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Environmental Implementation Review 2022
Country Report - DENMARK

Accompanying the document

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Environmental Implementation Review 2022: *Turning the tide through environmental compliance*

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Executive summary

In previous Environmental Implementation Reviews (EIRs), the main challenges identified for Denmark for the implementation of EU environmental policy and law were:

- the need to reduce pressures on nature from intensive agriculture, including the use of pesticides and nutrients;
- the need to improve air quality, especially in densely populated areas.

On **waste management**, Denmark is likely to meet the EU 2020 target of recycling 50 % of municipal waste. However, it has the highest municipal waste production per head in the EU27 and its circular (secondary) use of material is well below the EU average. Thus Denmark needs to primarily focus on reducing waste generation and improving its resource productivity. Furthermore, action is needed to reduce incineration (with energy recovery) of municipal waste; the high level of incineration is partly explained by the very low landfilling. The ERDF focuses on the circular economy and on promoting of competitiveness and innovation in small and medium sized enterprises.

Regarding **nature**, the share of habitats in poor or bad status has increased in Denmark. Although all terrestrial sites have been designated, the quality of the current set of conservation objectives and measures is insufficient; they are being updated 2022-2023. The situation for forested areas protected under the nature directives is severe as more than half of assessments show they are in a bad conservation status. Denmark has a generally good capability to assess its state of the marine environment, although some descriptors are still missing. No recent information is available on ecosystem assessment and accounting. There are also concerns about sufficient financing of the Natura 2000 network (based on a finalised prioritised action framework (PAF), which has not yet been formally submitted to the European Commission).

For **air quality**, Denmark plans to reach emission reduction commitments for sulphur and nitrogen oxides and non-methane volatile organic compounds for the period 2020-2029 and from 2030 onwards. However, the projections do not demonstrate compliance with emission reduction commitments for ammonia and particulate matter ($PM_{2.5}$) for 2020-2029 and from 2030 onwards. Denmark did not exceed of EU air quality limit values in 2020, and has substantially improved air quality since the 2019 EIR with dedicated extra efforts.

According to the last report on implementation of the Nitrates Directive, groundwater quality has slightly improved. The situation concerning the concentration of **nitrates** in surface water is stable and some improvements were recorded in reducing eutrophication. Nutrient inflows into the Baltic Sea around Denmark have significantly decreased for nitrogen in the Danish Straits and Kattegat, and for phosphorus in Kattegat. Improving nitrogen and phosphorus cycles helps improve circularity of the economy. Nevertheless, the Commission is closely monitoring the situation. The Recovery and Resilience Programme (RRP) makes the environmental transition in agriculture a specific target.

On **environmental financing**, Denmark has a small RRP (2021-2026) with just over EUR 1.5 billion and a cohesion policy (2021-2027) allocation of EUR 500 million. Denmark's overall environmental financing for investments is estimated to be annual 0.57% of GDP over the period 2014-2020, almost exclusively from national sources. The overall environmental investment needs in the coming years are estimated to be at least an annual 0.72% of Denmark's GDP, suggesting an environmental investment gap of at least 0.15%, by focusing on the country's environmental implementation priorities.

Part I: Thematic areas

1. Circular economy and waste management

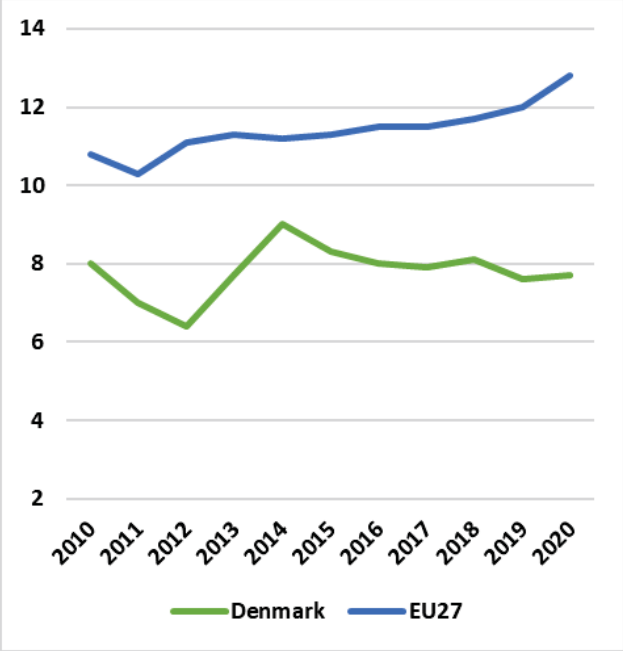
Measures towards a circular economy

The new Circular Economy Action Plan adopted in March 2020 is one of the main building blocks of the European Green Deal. The EU's transition to a circular economy will reduce pressure on natural resources and will create sustainable growth and jobs. It is also a prerequisite to achieve the EU's 2050 climate neutrality target and to halt biodiversity loss. The Action Plan announces initiatives along the entire life cycle of products, aiming to reduce the EU's consumption footprint and to double the EU's circular material use rate by 2030. It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that waste is prevented and the resources used are kept in the EU economy for as long as possible.

The circular material use rate is a good indicator of an economy's circularity, as it includes all the materials that are fed back into the economy. Large differences in the circularity rate exist across countries. To help achieve the EU circular economy action plan's goal of doubling the EU circular material use rate by 2030, ambitious measures targeting the whole product life cycle are needed at Member State level. Such measures range from sustainable product design to increase durability, reparability, upgradability and recyclability of products, to other measures such as remanufacturing[1], increasing the circularity in production processes, recycling, as well as boosting eco-innovation and the uptake of green public procurement.

Denmark's circular (secondary) material use rate was 8.2% in 2016 and 7.7% in 2020, well below the EU average of 12.8%. The trend in Figure 1 shows a light fall in the use of secondary material in the past few years .

Figure 1: Circular material use rate (%), 2010-2020[2]

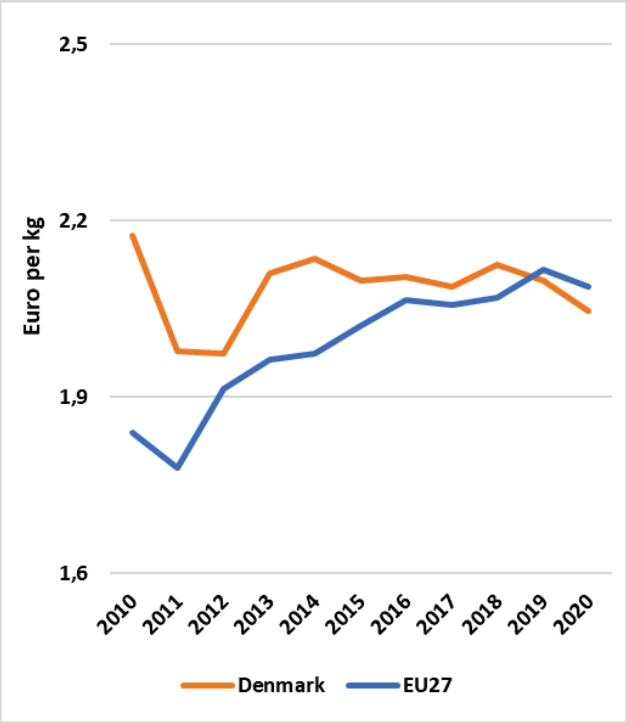


Resource productivity expresses how efficiently the economy uses material resources to produce wealth. Improving resource productivity can help minimise negative impacts on the environment and reduce dependency on volatile raw material markets. As shown in Figure 2, with EUR 2.05 generated per kg of material consumed in 2020, resource productivity in Denmark is close to the EU average of EUR 2.09 per kg. More specifically, Denmark needs to reduce its Domestic Material Consumption and Raw Material Consumption.

[1] A standardized industrial process that takes place within industrial or factory settings, in which cores are restored to original as-new condition and performance or better.

[2] Eurostat, Circular Economy Monitoring Framework.

Figure 2: Resource productivity 2010-2020[3]



Circular economy strategies

The Commission encourages Member States to adopt and implement national/regional circular economy strategies covering the whole life cycle of products, as they are one of the most effective ways to progress towards a more circular economy. Since the launch of the European Circular Economy Stakeholder Platform in 2017[4], national, regional or local authorities have used the platform to share their strategies and roadmaps.

The Danish government has in 2021 launched an action plan for circular economy[5]. This plan describes the current conditions and the direction to follow for the prevention and management of waste in Denmark until 2032[6]. The plan puts extra focus on how to make the value chains for biomass, construction and plastics become more circular. The Action Plan for Circular Economy contains a total of 129 initiatives, many of which are also included in Climate plan for a green waste sector and circular economy (2020), Strategy for Green Public Procurement (2020), National Strategy for a Sustainable Built Environment (2021), Strategy for circular economy (2018) and Action Plan on Plastics (2018).

Also worthy of note is the 2020 strategy for investments in green research, technology, and innovation, which contains a green mission (one of four) on circular economy focusing on reuse and reduction of plastic and textile waste[7] Although Denmark's recovery and resilience plan (RRP) does not contain reforms relating to circular economy, there is an investment dedicated to research on circular economy focusing on reuse and reduction of plastic and textile waste (EUR 23.5 million). The European Regional Development Fund (ERDF) for 2021-27 also includes actions to boost the circular economy.

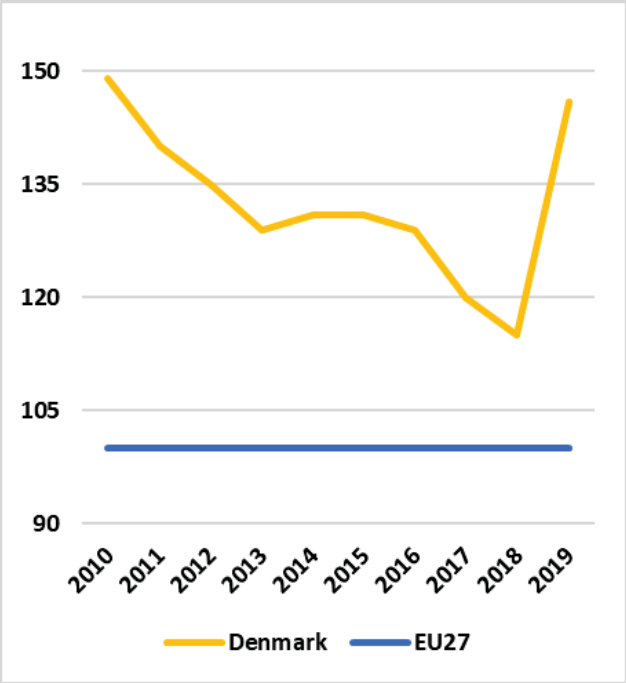
Eco-innovation

A successful transition to a circular economy requires social and technological innovation as the full potential of circular economy can only be reached when implemented across all value chains. Therefore, eco-Innovation is an important enabling factor for the circular economy. Product design approaches and new business models can help produce systemic circularity innovations, creating new business opportunities.

In 2021, Denmark ranked 4th on the 2021 Eco-Innovation Scoreboard, with a total score of 177, resulting in an eco-innovation leader performance. On two out of five components (eco innovation activities and resource efficiency outcomes) of the 2021 Eco-Innovation Index, Denmark performed below the EU average. On eco-innovation inputs, eco innovation outputs and socioeconomic outcomes it performed above the EU average, ranking 1st in eco-innovation outputs. See Figure 3.

[3] Eurostat, Resource productivity
[4] Circular Economy Stakeholder Platform
[5] Danish Action Plan for Circular Economy July 2021
[6] thus it represents Denmark's waste prevention programme.
[7] Danish Ministry of Higher Education and Science, 2020, Green solutions of the future.

Figure 3 – Eco-innovation performance 2010-2019[8]



EU Ecolabel and the eco management and audit scheme (EMAS)

The number of EU Ecolabel products and EMAS-licensed[9] organisations in a given country provides some indication of the extent to which the private sector and national bodies are actively engaged in the transition to a circular economy. It also shows how committed public authorities are to supporting schemes designed to promote the circular economy.

