denmark than the EU average. The higher tax wedge for second earners in Denmark implies lower work incentives for second earners than for single earners at the same wage level. Given that second earners are often women, this difference could perpetuate gender stereotypes. Overall, in 2021 the tax-benefit system helped reduce inequality (as measured by the GINI coefficient) by substantially more than the EU average. The average forward-looking effective corporate income tax rates were above the EU average in 2021.

Denmark performs relatively well on tax compliance and tax administration. Denmark has introduced a new IT system (PSRM) which has, according to official sources⁽¹¹⁰⁾, doubled debt collection from DKK 1.6 billion in 2020 to DKK 3.7 billion in 2021. Outstanding tax arrears have decreased slightly by 0.3 pps from 2019 to 2020 to 8.1% of net revenue. This is significantly below the EU-27 average, which increased by 9.1 pps to 40.7% from 2019 to 2020 and is inflated by very large values in a few Member States. The Annual Report on Taxation 2022 highlights that there is

scope to improve the rate of online filing of personal income tax returns⁽¹¹¹⁾. The VAT gap (an indicator of the effectiveness of VAT enforcement and compliance, where a low gap indicates high effectiveness) dropped significantly by 3.5 pps to 5.0% in 2020 and is well below the EU-wide gap, which dropped by 1.9 pps to 9.1% (Table A19.1).

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



Note: Second earners are members of a family with the primary earner earning 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

⁽¹¹⁰⁾See: [Nyt gældsinddrivelsessystem har inddrevet 10 mia. i Gældsstyrelsen \(gaeldst.dk\)](https://www.geldstyrelsen.dk/nyheder/nyt-gaeldsinddrivelsessystem-har-inddrevet-10-mia-i-gaeldsstyrelsen)

⁽¹¹¹⁾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.