As of September 2021, Denmark had 2 465 products out of 83 590, and 81 licences out of 2 057, registered in the EU Ecolabel scheme, showing a high take-up of these schemes[10]. As of October 2021, 14 organisations from 48 sites in Denmark are registered in the EMAS scheme. Since the last report in 2019, there has been 1 299 new product and 25 licences registrations of the EU Ecolabel, but there has been a decrease in the number of organisations registered with EMAS, by 14 organisations since 2019.

Green public procurement

Public procurement accounts for a large proportion of European consumption, with public authorities' purchasing power representing around 14% of EU GDP. This can help drive the demand for sustainable products that meet repairability and recyclability standards. Denmark adopted a green public procurement strategy in October 2020 (*Green Procurement for a Green Future*), which put the public sector at the forefront of the green transition. Around EUR 25 billion is spent per year in Denmark on public procurement of goods and services, which is around 10% of GDP. The strategy includes a target that all public procurement on areas where official ecolabelling schemes exist must be eco-labeled or comply with corresponding requirements by 2030. Denmark has been one of the first countries to comprehensively assess the climate footprint from public procurement. In 2019, procurement on behalf of the government, municipal, and regional authorities resulted in a climate footprint totalling approximately 12 million tons, of which around 4 million tons were emitted in Denmark. Based on the assessment made, Denmark plans to set an emission reduction target in 2022[11].

Denmark received a study visit using the EIR peer to peer tool on transferring knowledge and practice on setting up effective repair and reuse systems 24-25 September 2018[12] to learn from Belgium's experience.

Since Denmark's circular material use rate is far below the EU average a priority action on this is proposed.

2022 priority actions

- adopt measures to increase the circular material use rate, and lower Domestic Material and Raw Material Consumption, learning from best EU practices.

Waste management

Turning waste into a resource is supported by:
(i) fully implementing EU waste legislation, which includes the waste hierarchy, the need to ensure separate collection of waste, the landfill diversion targets, etc.;
(ii) reducing waste generation and waste generation per capita in absolute terms;
(iii) limiting energy recovery to non-recyclable materials and phasing out landfilling of recyclable or recoverable waste.

[8] European Commission - Directorate-General for Environment (DG ENV), Eco-innovation Observatory, Eco-innovation index.
[9] EMAS is the European Commission's Eco-Management and Audit Scheme, a programme to encourage organisations to behave in a more environmentally sustainable way.
[10] European Commission, Ecolabel Facts and Figures.
[11] Danish Ministry of Finance, Green Procurement for a Green Future, 2020, p.4.
[12] EIR peer to peer

This section focuses on the management of municipal waste[13] for which EU law sets mandatory recycling targets.

Preventing products and materials from becoming waste for as long as possible is the most efficient way to improve resource efficiency and to reduce the environmental impact of waste. Waste prevention including re-use are the most preferred options; they top the waste hierarchy. The volume of municipal waste generated is a good indicator of the effectiveness of waste prevention measures.

After a stable trend, municipal waste generation in Denmark has started to increase again in recent years. It amounted to 845 kg/year/inhabitant in 2020, the highest in the EU (EU average 505 kg/year/inhabitant), as Figure 4 shows. It indicates that Denmark's economic growth is not yet decoupled from waste generation. This is an issue of waste prevention. In the 2019 EIR Denmark had two priority actions on waste: to introduce new policy instruments to promote waste prevention and recycling and to shift away from incineration.

Figure 4: Municipal waste by treatment in Denmark, 2011-202019[14]

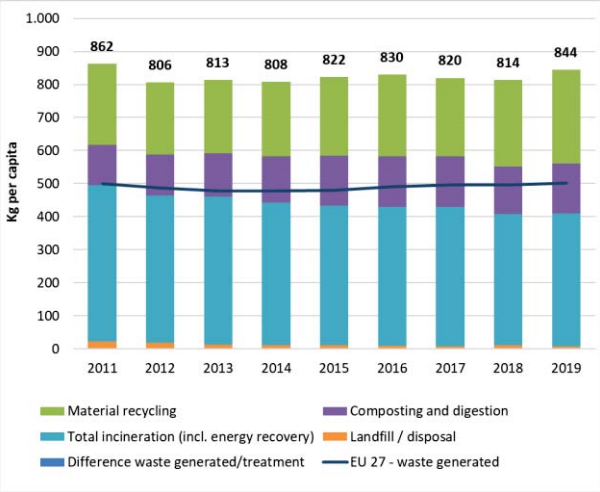


Figure 4 also shows municipal waste by type of treatment, in kilos produced per person. Much of the waste in Denmark is incinerated with energy recovery (382 kg per person in 2020).

By 2019, there were 23 dedicated and multi-fired incineration plants in Denmark, of which 17 plants are municipally owned. It is expected that moving to private ownership will lead to an adjustment of the current over-capacity over time. This may lead to some investment losses, although most incineration plants are more than 20 years old. No new plants are envisaged. In June 2020, Denmark decided that it must reduce capacity for waste incineration to correspond to the amount of residual waste from Denmark in 2030, which entails an expected reduction in capacity by approximately 30% from 2020 to 2030, and that the treatment of residual waste must be sent out for tender in order to optimise waste treatment both environmentally and economically[15]. Thus, it is assessed that there is a need to close several municipal incineration plants – corresponding to the expected need for incineration capacity for domestically generated residual waste in 2030. As part of this political agreement DKK 200 million are reserved for stranded assets in incineration plants[16].

Figure 5 and national projections[17] shows that Denmark is moving towards the EU's 2025 municipal waste recycling target of 55%, as 53.9% in 2020 was recycled (EU average (47.8%)). The EU action plan for circular economy includes a number of targeted policy initiatives to ensure compliance with the 2025 targets.

The level of recycling in Denmark is not directly linked to the level of investments in recycling plants in Denmark. As a small open economy most of Denmark's recyclable waste is exported to neighbouring Sweden and Germany for material recycling. Waste exported to be recycled abroad still counts towards towards Denmark's overall recycling rate so exporting waste to be recycled does not inherently limit improving a country's recycling rate.

Figure 5: Recycling rate of municipal waste, 2011-2020[18]

[13] municipal waste consists of (a) mixed waste and separately collected waste from households, including paper and cardboard, glass, metals, plastics, bio-waste, wood, textiles, packaging, waste electrical and electronic equipment, waste batteries and accumulators, and bulky waste, including mattresses and furniture; (b) mixed waste and separately collected waste from other sources, where such waste is similar in nature and composition to waste from households. (Directive 2008/98/EC, Article. 3 2b).

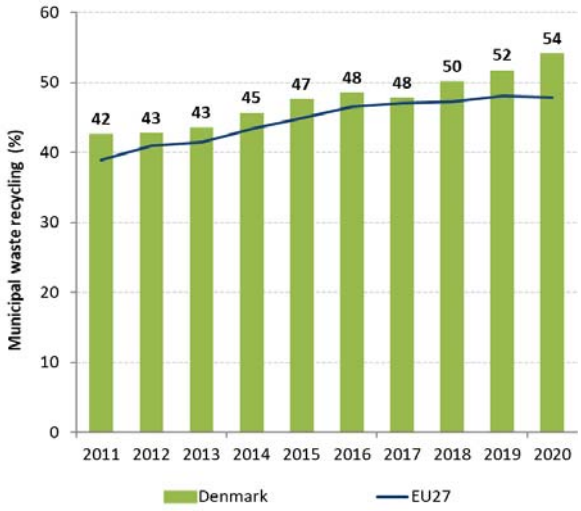
[14] Eurostat, Municipal waste by waste operation, april 2022.

[15] Climate plan for a green waste sector and circular economy

[16] Ramboll, Evaluation report for assessing the waste management plan of Denmark. Final draft 22.12.2021

[17] Danish Environmental Protection Agency, Baseline projection

[18] Eurostat, Recycling rate of municipal rate, April 2022.



Denmark was not listed in the Commission's Early Warning report'[19] at risk of missing the EU 2020 target of 50 % collected for recycling of municipal waste. The Commission is currently finalising its analysis of the progress on the recommendations from the 2018 Early Warning Reports and analysis of progress towards achieving the 2025 waste recycling targets. This report will be presented at the end of 2022 and will assess the progress made to date.

Implementation of the 2018 waste legislative package

Denmark has notified the Commission that it has transposed the 2018 waste package. A conformity assessment is now ongoing.

Waste management plans and waste prevention programmes (referred to in the section on circular economy) are instrumental for a sound implementation of the EU waste legislation. They set out key provisions and investments to ensure compliance with existing and new legal requirements (e.g. on waste prevention, separate collection for a number of specific waste streams, recycling and landfill targets). Revised plans and programmes were due on 5 July 2020.

Denmark's revised waste management plan & waste prevention programme from July 2021 is acceptable[20]. The plan aims to reduce waste generation and shift away from incineration with energy recovery as there is overcapacity and towards more recycling. Denmark has implemented door to door collection within walking distance from houses (depending on the logistics of the area) for nine fractions of household waste.

However, Denmark must take more action to ensure compliance with the recycling targets for the post-2020 period. Therefore, only limited progress was made on both priority actions since 2019, and in the light of the Early Warning Report 2022 they are repeated. National plans, programmes and strategies also need to be implemented.

2022 priority actions

- Bring in new policy instruments, including economic instruments. These instruments should: (i) promote waste prevention; (ii) make preparing for waste reuse and recycling more economically attractive.
- Shift reusable and recyclable waste away from incineration with energy recovery.

[19] European Commission, Report on the implementation of waste legislation, including the early warning report for Member States at risk of missing the 2020 preparation for re-use/recycling target on municipal wasteCOM(2018)656.

[20] Danish Ministry of Environment, Handlingsplan-for-cirkulaer-oekonomi

2. Biodiversity and natural capital

The 2030 EU biodiversity strategy adopted in May 2020 aims to put the EU's biodiversity on a path to recovery and sets out new targets and governance mechanisms to achieve healthy and resilient ecosystems.
In particular, the strategy sets out ambitious targets to:
(i) protect a minimum of 30% of the EU's land area and 30% of its sea area and integrate ecological corridors, as part of a true trans-European nature network;
(ii) strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests;
(iii) effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately.
The strategy also sets out an EU nature restoration plan – a series of concrete commitments and actions to restore degraded ecosystems across the EU by 2030, and manage them sustainably, addressing the key drivers of biodiversity loss.

The Habitats and the Birds Directives are key legislative tools to achieve the EU biodiversity strategy targets. They are the cornerstone of EU legislation governing wildlife conservation[21].

Denmark's national biodiversity strategy is entitled 'The Danish Nature Policy — Our Shared Nature'[22]. Adopted in 2014, it contains a long-term vision for 2050 and serves as Denmark's revised national biodiversity strategy and action plan. In 2020 there was a political agreement on nature and biodiversity[23] and in 2021 on green cities[24].

Nature protection and restoration

Natura 2000[25], the largest coordinated network of protected areas in the world, is the key instrument to achieve the Birds and Habitats Directives' objectives to ensure the long term protection, conservation and survival of Europe's most valuable and threatened species and habitats and the ecosystems they underpin. The setting up of a coherent Natura 2000 network, the designation of Sites of Community Importance (SCI) as Special Areas of Conservation (SAC) and the setting of conservation objectives and measures for the Natura 2000 sites are key milestones towards meeting the objectives of the Directives.

Setting up a coherent network of Natura 2000 sites

Denmark hosts 60 habitat types[26] and 79 species[27] covered by the Habitats Directive. The country also hosts populations of 54 bird taxa listed in Annex I the Birds Directive[28].

By 2021, 8.3% of Denmark's territory was covered by Natura 2000 (against the EU average of 18.5%), see Figure 7. Special Protection Areas (SPAs) classified under the Birds Directive covered 6% (against the EU average of 12.8%) and SCIs under the Habitats Directive covered 7.4 % (EU average 14.2%) of Danish territory.

The latest assessment of the SPA part of the Natura 2000 network shows that Demark's designation of the network of marine SPAs was insufficient to cover several important bird areas (IBAs). The Danish government on 12 November 2021, with an Order No 2091, proceeded with the designation of 6 new SPAs[29], and promised 6 December 2021 to look further at appointing additional marine areas as SPAs.

The Danish government initiated in 2018 a procedure to adjust the boundaries of the sites within its Natura 2000 network. This procedure is still ongoing. The Commission will be able to finalise its assessment after receiving full justifications for each proposed change.

Considering both Natura 2000 and other nationally designated protected areas, Denmark legally protects 15.1% of its territory (against the EU 27 average of 26.4%) and 18,7% of marine areas (against the EU 27 average of 10.7%)[30]. Figure 6 shows the situation at EU

[21] These should be reinforced by the Nature Restoration Law, according to the EU's new biodiversity strategy.
[22] Danish Nature Policy – our share nature
[23] Political agreement on nature and biodiversity.
[24] Political agreement on green cities.
[25] Natura 2000 comprises Sites of Community Importance (SCIs) designated pursuant to the Habitats Directive as well as Special Protection Areas (SPAs) classified pursuant to the Birds Directive; figures of coverage do not add up due to the fact that some SCIs and SPAs overlap. Special Areas of Conservation (SACs) means a SCI designated by the Member States.

[26] EEA, Article 17 dashboard, Annex I total, 2019.
[27] EEA, Article 17 dashboard, Annex II & Annex IV excluding those in Annex II & Annex V excluding those in Annex II, 2019. This counting only takes into account species and habitats for which assessment of conservation status was requested.
[28] EEA, Article 12 dashboard, Annex I, 2020. This counting only takes into account birds taxa for which information was requested.
[29] Danish Ministry of Environment, 2021
[30] EEA, Protected Areas, terrestrial protected area percentage (2021) and marine protected area percentage (2019), March 2022.

level for land and marine sites to meet the EU's biodiversity strategy 2030 target of 30%.

Figure 6: Marine & terrestrial protected area coverage, 2021[31]

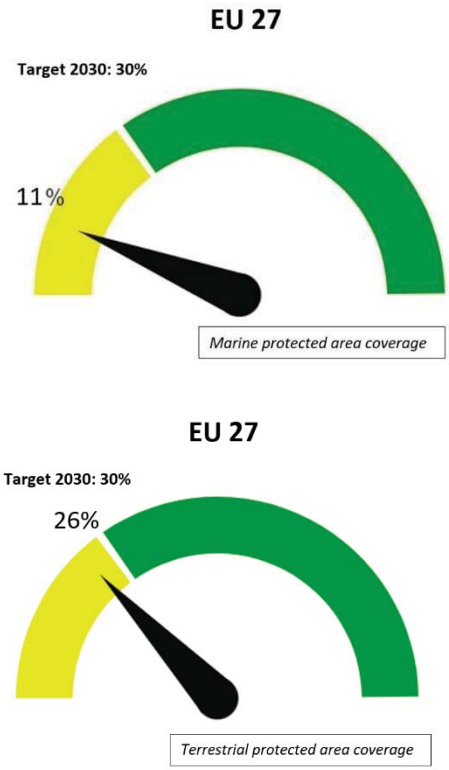
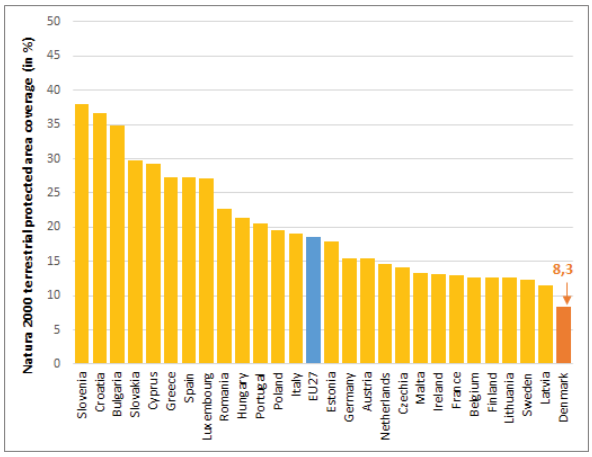


Figure 7: Natura 2000 terrestrial protected area coverage, 2021[32]



Designating Special Areas of Conservation (SACs) and setting conservation objectives and measures

All SCIs have been designated as SACs and conservation objectives and measures have been drawn up for each of these sites. However, the quality of the current conservation objectives and measures is insufficient and will be updated in 2022/23. Moreover, the management plans are not sufficiently linked with other applicable legislation to tackle agriculture emissions which exert high pressure on species and habitats.; these aspects will also be a part of the coming plans, which were in public consultation in spring 2022.

Progress in maintaining or restoring favourable conservation status of species and habitats

The results of Habitats Directive Article 17 and Birds Directive Article 12 reports on progress towards maintaining or restoring the favourable conservation status of species and habitats are key to measure the performance of Member States.

According to the report submitted by Denmark on the conservation status of habitats and species covered by Article 17 of the Habitats Directive for the period 2013-2018, the share of assessments for habitats in good conservation status in 2018 is only 5% which is the second lowest in the EU and the same as the number reported under the previous reporting period (2007-2012), see Figure 8. As to protected species, the share of assessments in good conservation status in 2018 is 20% which is less than the 32% reported under the previous reporting period (2007-2012), see Figure 9.

The bird conservation results with 54% show that the population of breeding species was either increasing in the short term or stable (for wintering species this figure was 27%).

The share of habitats in bad conservation status has remained at 77% and the share of assessments for species in bad conservation status has increased to 34%, as shown in Figure 8[33]. The main pressures come from agriculture, mixed sources of pollution, development, construction and use of residential, commercial, industrial and recreational infrastructure and alien and problematic species.

[31] EU Biodiversity Strategy Dashboard, indicators A1.1.1 and A1.2.1, February 2022.
[32] EEA, February 2022.Natura 2000 Barometer, February 2022.
[33] EEA, State of Nature in the EU 2021.

Figure 8: Assessments on conservation status for habitats for 2007-2012 and 2013-2018 reporting periods[34]

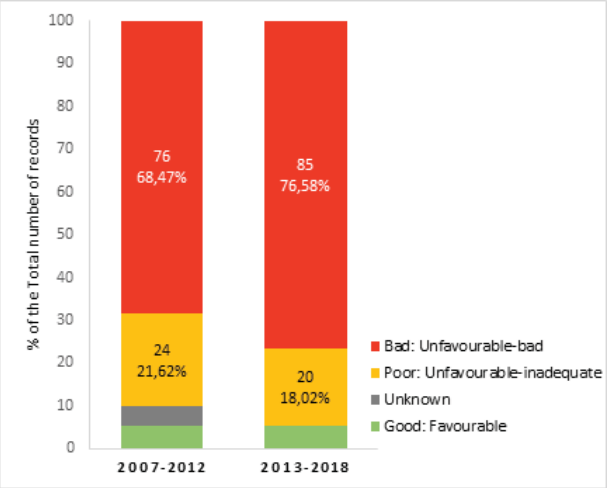
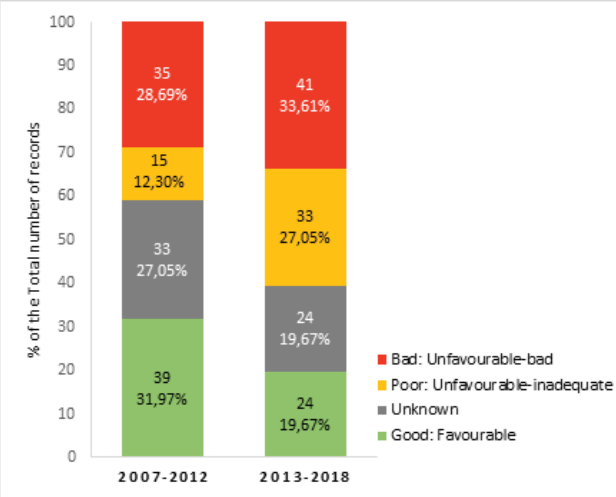


Figure 9: Assessments on conservation status for species for 2007-2012 and 2013-2018 reporting periods[35]



Denmark has used LIFE for nature projects for example the Better BirdLife[36] and Open Woods[37] projects.

Denmark had two priority actions in 2019. The first was to achieve favourable conservation for habitats and species where there has been no progress; thus it is repeated. The second was to put in place clearly defined conservation measures for sites, and to provide adequate resources; on the first aspect there is limited progress since the management plans for the new planning period to put in place clearly defined conservation objectives and measures were in public consultation in spring 2022; on the second aspect, considering that Denmark has not submitted a complete priotised action framework (see section 5), a new priority action is included.

2022 priority actions

- increase efforts to ensure that the Natura 2000 network is managed in a way that achieves the favourable conservation status of protected habitats and species, especially by reducing main pressures such as from agriculture.
- finalize the update of the Natura 2000 management plans to be adopted for the next planning cycle to ensure that their conservation objectives and measures are clearly defined, sufficiently detailed and linked with other applicable legislation and plans to achieve favourable conservation status.
- complete and submit a finalised PAF.

Bringing nature back to agricultural land and restoring soil ecosystems

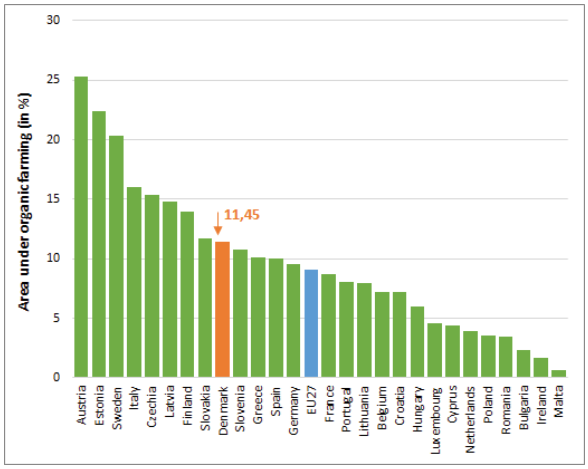
Agricultural land

The biodiversity strategy works alongside the new farm to fork strategy and the new common agricultural policy (CAP) to support and achieve the transition to fully sustainable agriculture.
The biodiversity and farm to fork strategies have set four important targets for 2030:
- a 50% reduction in the overall use of – and risk from – chemical pesticides;
- a 50% reduction in the use of more hazardous pesticides;
- a 50% reduction in losses of nutrients from fertilisers while ensuring there is no deterioration of soil fertility (which will result in a 20% reduction in the use of fertilisers);
- bring back at least 10% of agricultural area under high-diversity landscape features and increase areas under organic farming to at least 25%.

[34] EEA, Conservation status and trends of habitats and species, December 2021. Please note when comparing the figures shown for 2007-2012 and 2013-2018 these may also be affected by changes of methods or due to better data availability.
[35] EEA, Conservation status and trends of habitats and species, December 2021. Please note when comparing the figures shown for 2007-2012 and 2013-2018 these may also be affected by changes of methods or due to better data availability.
[36] LIFE Better BirdLife
[37] LIFE Open Woods

Denmark has an estimated 11.45% of area under organic farming, slightly above the EU average of 9,07% (2020)[38], see Figure 10.

Figure 10: Share of total utilised agricultural area occupied by organic farming per Member State[39]



The agricultural sector in Denmark has a level of high productivity. However, intensive farming generates negative impacts on the environment and climate, such as nutrient leaching, GHG emissions, loss of habitats and biodiversity[40]. The farmland bird index fell from 79.3 in 2011 to 72 in 2019 (2000 = 100)[41].