Table A20.1: Key economic and financial indicators

	2004-07	2008-12	2013-19	2020	2021	2022	forecast	
							2023	2024
Real GDP (y-o-y)	2.5	-0.4	2.1	-2.0	4.9	3.8	0.3	1.5
Potential growth (y-o-y)	1.5	1.1	1.6	1.6	1.9	2.2	1.9	1.6
Private consumption (y-o-y)	3.3	-0.3	1.9	-1.4	4.2	-2.3	0.1	1.3
Public consumption (y-o-y)	1.6	1.6	0.8	-1.4	4.2	-3.5	-0.1	1.1
Gross fixed capital formation (y-o-y)	5.8	-3.6	3.7	5.1	6.2	8.6	-3.5	-0.3
Exports of goods and services (y-o-y)	6.2	1.0	3.6	-6.3	8.0	8.6	1.1	1.4
Imports of goods and services (y-o-y)	9.5	0.5	3.7	-3.6	8.0	4.2	-1.0	0.6
Contribution to GDP growth:								
Domestic demand (y-o-y)	3.2	-0.5	1.8	0.1	4.3	0.1	-0.8	0.8
Inventories (y-o-y)	0.3	-0.2	0.0	-0.2	0.0	0.8	-0.2	0.2
Net exports (y-o-y)	-1.0	0.3	0.2	-1.9	0.5	2.9	1.3	0.6
Contribution to potential GDP growth:								
Total Labour (hours) (y-o-y)	0.2	-0.1	0.2	0.4	0.6	0.8	0.7	0.4
Capital accumulation (y-o-y)	0.8	0.3	0.5	0.7	0.9	1.1	0.9	0.8
Total factor productivity (y-o-y)	0.6	0.9	0.9	0.5	0.3	0.2	0.3	0.4
Output gap	3.3	-2.3	-1.6	-4.1	-1.3	0.3	-1.2	-1.3
Unemployment rate	4.5	6.7	6.1	5.6	5.1	4.5	5.0	5.1
GDP deflator (y-o-y)	2.4	2.2	0.8	2.6	2.8	7.6	0.2	2.1
Harmonised index of consumer prices (HICP, y-o-y)	1.5	2.4	0.5	0.3	1.9	8.5	4.3	2.5
HICP excluding energy and unprocessed food (y-o-y)	1.2	2.1	0.7	0.9	1.1	5.3	6.3	3.4
Nominal compensation per employee (y-o-y)	3.4	2.6	1.6	2.6	2.9	2.9	4.9	5.3
Labour productivity (real, hours worked, y-o-y)	1.5	0.7	1.4	1.0	1.0	-0.7	0.7	1.4
Unit labour costs (ULC, whole economy, y-o-y)	2.3	2.0	0.8	3.5	0.6	3.0	4.2	3.5
Real unit labour costs (y-o-y)	0.0	-0.2	0.0	0.9	-2.1	-4.3	4.0	1.4
Real effective exchange rate (ULC, y-o-y)	1.2	-0.3	-0.3	-0.4	0.3	-0.3	-1.1	0.0
Real effective exchange rate (HICP, y-o-y)	0.1	-0.4	0.0	1.1	-0.7	-1.2	.	.
Net savings rate of households (net saving as percentage of net disposable income)	-2.7	-0.1	3.5	5.7	3.2	8.4	.	.
Private credit flow, consolidated (% of GDP)	17.5	5.3	2.9	5.0	12.3	9.1	.	.
Private sector debt, consolidated (% of GDP)	192.3	224.0	216.7	221.3	214.7	184.6	.	.
of which household debt, consolidated (% of GDP)	116.5	136.5	120.6	111.8	104.2	86.0	.	.
of which non-financial corporate debt, consolidated (% of GDP)	74.8	86.8	95.8	109.4	110.4	98.6	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances) (1)	.	2.9	3.3	2.0	1.7	.	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	3.6	7.8	6.3	6.1	5.8	7.9	6.2	6.5
Corporations, gross operating surplus (% of GDP)	22.7	22.3	24.3	24.8	26.2	29.4	27.2	26.9
Households, net lending (+) or net borrowing (-) (% of GDP)	-4.8	-1.0	1.0	1.5	-0.3	2.1	2.4	3.1
Deflated house price index (y-o-y)	11.1	-6.0	3.8	4.7	9.5	-7.3	.	.
Residential investment (% of GDP)	6.2	4.3	4.3	5.7	6.0	6.2	.	.
Current account balance (% of GDP), balance of payments	3.0	5.2	8.1	7.9	9.0	13.1	10.7	10.7
Trade balance (% of GDP), balance of payments	4.2	5.5	6.8	6.3	7.1	10.6	.	.
Terms of trade of goods and services (y-o-y)	0.4	0.6	0.3	2.4	0.4	-0.2	-5.2	-0.5
Capital account balance (% of GDP)	0.1	0.1	-0.1	0.0	0.1	0.2	.	.
Net international investment position (% of GDP)	-0.8	14.5	51.6	70.0	76.3	64.1	.	.
NENDI - NIIP excluding non-defaultable instruments (% of GDP) (2)	-25.6	-18.5	13.8	32.5	31.4	.	.	.
IIP liabilities excluding non-defaultable instruments (% of GDP) (2)	139.7	163.7	163.2	183.1	164.7	.	.	.
Export performance vs. advanced countries (% change over 5 years)	3.2	-1.0	-5.1	11.2	11.3	.	.	.
Export market share, goods and services (y-o-y)	-1.6	-3.8	0.6	6.6	-2.3	4.6	-1.5	-2.3
Net FDI flows (% of GDP)	1.8	2.1	1.7	2.3	5.7	-0.1	.	.
General government balance (% of GDP)	4.3	-1.6	0.7	0.2	3.6	3.3	2.3	1.3
Structural budget balance (% of GDP)	.	.	0.8	2.6	4.4	3.1	3.5	2.1
General government gross debt (% of GDP)	35.1	41.4	38.4	42.2	36.7	30.1	30.1	28.8

(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 Denmark 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's 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).⁽¹¹²⁾ Gross financing needs are expected to remain limited at around 5% of GDP in the short-term (i.e. over 2023-2024) and to decline compared with the recent peak in 2020 (Table 1 of this annex). Financial markets' perceptions of sovereign risk remain positive, as confirmed by the spread and the 'AAA' rating that the three major rating agencies assigned to Danish government debt.