Soil ecosystems

Soil is a finite and extremely fragile resource. It is increasingly degrading in the EU.
The new EU soil strategy, adopted on 17 November 2021, stresses the importance of soil protection, of sustainable soil management and of restoring degraded soils to achieve the Green Deal objectives as well as land-degradation neutrality by 2030.
This entails:
(i) preventing further soil degradation;
(ii) making sustainable soil management the new normal;
(iii) taking action for ecosystem restoration.

One example of soil degradation is the area of soil that is sealed or artificialised[42] (Figure 11). The net land taken per year in the period 2012-2018 can be seen as a measure of one important pressure on nature and biodiversity - land use change - which constitutes at the same time an environmental pressure on people living in urbanised areas.

Despite falling during the last decade (land take was over 1000km^2/year between 2000-2006), land take in EU28 still amounted to 539km^2/year between 2012-2018[43]. The net land take concept combines land take with the share of land returned to non-artificial land use (re-cultivation). While some land was re-cultivated in the EU28 in the period 2000-2018, 11 times more land was taken.

Denmark ranks above the EU average on land take with net land take of 152.8m2/km2 2012-2018 (EU27 average: 83.8 m^2/km^2). [44].

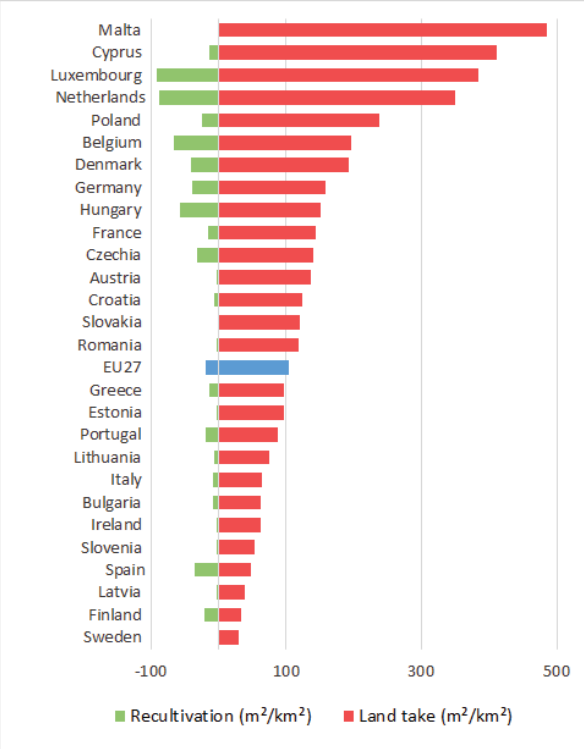
In 2018, Denmark updated its reporting on land degradation in line with the next Performance Review and Implementation System (PRAIS3) reporting platform[45]. It includes actions intended to combat land degradation .

However, Denmark has not yet committed to set land degradation neutrality targets under the United Nations Convention to Combat Desertification (UNCCD) [46].

The RRP for Denmark provides EUR 89 million for a reform to take 4 700ha of carbon rich soil out of production and EUR 38 million for an investment to rehabilitate four sites.

[38] Eurostat, organic farming
[39] Eurostat, Area under organic farming, February 2022.
[40] Commission Reccomendations for Denmark's CAP Plan, 2021
[41] Eurostat Farmland Bird Index.
[42] Artificial land cover is defined as the total of roofed built-up areas (including buildings and greenhouses), artificial non built-up areas (including sealed area features, such as yards, farmyards, cemeteries, car parking areas etc. and linear features, such as streets, roads, railways, runways, bridges) and other artificial areas (including bridges and viaducts, mobile homes, solar panels, power plants, electrical substations, pipelines, water sewage plants, and open dump sites).
[43] EEA Land take and recultivation in Europe
[44] EEA Land take and recultivation; fig 6; Net land take = land take + recultivation.
[45] UNCCD, Prais3
[46] UNCCD, The LDN Target Setting Programme

Figure 11: Land take and re-cultivation in EU27 (m2/km2), 2012-2018[47]



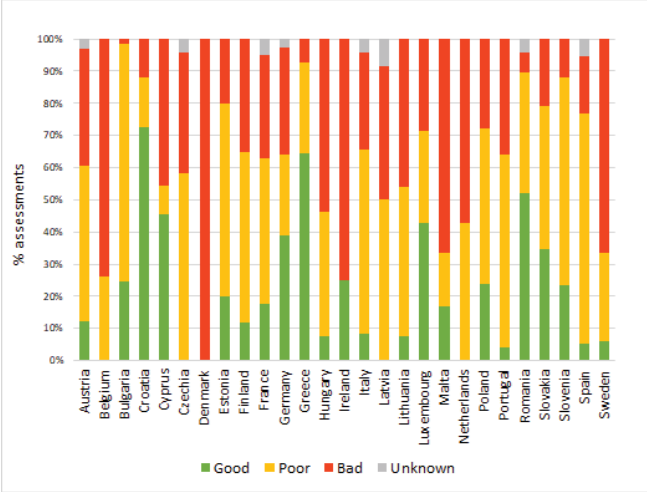
Forests and timber

The EU Forest Strategy for 2030 adopted in July 2021 is a part of the Fit for 55 Package. The Strategy promotes the many services that forests provide. Its' key objective is to ensure healthy, diverse and resilient EU forests, that contribute significantly to strengthened biodiversity and climate ambition.
Forests are important carbon sinks and their conservation efforts are vital for the EU's vision of achieving climate neutrality by 2050.

Of the 27% of EU forest area protected under the Habitats Directive, less than 15% of areas assessed were found to be in a favourable conservation status[48]. The share of forest area in the EU in a bad conservation status increased from 27% in 2015 to 31%.

In Denmark, forests cover 12.19% of land[49] with 21 000ha in Denmark covered by primary forests[50]. The situation of forest habitats protected under the Habitats Directive is particularly worrying in Denmark as more than half of the assessed protected forests are in a bad status (Figure 12)[51].

Figure 12: Conservation status of forests protected under the Habitats Directive in EU Member States, 2013-2018 (% assessments)[52]



In accordance with the EU Timber Regulation (EUTR)[53], which prohibits placing illegally harvested timber on the EU market, EU Member States competent authorities must conduct regular checks on operators and traders, and apply penalties for any breaches. By amending Article 20 of the EUTR, biennial reporting became annual and covers the calendar year as of 2019.

In the period March 2017 - February 2019[54], Denmark carried out 49 checks on operators importing timber. It is estimated that Denmark had 24 000 operators placing domestic timber and 3 889 operators placing imported timber onto the internal market over the reporting period.

The new Deforestation Regulation[38] will repeal and replace the EU Timber Regulation, as it will essentially integrate and improve the existing system to control timber legality.

Denmark hosted an EIR peer to peer study visit on implementation of the EUTR, 29 October2018. It also participated in a Workshop of the EUTR Nordic Baltic Competent Authorities 17-19 June2019.

[47] EEA, Land Take in Europe.
[48] EEA, State of Nature in the EU
[49] EEA, Forest information system for Europe; Denmark uses FAO National Forest Inventory data which gives a higher figure of 14.7%.
[50] JRC, Mapping and assessment of primary and old-growth forests in Europe, p. 13; Denmark uses another source, Sabatini *et al*, 2018, which gives a much lower figure of 1690 ha.
[51] EU Forest Strategy 2030 Staff Working Document.
[52] EEA, Conservation status and trend in conservation status by habitat group - forests, January 2022.
[53] Regulation (EC) No 2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community.
[54] Commission report 2020 on EU Timber Regulation

Invasive alien species (IAS)

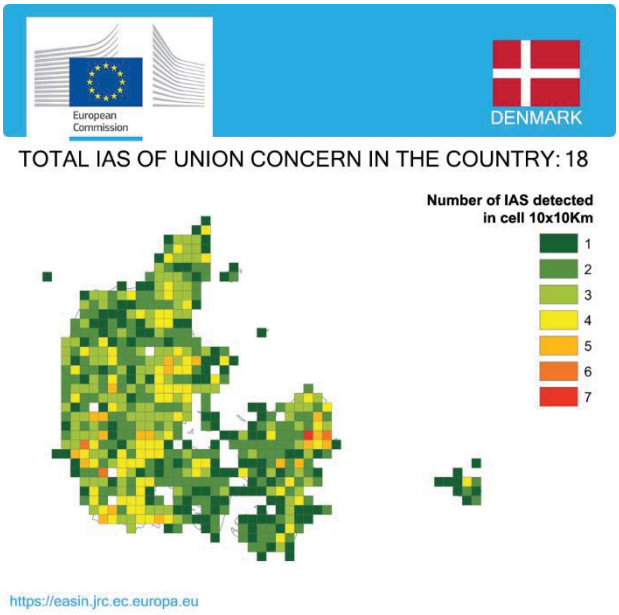
IAS are a key cause of biodiversity loss in the EU (alongside changes in land and sea use, overexploitation, climate change and pollution).
Besides inflicting major damage on nature and the economy, many IAS also facilitate the outbreak and spread of infectious diseases, posing a threat to humans and wildlife.
The implementation of the EU Invasive Alien Species Regulation and other relevant legislation must be stepped up.
The biodiversity strategy for 2030 aims to manage recognised invasive alien species and decrease the number of 'red list' species they threaten by 50%.

The core of Regulation (EU) 1143/2014 on invasive alien species. (the IAS Regulation[55]) is the list of Invasive Alien Species of Union concern. There are currently 66 invasive alien species (IAS) of EU concern , of which: 30 are animal species and 36 are plant species; 41 are primarily land species, 23 are primarily freshwater species, 1 is a brackish-water species and 1 is a marine species.
A 2021 report[56] on the review of the application of the IAS Regulation based on reports that Member States submitted for the period 2015-2018, showed the implementation of the IAS Regulation is already starting to deliver on its objectives such as a coherent framework for addressing IAS at EU level and has increased awareness of the problem of IAS, including among the general public. At the same time, the above report identified some challenges and areas for improvement. Given that the deadlines for implementing the various obligations of the IAS Regulation applied gradually between July 2016 and July 2019, it is premature to draw conclusions on several aspects of the implementation of the IAS Regulation.

Another 2021 report[57] on the baseline distribution shows that of the 66 species on the Union list, 18 have been observed in the environment in Denmark. The spread can be checked in Figure 13.

Denmark had a priority action in 2019 to remedy the lack of data, and seek ways to improve its surveillance system. In the 2019 Article 24 report, it is indicated that in Denmark, there is a registration website for IAS for citizens to register observations, which are then verified by the Danish Environmental Protection Agency. These data are especially important for rapid eradication actions. Additionally, Denmark has a national programme (NOVANA) for surveillance of IAS, and when new species are added to the EU list, they are included in the programme. Moreover, IAS are included in several surveillance projects, e.g., altas projects, and projects using new technologies, such as eDNA and satellite data.

Figure 13: Number of IAS of EU concern, based on available georeferenced information for Denmark, 2021



Marine ecosystems

The EU Biodiversity Strategy for 2030 aims to substantially reduce the negative impacts on sensitive species and habitats in marine ecosystems and to achieve good environmental status as well as eliminate or reduce the incidental catches of protected, endangered, threatened and sensitive species to a level

[55] Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species
[56] Report from the Commission to the European Parliament and the Council on the review of the application of Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, COM(2021) 628 final, 13.10.2021
[57] Cardoso A.C., Tsiamis K., Deriu I., D' Amico F., Gervasini E., EU Regulation 1143/2014: assessment of invasive alien species of Union concern distribution, Member States reports vs JRC baselines, EUR 30689 EN, 2021, ISBN 978-92-76-37420-6, doi:10.2760/11150, JRC123170.

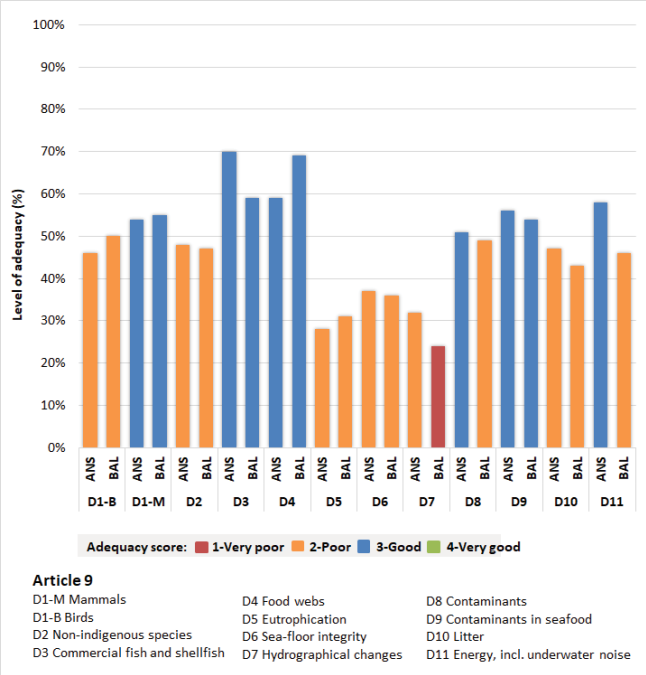
that allows species recovery and conservation[58].

The Marine Strategy Framework Directive (MSFD)[59] requires Member States to achieve good environmental status (GES) of their marine waters. To that end, Member States must develop marine strategies for their marine waters, and cooperate with Member States sharing the same marine regarion or subregion. These marine strategies comprise different steps to be developed and implemented over six-year cycles.

Among other obligations, the MSFD requires Member States by 15 October 2018 to define a set of GES characteristics for each descriptor (Article 9), and to provide an initial assessment of their marine waters (article 8). The Commission then assesses whether this constitutes an appropriate framework to meet the requirements of the Directive.

The Commission assessed Denmark's 2018 determinations of GES for each of the 11 descriptors in the MSFD[60] and determined their adequacy in relation to the Commission GES Decision[61]. A good or very good score indicates that the national GES determinations are well aligned with the requirements of the GES Decision, providing qualitative and quantitative national environmental objectives to be achieved for their marine waters (Figure 14).

Figure 14: Level of adequacy of GES determination by Denmark (ANS and BAL regions) with criteria set under the Commission GES Decision - Article 9 (2018 reporting exercise)[62]



Denmark has two marine sub-regions:

ANS-NE Atlantic, the Greater North Sea. In this sub-region, 6 out of 11 determinations of GES were assessed as good or very good[63]. Denmark's assessment of GES is coherent with the MSFD for 6 out of 11 descriptors.

BAL, the Baltic Sea. In this marine sub-region, 4 out of 11 determinations of GES were assessed as good or very good. Denmark's assessment of GES is coherent with the MSFD for 4 out of 11 descriptors.

The MSFD also requires that Member States make an assessment of the current environmental status of their marine waters in relation to the GES determination. A good or very good score indicates that the Member State has good capabilities to assess their marine environment in accordance with the requirements set out in the Commission GES Decision (Figure 15).

[58] The EU Common Fisheries Policy (CFP) aims to contribute to the achievement of the objectives of the environmental legislation for marine ecosystems.

[59] Marine Strategy Framework Directive 2008/56/EC

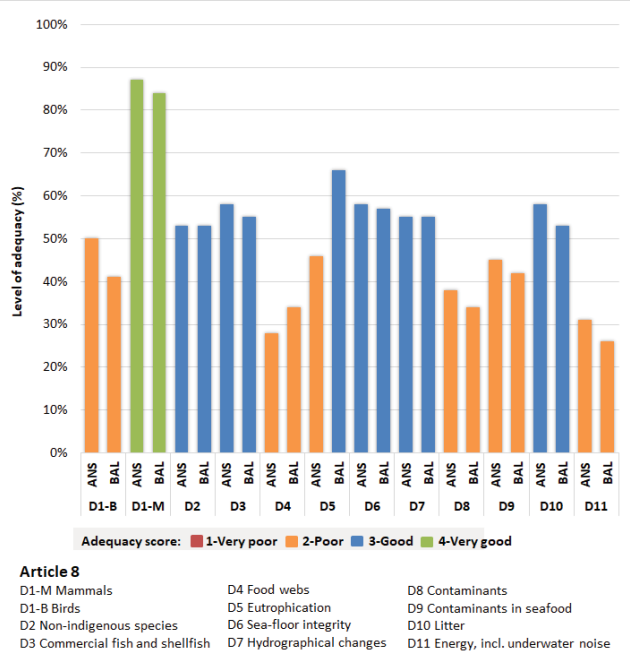
[60] Annex I to Directive 2008/56/EC.

[61] Commission Decision (EU) 2017/848 laying down criteria and methodological standards on the good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU.

[62] Assessment carried out by the European Commission of the data reported by the Member States, January 2022. Please note that only two sub-sections of descriptor D1 are displayed (D1-M Mammals and D1-B Birds). For the analysis, these two sub-sections were considered as a whole after averaging them.

[63] Only one part of D1 (Mammals) and D2-D11 are displayed.

Figure 15: Level of adequacy of national assessment of Denmark's marine environment (ANS and BAL regions) with criteria set under the Commission GES Decision - Article 8 (2018 reporting exercise)[64]



In the marine sub-region ANS-NE Atlantic, the Greater North Sea, 6 descriptors out of 11 were scored as good or very good. Denmark's assessment of its marine environment is coherent with the requirements set under the Commission GES Decision for 6 out of 11 descriptors.

In the marine sub-region BAL, the Baltic Sea, 7 descriptors out of 11 were scored as good or very good. Denmark's assessment of its marine environment is coherent with the requirements set under the Commission GES Decision for 7 out of 11 descriptors.

In the 2019 EIR, Denmark had a priority action to achieve timely reporting under the MFSD. It has made limited progress on this with several descriptors missing.

As highlighted in the Commission's report on the implementation of the MSFD[65], although regional cooperation has improved since the adoption of the MSFD, more cooperation is needed to meet the requirements under the Directive of full regional coherence of the marine strategies.

Furthermore, in March 2022, the European Commission published a Communication with recommendations for Member States. The Commission assessment highlights that Member States need to step up their efforts to determine the good environmental status and the use of the criteria and methodological standards according to the Commission GES Decision. The above considerations form the basis for the 2022 priority actions.

2022 priority actions

- ensure regional cooperation with Member States sharing the same marine (sub)region to address the main environmental pressures;
- implement the recommendations made by the Commission in the staff working document[66] accompanying the Communication[67] on recommendations per Member States and region on the 2018 updated reports for Articles 8, 9 and 10 of the MSFD.

Ecosystem assessment and accounting

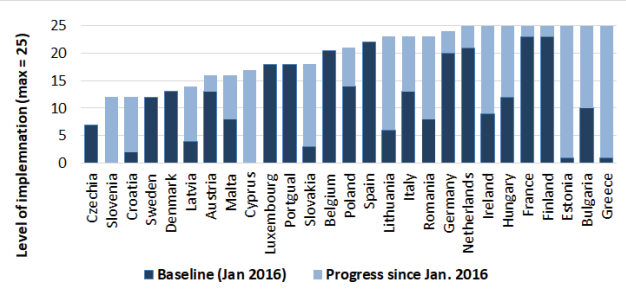
The EU biodiversity strategy for 2030 calls on Member States to better integrate biodiversity considerations into public and business decision making at all levels and to develop natural capital accounting. The EU needs a better performing biodiversity-observation network and more consistent reporting on the condition of ecosystems.

As mentioned in the 2019 EIR, Denmark has been involved with MAES[68] since 2014 in collaboration with universities. A report was published in 2017[69] illustrating the synergies and trade-offs for six different scenarios between six ecosystem services and biodiversity. A case study also showed that it is possible to combine existing spatial data layers and models to facilite analyses of the effects of land use changes across many ecosystem services and biodiversity indicators. A follow up project on two modelling components has been carried out[70].

No progress has been recorded since January 2016 (Figure 16). This assessment is based on 27 implementation questions, updated every six months. Progress on ecosystem accounting implementation is assessed at national level based on 13 questions.

[64] Assessment carried out by the European Commission of the data reported by the Member States, January 2022. Please note that only two sub-sections of descriptor D1 are displayed (D1-M Mammals and D1-B Birds). For the analysis, these two sub-sections were considered as a whole after averaging them.
[65] COM(2020)259
[66] SWD(2022)1392.
[67] COM(2022)550.
[68] Mapping and Assessment of Ecosystems and their Services.
[69] Aarhus University report
[70] Termansen M *et al.*

Figure 16: ESMERALDA MAES Barometer (January 2016 - March 2021)[71]



Denmark had a priority action in the 2019 EIR to start work on a nationwide MAES initiative to start a natural capital accounting systems. Only limited progress has been made so another priority action is proposed in 2022.

2022 priority actions

- Continue supporting the mapping and assessment of ecosystems and their services, and ecosystem accounting development, through appropriate indicators for integrating ecosystem extent, condition and services (including some monetary values) into national accounts; continue supporting the development of national business and biodiversity platforms, including natural capital accounting systems to monitor and value the impact of business on biodiversity.

[71] European Commission, Joint Research Centre, Publication Office, EU Ecosystem assessment: summary for policymakers, page 80, May 2021.

3. Zero pollution

Clean air

EU clean-air policies and legislation need to significantly improve air quality in the EU, moving the EU closer to the quality recommended by the WHO and curbing emissions of key air pollutants.
Air pollution and its impacts on ecosystems and biodiversity should be further reduced with the long-term aim of not exceeding critical loads and levels. This requires strengthening efforts to reach full compliance with EU clean-air legislation and defining strategic targets and actions for 2030 and beyond.
The 2030 zero-pollution action-plan targets are to reduce the health impacts of air pollution by 55% and to reduce the EU ecosystems threatened by air pollution by 25%, compared to 2005.

The EU has developed a comprehensive suite of air quality legislative measures, which set health-based air quality standards[72] and emission reduction commitments[73] per Member State for a number of air pollutants.

Air quality in Denmark is generally good with exceptions. The latest available annual estimates by the European Environment Agency (for 2019)[74] indicate about 2 900 premature deaths (or 30 700 years of life lost (YLL)) attributable to fine particulate matter concentrations[75] and 150 (1600 YLL) to ozone concentrations[76][77].

The emissions of key air pollutants have fallen significantly in Denmark over the last years, while GDP growth continued (see Figure 17). According to the latest projections as submitted under Article 10(2) of the National Emission Reduction Commitments Directive (NECD)[78], Denmark expects to reach its emission reduction commitments for SO_x, NO_x and NMVOC for the period 2020 to 2029 and from 2030 onwards. The projections however do not demonstrate reaching emission reduction commitments for NH_3 and $PM_{2.5}$ for 2020 to 2029 and from 2030 onwards. Latest inventory data submitted by Denmark, prior to review by the Commission, indicate that Denmark is in compliance with the emission reduction commitments for NO_x, NMVOC, SO_2 and $PM_{2.5}$, and in non-compliance with the emission reduction commitment for NH_3 in 2020.

Denmark has submitted a National Air Pollution Control Programme on 1 April 2019 and an update on 11 August 2021.