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

The DSA for Denmark shows that, under the baseline, the government debt-to-GDP ratio is expected to decline and remain well below 60% of GDP over the medium term (at 7.3 % of the GDP in 2033) (Graph 1).^{(113), (114)} The assumed structural primary balance (a surplus of 2.6% of GDP) seems plausible compared to past fiscal performance. At the same time, the baseline

projections up to 2033 benefit from a favourable (although diminishing) snowball effect with real GDP growth at around 1.1% of GDP over 2025-2033. Government gross financing needs are expected to become negligible and on a strong declining path over the projection period.

The baseline projection is stress-tested against four alternative scenarios to assess the impact of changes in key assumptions (Graph 1). Overall, the baseline debt projection for Denmark is very robust to changes in the underlying macroeconomic assumptions. Reducing the SPB level permanently by half of the cumulative forecast change under the 'lower structural primary balance' scenario would lead to a higher government debt-to-GDP ratio by 2033 (about 6 pps.) as compared with the baseline. Under the 'historical structural primary balance (SPB)' scenario, i.e. the SPB gradually converges to a surplus of 2.4 % of GDP (its historical 15-year average), the projected debt-to-GDP would be slightly higher (about 2 pps.) than in the baseline in 2033. 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 lead to slightly higher government debt-to-GDP ratio (about 1 pp.) by 2033, as compared with the baseline. A temporary worsening of financial conditions, as reflected in the 'financial stress' scenario (i.e. temporarily increase of interest rates by 1 pp.), would lead to a broadly similar public debt-to-GDP ratio by 2033 compared with the baseline.

Additionally, stochastic indicate a low sensitivity of these projections against plausible unforeseen events (Graph 2).⁽¹¹⁵⁾ These stochastic simulations point to 10% probability of the debt ratio in 2027 being greater than in 2022, entailing low risk given the initial low debt level. In addition, such shocks point to low uncertainty (i.e. the difference between the 10th and 90th debt distribution percentiles) surrounding the government debt baseline projections.

⁽¹¹²⁾The S0 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.

⁽¹¹³⁾The assumptions underlying the Commission's 'no-fiscal policy change' baseline notably comprise: (i) a structural primary surplus, before ageing costs, of 2.6% 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; (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 1.1%); (v) ageing costs in line with the 2021 Ageing Report (European Commission, Institutional Paper 142, November 2020). For information on the methodology, see the 2022 Debt Sustainability Monitor.

⁽¹¹⁴⁾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.

⁽¹¹⁵⁾The stochastic projections show the joint impact on debt of 2000 different shocks affecting the government's budgetary position, economic growth, interest rates and exchange rates. The cone covers 80% of all the simulated debt paths, therefore excluding tail events.

3 - Long-term risks to fiscal sustainability are low overall. ⁽¹¹⁶⁾

The S2 indicator (at -0.7 pp. of GDP) points to low fiscal sustainability risks. The indicator shows that, relative to the baseline, the SPB would not need to improve to ensure debt stabilisation over the long term. This result is underpinned by the favourable initial budgetary position (-2.3 pps. of GDP), which is partially offset by the projected increase in ageing-related costs (contribution of 1.6 pps. of GDP). Ageing costs' developments are primarily driven by the projected increase in health and in particular long-term care spending over the projection period (joint contribution of 3.4 pps. of GDP), while public pension expenditure are projected to decrease (contribution of -1.5 pps. of GDP) (Table 2).

Combined with low debt vulnerabilities, as highlighted by the S1 indicator, overall long-term risks are assessed as low. Indeed, the S1 sustainability gap indicator (at -2.3 pps of GDP) signals that the structural primary balance could deteriorate and still ensure debt converging to 60% of GDP by 2070. This result is mainly driven by the favourable initial budgetary position (-2.7 pps. of GDP), which is partially offset by the projected increase of the ageing costs (contribution of 1.2 pps. of GDP) (Table 2).

Finally, several additional risk factors need to be considered in the assessment. On one hand, risk-increasing factors are related to the recent increase in interest rates, contingent liability risks stemming from the private sector, including via the possible materialisation of sizeable state guarantees granted to firms and self-employed during the COVID-19 crisis. Overall, this risk remains currently limited due to relatively low take-up. Contingent liability risks stemming from

the banking sector point to moderate risks. On the other-hand, risk-mitigating factors include the lengthening of debt maturity in recent years, relatively stable financing sources (with a diversified and large investor base), the currency denomination of debt, and historically low borrowing costs. In addition, Denmark's positive net international investment position (stronger compared to 2020) helps mitigating vulnerabilities.