Figure 17: Emission trends of main pollutants/GDP in Denmark, 2005-2019[79]

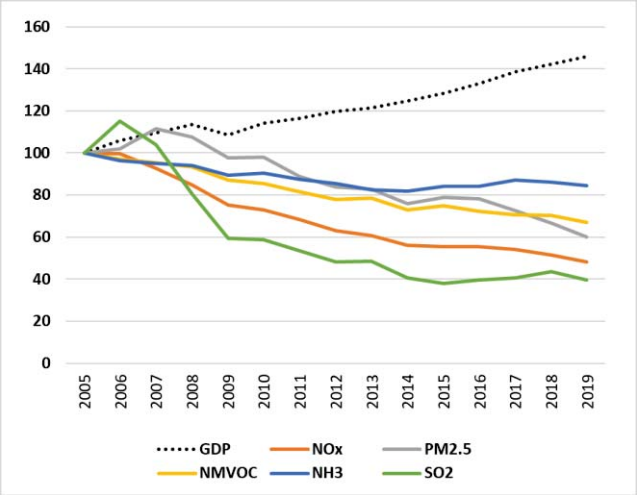
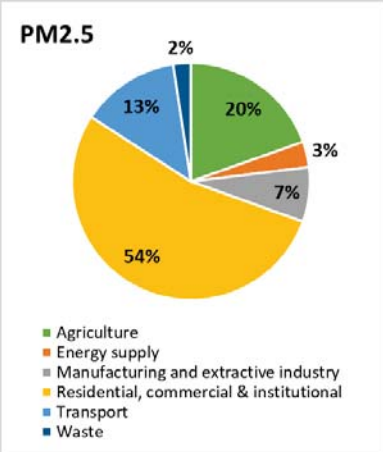


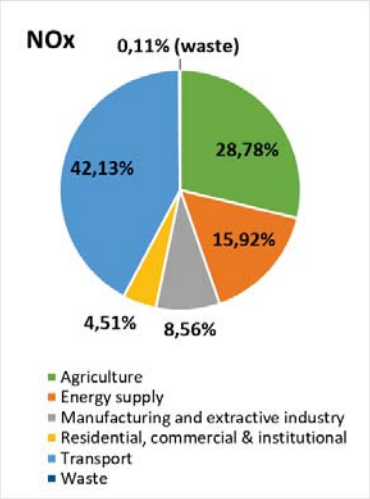
Figure 18 shows the emissions of PM2.5 and NOx by economic sector.

Figure 18: PM2.5 and NOx emissions by sector in Denmark (2019)[80]



[72] European Commission, 2016. Air Quality Standards
[73] European Commission, Reduction of National Emissions
[74] EEA, Air Quality in Europe –2021 Report. Please see details in this report as regards the underpinning methodology, p.106
[75] Particulate matter (PM) is a mixture of aerosol particles (solid and liquid) covering a wide range of sizes and chemical compositions. PM10 (PM2.5) refers to particles with a diameter of 10 (2.5) micrometres or less. PM is emitted from many human sources, including combustion.
[76] Low-level ozone is produced by photochemical action on pollution
[77] Please note that these figures refer to the impacts of individual pollutants, and to avoid double-counting cannot be added up to derive a sum.
[78] Directive 2016/2284/EU.

[79] EEA.
[80] EEA.



In 2020, Denmark did not register any cases exceeding the limit values set under the Ambient Air Quality Directive.[81].

According to latest air pollutant emission projections additional measures would be needed to achieve the NECD emission reduction commitments.

In the 2019 EIR, Denmark had two priority actions. The first was to take specific action under the national air pollution control programme (NAPCP) to reduce the main emission sources, in particular to reduce PM2.5 and ammonia. The second was to reduce ammonia ceilings to comply with national emission ceilings, by shifting to low-emission agricultural measures. Denmark has achieved limited progress on both fronts.

2022 priority actions

- take action under the NAPCP to reduce emissions from the main sources mentioned above.
- ensure full compliance with the EU air quality standards and maintain downward emissions trends of air pollutants, to reduce adverse air pollution impacts on health and economy with a view to reaching WHO guideline values in the future.

Industrial emissions

The main objectives of EU policy on industrial emissions are to:
(i) protect air, water and soil;
(ii) prevent and manage waste;
(iii) improve energy and resource efficiency;
(iv) clean up contaminated sites.
To achieve this, the EU takes an integrated approach to the prevention and control of routine and accidental industrial emissions. The cornerstone of the policy is the Industrial Emissions Directive[82] (IED). The Commission tabled a proposal in April 2022[83]. The revision seeks to improve the Directive's contribution to the zero-pollution objective, as well as its consistency with climate, energy and circular-economy policies.

The overview of industrial activities regulated by the IED is based on data reported to the EU Registry (2018)[84].

In Denmark, around 2 350 industrial installations are required under the IED to have a permit. This represents an increase of about 70 installations since 2015, largely due to an increase in the intensive rearing of poultry or pigs but also in the waste management sector. The distribution of installations is shown in Figure 19.

Industrial sectors in Denmark with the most installations in 2018 are intensive poultry and pig rearing (68%), followed by the waste management sector, including landfills (15%), the food, drink and milk sector (5%) and the energy sector (4%).

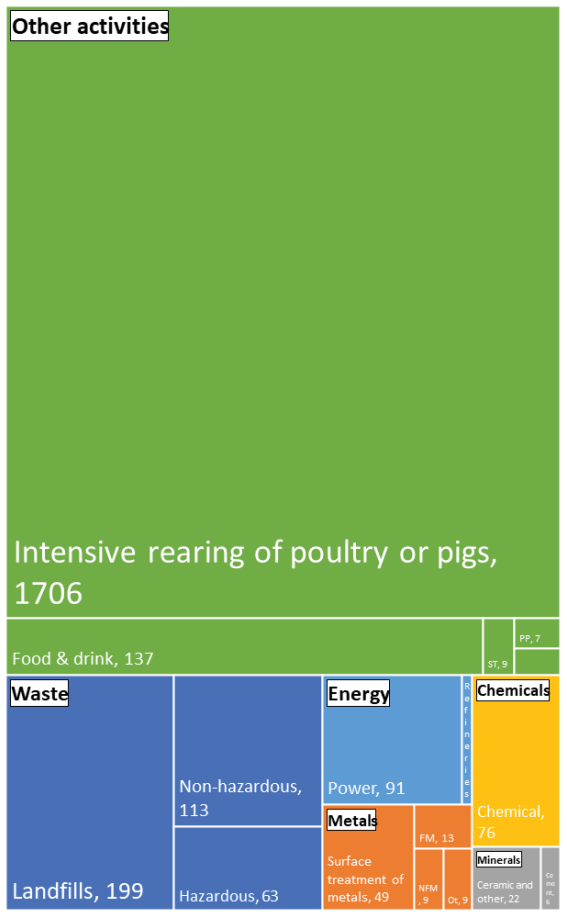
[81] EEA, Eionet Central Data Repository

[82] Directive 2010/75/EU covers industrial activities carried out above certain thresholds. It covers the energy industry, metal production, the mineral and chemical industry, waste management, and a wide range of industrial and agricultural sectors (e.g. intensive rearing of pigs and poultry, pulp and paper production, painting and cleaning).

[83] European Commission, proposal for a revision of the Industrial Emissions Directive, 4 April 2022. The revision of the IED is performed in parallel to the revision of Regulation (EC) No 166/2006 on the European Pollutant Release and Transfer Register (E-PRTR).

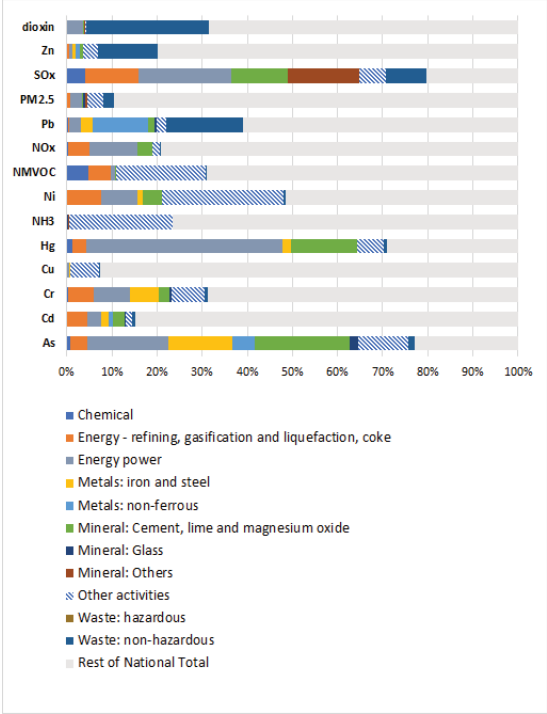
[84] EEA.

Figure 19: Number of IED industrial installations per sector in Denmark, 2018[85]



The industrial sectors identified as contributing the largest burden to the environment for emissions to air were the energy sector for sulphur oxides (SOx), nitrogen oxides (NOx) as well as for cadmium (Cd), chromium (Cr) and mercury (Hg); the waste management sector for lead (Pb), zinc (Zn), and dioxins; the mineral industry for arsenic (As); and intensive rearing of poultry and pigs for ammonia (NH3) and PM2.5. The breakdown is given in Figure 20.

Figure 20: Emissions to air from IED sectors and rest of national total air emissions in Denmark, 2018[86]

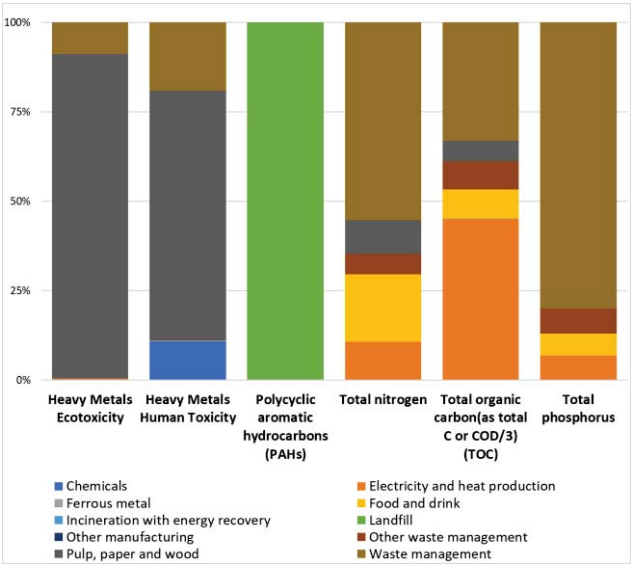


The environmental burdens for industrial emissions to water mainly result from the waste management for total nitrogen, phosphorous, from landfills for polycyclic aromatic hydrocarbons (PAHs), from the energy sector for total organic carbon (TOC) and from the pulp and paper sector for heavy metals. Figure 21 provides the breakdown by substance based on E-PRTR data.

[85] EEA, EU Registry, European Industrial Emissions Portal (data retrieved on 3 November 2021).

[86] EEA, LRTAP, Air pollutant emissions data viewer (Gothenburg Protocol, LRTAP Convention) 1990-2019 (data retrieved on 3 November 2021).

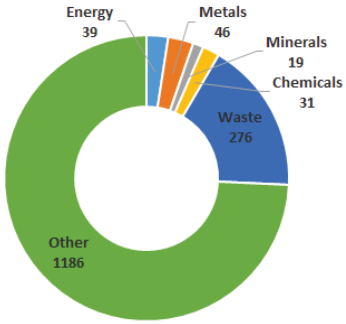
Figure 21: Relative releases to water from industry in Denmark, 2018[87]



The EU approach taken to enforcing the IED requirements creates strong rights for the public to have access to information and to participate in the permitting process. This empowers individuals and NGOs, to ensure that permits are appropriately granted and their conditions followed. As part of environmental inspection, competent authorities carry out site visits to IED installations to take samples and to collect the requisite information. According to Article 23(4) of the IED, site visits are carried out between once every year and once every three years, depending on the environmental risks posed by the installations. In 2018, Denmark carried out 1 597 site visits, the majority to installations for intensive poultry or pig rearing (66%), followed by the waste management sector, including landfills and the food drink milk sector (8%), as shown in Figure 22.

[87] EEA, EU Registry, European Industrial Emissions Portal. The heavy metals are presented both as a weighted sum of eco toxicity and human toxicity factors to illustrate both the ecological and human impact (based on USEtox) (data retrieved on 3 November 2021).

Figure 22: Number of inspections in IED installations in Denmark in 2018[88]



The development of Best Available Techniques (BAT) Reference Documents (BREFs) and BAT Conclusions ensures good collaboration with stakeholders and enables better implementation of IED[89]. Since the last EIR report, BAT Conclusions were adopted for waste incineration, for the food, drink and milk industries and for surface treatment using organic solvents including wood and wood products preservation with chemicals.

The Commission relies on the efforts of national competent authorities to implement the legally binding BAT conclusions and associated BAT emission levels in environmental permits, resulting in considerable and continuous reduction of pollution.

On 16 November 2021, Denmark hosted the EIR peer to peer workshop on ammonia reducing technology and measures.

In 2019, Denmark had priority actions to review permits to comply with new adopted BAT conclusions and to step up control and enforcement to ensure compliance with BAT conclusions. These actions have been followed up by the Commission through the reporting by Denmark to the EU Registry. The Commission is currently verifying with Denmark the reported information on the permits granted for each installation in the scope of the IED.

Major industrial accidents prevention – SEVESO

The main objectives of EU policy on the prevention of major industrial accidents are to:
(i) control major accident hazards involving dangerous substances, especially chemicals;
(ii) limit the consequences of such accidents for human health and the environment;

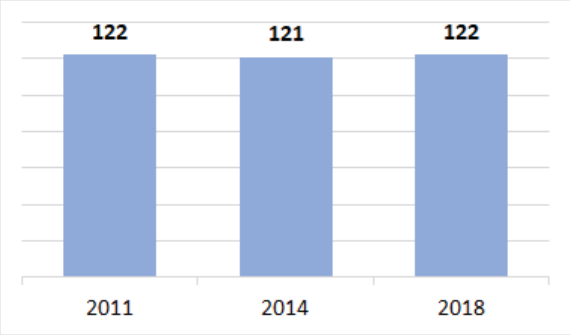
[88] EEA, EU Registry, European Industrial Emissions Portal (data retrieved on 3 November 2021).
[89] European Commission BAT reference documents

(iii) continuously improve prevention, preparedness and response to major accidents.
The cornerstone of the policy is Directive 2012/18/EU (the Seveso-III Directive)[90].

The overview below of industrial plants regulated by the Seveso-III Directive, hereafter 'Seveso establishments', is based on data reported to the eSPIRS database (2018)[91] and the Denmark report on implementation of the Seveso-III Directive for the period 2015-2018[92].

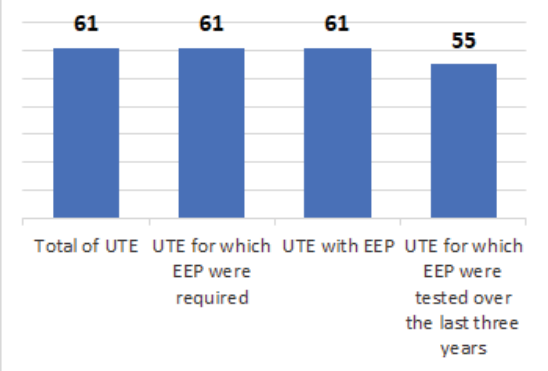
In Denmark, of the 122 Seveso establishments, 61 are categorised as lower-tier establishments (LTE) and 61 as upper-tier establishments (UTE) – based on the quantity of hazardous substances likely to be present. The UTE are subject to more stringent requirements. The number of Seveso establishments is given in Figure 23.

Figure 23: Number of Seveso establishments in Denmark, 2011, 2014 and 2018[93]



According to Denmark, an external emergency plan (EEP) is required for 61 UTE. In 2018, 61 UTE had an EEP and 55 of these EEP had been tested over the last three years. The summary is shown in Figure 24. The establishment of EEPs is essential to allow proper preparation and effective implementation of the necessary actions to protect the environment and the population should a major industrial accident nevertheless happen.

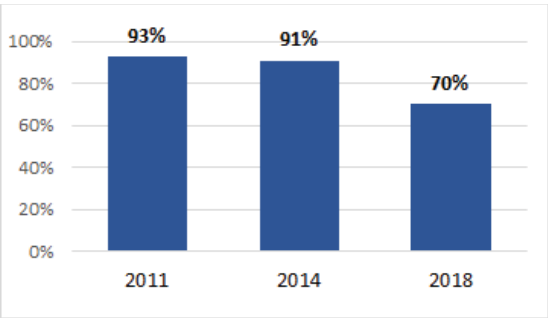
Figure 24: Situation regarding EEP in Denmark, 2018[94]



The information to the public referred to in annex V to the Seveso-III Directive – especially about how the public concerned will be warned in case of a major accident; the appropriate behaviour in the event of a major accident ; and the date of the last site visit – are permanently available for 100% of Seveso establishments in Denmark. This is an important provision of the Seveso-III Directive as this public knowledge could reduce the consequences of a major industrial accident.

Figure 25 gives the share of UTE on which information on safety measures and requisite behaviours were actively made available to the public in recent years.

Figure 25: Share of UTE for which information on safety measures and requisite behaviours were actively made available to the public in Denmark, 2011, 2014 and 2018[95]



2022 priority actions

- Strengthen control and enforcement to ensure compliance with Seveso-III Directive provisions, especially on information to the public and EEP.

[90] Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.
[91] European Commission, Seveso Plants Information Retrieval System
[92] As provided for by Article 21(2) of the Seveso-III Directive
[93] European Commission, Assessment and summary of Member States' implementation reports for Implementing Decision 2014/896/EU (implementing Directive 2012/18/EU on the control of major accident hazards involving dangerous substances), 2022.
[94] As above.
[95] As above.

Noise

The Environmental Noise Directive[96] provides for a common approach to avoid, prevent and reduce the harmful effects of exposure to environmental noise, although it does not set noise limits as such. The main instruments it uses in this respect are strategic noise mapping and planning. A relevant 2030 zero pollution action plan target is a reduction by 30% of the share of people chronically disturbed by transport noise compared to 2017.

Excessive noise from aircraft, railways and roads is one of the main causes of environmental health-related issues in the EU. It produces ischaemic heart disease, stroke, interrupted sleep, cognitive impairment and stress[97].

In Denmark, based on a limited set of data[98], environmental noise is estimated to cause at least around 100 premature deaths and 400 cases of ischaemic heart disease annually[99]. Moreover, some 55 000 people suffer from disturbed sleep. In Denmark, the number of people exposed to noise increased by 15% between 2012 and 2017, based on reported data. Noise mapping of agglomerations, roads and railways is complete, and based on the latest full set of analysed information.

Water quality and management

EU legislation and policy requires that the impact of pressures on transitional, coastal and fresh waters (including surface and ground waters) be significantly reduced. Achieving, maintaining or enhancing a good status of water bodies as defined by the Water Framework Directive will ensure that EU citizens benefit from good quality and safe drinking and bathing water. It will further ensure that the nutrient cycle (nitrogen and phosphorus) is managed in a more sustainable and resource-efficient way.

Water Framework Directive

The Water Framework Directive[100] is the cornerstone of the EU's water policy in the 21st century[101]. This Directive along with other water-related directives[102] set the framework for sustainable and integrated water management. The aim is to achieve a high level of protection of water resources, to prevent of further deterioration and to restore water to good status.

By March 2022, all Member States have to report the third generation of river basin management plans (RBMPs) under the Water Framework Directive. The Commission will assess the reported status and progress, and will check how the findings identified in the assessment of the second RBMPs[103] have been addressed. Denmark has not yet reported the third RBMPs.

The Commission published in December 2021 the sixth Implementation Report[104]. It includes, an interim assessment on progress of the implementation of the programmes of measures and on monitoring of the new priority substances. The assessment report for Denmark[105] showed that the planned and implemented measures in all four river basin districts (RBDs) contributed significantly to reaching the objectives of the Water Framework Directive in 2021. However, the pace had slowed in particular for planned measures related to wetlands, hydromorphological changes on rivers and lake restorations.

In Denmark, 70 research projects took place in the 2nd management cycle to better identify pressure factors, potential areas for action and their significance for achieving the environmental objectives[106].

[96] Directive 2002/49/EC

[97] WHO 2018, Environmental Noise Guidelines for the European Region.

[98] For further information: European Environment Agency, Noise Fact Sheets 2021.

[99] These figures are an estimation by the European Environmental Agency based on : **(i)** the data reported by Member States on noise exposure covered by Directive 2002/49/EC; **(ii)** ETC/ATNI, 2021, Noise indicators under the Environmental Noise Directive 2021: Methodology for estimating missing data, ETC/ATNI Report No 2021/06, European Topic Centre on Air Pollution, Transport, Noise and Industrial Pollution; **(iii)** the methodology for heaalculations, ETC/ACM, 2018, Implications of environmental noise on health and wellbeing in Europe, Eionet Report ETC/ACM No 2018/10, European Topic Centre on Air Pollution and Climate Change Mitigation.

[100] Water Framework Directive (2000/60/EC).

[101] EU Water Policy.

[102] This includes the Groundwater Directive (2006/118/EC), the Environmental Quality Standards Directive (2008/105/EC), the Floods Directive (2007/60/EC), the Bathing Water Directive (2006/7/EC), the Urban Waste Water Treatment Directive (91/271/EEC), the new Drinking Water Directive (2020/2184/EC), the Nitrates Directive (91/676/EEC), the Marine Strategy Framework Directive (2008/56/EC), the Industrial Emissions Directive (2010/75/EU) and the new Regulation on minimum requirements for water reuse (2020/741).

[103] Detailed information can be found in the 5th Report from the Commission on the implementation of the Water Framework Directive and the Floods Directive, as well as in the 2019 EIR.

[104] See the 6th Implementation Report of the Water Framework Directive and Floods Directive.

[105] European Commission, Directorate-General for Environment, Assessment of Member States' progress in Programmes of Measures during the second planning cycle of the Water Framework Directive. Member State: Denmark, 2022.

[106] European Commission, Assessment of Member States' progress in Programmes of Measures during the second planning cycle of the Water Framework Directive, pp.3-4. European Commission.

Based on the second RBMPs reporting and data published in 2020[107], in Denmark 28.2% of all surface water bodies[108]achieved good ecological status (with unknown status 23.8%) and only 0.8% were in good chemical status (with 98.5% unknown). For groundwaters, 25.1% did not achieve good chemical status (30.6% were in unknown status) and 0.7% were in a poor status.

Figure 26 illustrates the proportion of surface water bodies in Denmark and other European countries that failed to achieve good ecological status.

Figure 26. Proportion of surface water bodies (rivers, lakes, transitional and coastal waters) in less than good ecological status per River Basin District[109]

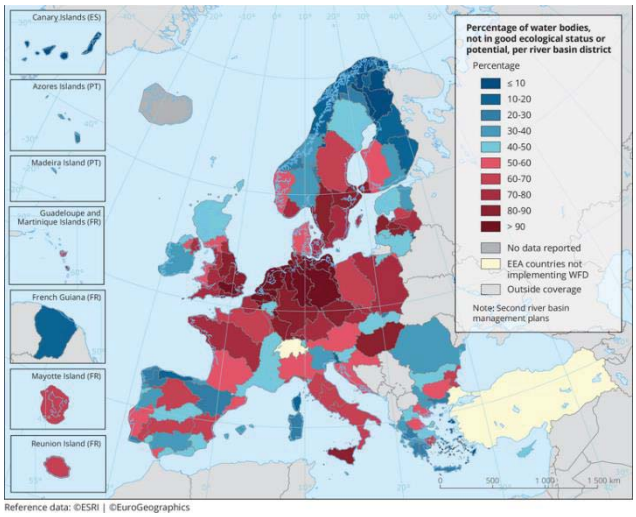
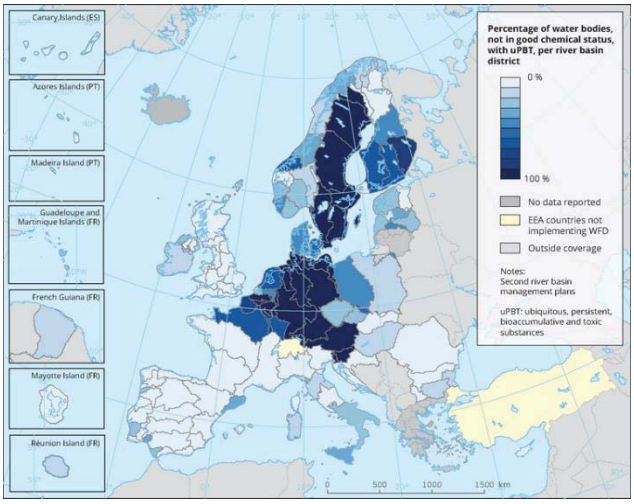


Figure 27 presents the percentage of surface water bodies in Denmark and other European countries failing to achieve good chemical status. For Denmark, the percentage is 0.7%, including water bodies failing due to substances behaving as ubiquitous PBTs (persistent, bio-accumulative, or toxic). Excluding uPBTs, the percentage of surface water bodies that did not achieve good chemical status is unknown.