⁽¹¹⁶⁾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 - Denmark

Table 1. Baseline debt projections	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Gross debt ratio (% of GDP)	42.2	36.7	30.1	30.1	28.8	26.2	23.7	21.0	18.5	16.2	13.8	11.5	9.3	7.3
Changes in the ratio	8.5	-5.5	-6.6	0.1	-1.4	-2.5	-2.6	-2.7	-2.4	-2.3	-2.4	-2.3	-2.2	-2.0
of which														
Primary deficit	-0.8	-4.2	-4.1	-2.9	-1.8	-2.0	-2.2	-2.4	-2.2	-2.1	-2.2	-2.1	-1.9	-1.8
Snowball effect	0.4	-2.5	-3.1	0.4	-0.5	-0.5	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Stock-flow adjustments	8.9	1.1	0.6	2.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross financing needs (% of GDP)	14.6	7.8	6.1	5.4	4.8	3.5	2.4	1.2	0.4	-0.1	-0.5	-0.6	-0.7	-0.8

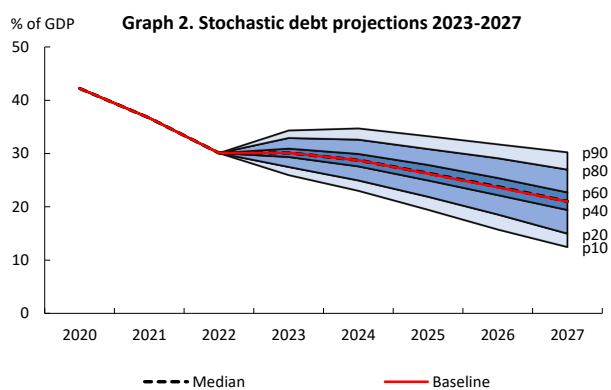
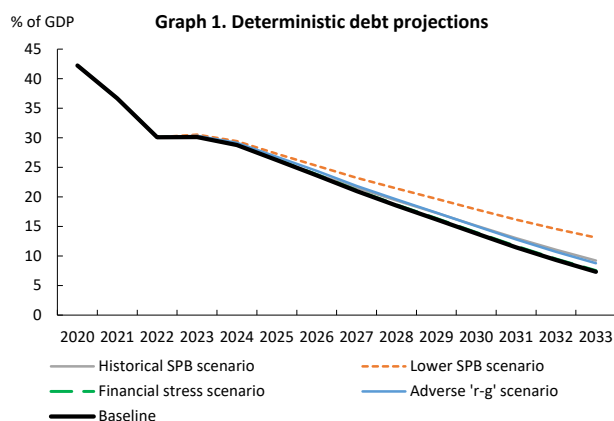


Table 2. Breakdown of the S1 and S2 sustainability gap indicators

	S1	S2
Overall index (pps. of GDP)	-2.3	-0.7
of which		
Initial budgetary position	-2.7	-2.3
Debt requirement	-0.7	
Ageing costs	1.2	1.6
of which		
Pensions	-1.1	-1.5
Health care	0.4	0.6
Long-term care	2.0	2.8
Others	-0.2	-0.3

Source: Commission services.

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

Short term	Medium term - Debt sustainability analysis (DSA)						Long term				
	Overall (S0)	Overall	Deterministic scenarios					Stochastic projections	S2	S1	Overall (S1 + S2)
			Baseline	Historical SPB	Lower SPB	Adverse 'r-g'	Financial stress				
LOW	LOW	Overall	LOW	LOW	LOW	LOW	LOW	LOW	LOW	LOW	
		Debt level (2033), % GDP	7.3	9.2	13.1	8.8	7.5				
		Debt peak year	2023	2023	2023	2023	2023				
		Fiscal consolidation space	68%	69%	74%	68%	68%				
		Probability of debt ratio exceeding in 2027 its 2022 level					10%				
					17.8						

(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 (for further details on the Commission's multidimensional approach, see the 2022 Debt Sustainability Monitor).