Figure 27. Percentage of surface water bodies not achieving good chemical status[110]

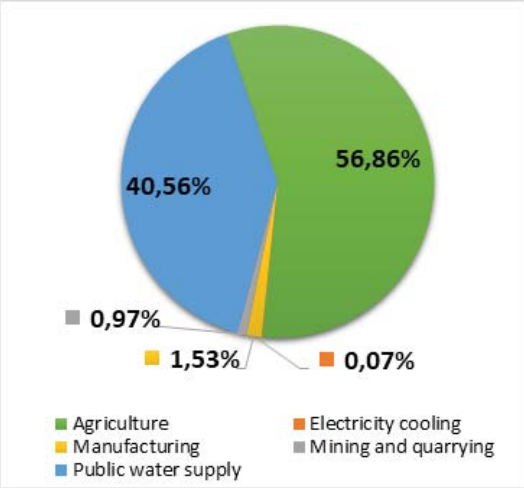


Under the IED framework, Denmark achieved a significant decrease the last decade (20.1%) in industrial releases of heavy metals such as Cd, Hg, Ni, Pb and an increase (21.4%) in total organic carbon (TOC) to water[111].

The total volume of water abstracted annually in Denmark from surface and groundwater sources in 2018 was 868.77 hm^3[112]. By sector, the percentage of water abstraction was 56.86% for agriculture, 40.56% for public water supply, 0.07% for electricity cooling, 1.53% for manufacturing and 0.97% for mining and quarrying, as illustrated in Figure 28. It should be noted that 2018 was a particularly dry year, so the amount of water used for agriculture was higher than normal. Denmark uses a register to monitor water abstractions. All water abstractions require a permit, except for a broad owner's abstraction of surface water for cattle, under the Danish Water Supply Act.

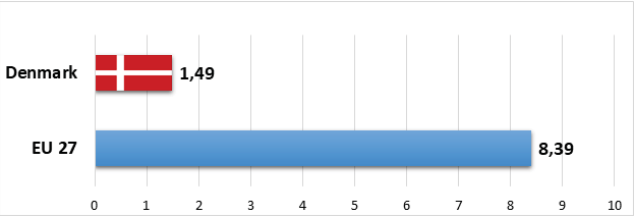
[107] WISE Freshwater (europa.eu)
[108] river, lake, transitional, coastal, territorial
[109] EEA, 2021.
[110] EEA, December 2019.
[111] EEA, 2021
[112] EEA, 2022.

Figure 28: Water abstraction per sector in Denmark[113]



In Denmark, the water exploitation index plus (WEI+)[114] was 1.49% in 2017, far less than the 20% that is generally considered as an indication of water scarcity[115] (Figure 29); Denmark is ranked 18th (from high to low score) in the EU level in terms of WEI+ .

Figure 29: Water exploitation index plus (WEI+) inside EU, 2017[116]



Denmark has taken several measures (smart meters, intelligent pumps, intelligent valves, deployed noise loggers and much more) to reduce the level of non-revenue water (NRW), including creating an economic incentive for water utilities to keep their NRW level below 10%. Denmark has also taken action to create awareness of the importance of saving water. As a result, Denmark has managed to reduce its water consumption by over 40% since 1980. Doing so means that Denmark has achieved one of the world's lowest levels of NRW with a consistent national average of just 6 to 8% compared to some parts of the world where NRW is over 50%. Water loss has been kept low through systematic leakage detection and by implementing modern ICT tools to assist NRW performance monitoring and reporting Another good practice in Denmark is the Water Valley initiative for water technology that will enable water consumption to become more resource efficient, cost effective and quality assured[117].

Floods Directive

As mentioned, the Commission published in December 2021 the sixth Implementation Report. It includes the review and update of the Preliminary Flood Risk Assessments during the second cycle (2016-2021). The assessment report showed that in Denmark, the information provided in the Preliminary Flood Risk Assessment document in combination with the methodology report was informative and clear. Denmark also applied clear methodology to calculate APSFRs[118] using a spatial process to rank areas of flood risk, factoring in climate change. However, pluvial floods should be also considered – at least in areas with high vulnerabilities.

Denmark has made an attempt to overcome data scarcity for past fluvial flood events by conducting a survey amongst municipalities.

Denmark has not yet adopted and reported the second generation of flood risk management plans (FRMPs) under the Floods Directive. The European Commission will assess progress since the adoption of the first flood risk management plans and publish a report.

Drinking Water Directive

As regards the Drinking Water Directive[119], no new assessment of the quality of Drinking Water is available since the EIR 2019. The quality of drinking water in Denmark has not been indicated as an area of concern[120].

The recast Directive [121]entered into force on 12 January 2021, Member States have until 12 January 2023 to transpose it into their national legal system. Denmark will have to comply with these reviewed quality standards.

[113] European Environment Agency, Water abstraction by source and economic sector in Europe, 2022.
[114] EEA, Water exploitation Index Plus, 2022. The Water Exploitation Index plus (WEI+) is a measure of total fresh water use as a percentage of the renewable fresh water resources (groundwater and surface water) at a given time and place. It quantifies how much water is abstracted and how much water is returned after use to the environment.
[115] Eurostat
[116] EEA, Water exploitation Index Plus, 2022.

[117] Water Valley Denmark
[118] Areas of Potential Significant Flood Risk

[120]The latest report for 2017-2019 by the Danish Environmental Protection Agency was based on analysis of water from supplies of water surpassing 1,000 m3 a day on average or serving more than 5,000 people. The controls showed that majority of biological and chemical parameters were close to or 100% compliance. For the microbiological parameters deviations were mainly observed for coliform bacteria and colony count 22 ˚C, in 1-4 % of the per-formed analyses. For the chemical parameters deviations were mainly observed for colour, turbidity, NVOC, ammonium, iron, manganese and nitrite, where 1-8 % of the performed analyzes deviated from the standard values.

Bathing water

Regarding the Bathing Water Directive, Figure 30 shows that in 2020, of the 1 026 Danish bathing waters, 90.7% were of excellent quality[122]. The evolution is shown in Figure 31.

Figure 30: Bathing water quality in Europe in the 2020 season[123]

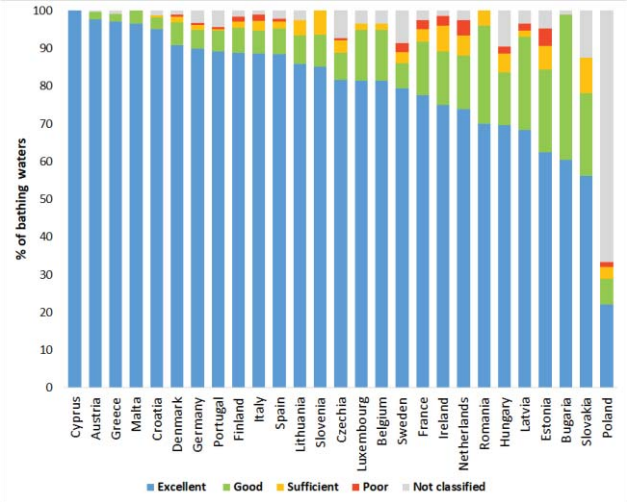
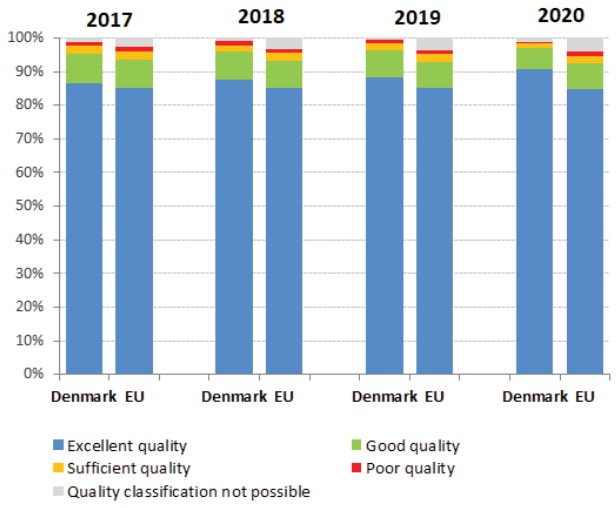


Figure 31: Bathing water quality 2017-2020[124]



**For 2017, 2018 and 2019, data about the UK bathing waters are included under the EU average.*

Nitrates Directive

The latest Commission Report on the Implementation of the Nitrates Directive, referring to the period 2016-2019[125], warns that nitrates are still polluting water in the EU and causing harm. Excessive nitrates in water are harmful both to human health and to ecosystems, causing oxygen depletion and eutrophication. Where national authorities and farmers have cleaned up waters, it has had a positive impact on drinking water supply and biodiversity, and on sectors such as fisheries and tourism that depend on them. Nevertheless, excessive fertilisation remains a problem in many parts of the EU.

Denmark has received a derogation under the Nitrates Directive for the application of more than 170 kg/ha of nitrogen from manure until 31 July 2024[126].

According to the last report on the implementation of the Nitrates Directive[127], between periods 2008-11 and 2016-19, groundwater quality has slightly improved as compared to the previous reporting period, with the percentage of stations reaching or exceeding 40 or 50mg nitrate per litre that falling from 6.9% to 6.7% and from 19.3% to 14.3%, respectively. The situation concerning nitrates concentrations in surface water is stable with some improvements recorded in reducing of eutrophication. However, nutrient inputs to the Baltic Sea around Denmark however have significantly decreased for nitrogen in the Danish Straits and Kattegat, and for phosphorus in Kattegat[128]. In 2020, the government reached a new agreement on nitrogen[129]. In 2021, this was followed up by a deal on the green transition of Danish agriculture[130]. Improving the nitrogen and phosphorus cycles helps improve the circularity of the economy. Nevertheless, the Commission is aware of the challenges that the nutrient surplus in Denmark poses on the local environment and for the Baltic Sea. It will continue its structured dialogue with the Danish authorities to ensure that appropriate measures are taken to implement EU legislation[131]. However latest data for 2010-2020 shows increases in pollutant releases to water of 35.5% for nitrates, 30.8% for phosphorus and 21.4 for TOC[132].

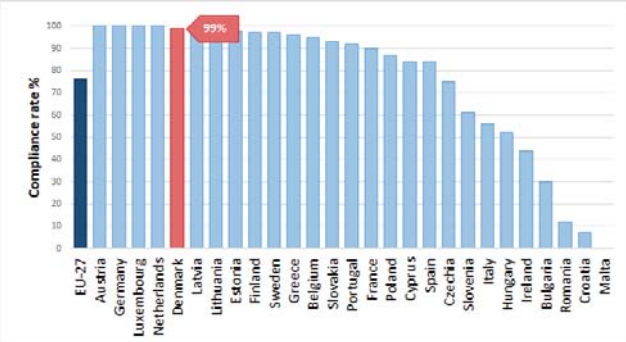
Urban wastewater treatment

Regarding the Urban Wastewater Treatment Directive, in Denmark, the compliance rate is 99% much higher than the EU average of 76% in 2018[133]. Further action is

[122] EEA, 2021. State of bathing waters in 2020 – Denmark country report.
[123] EEA, Bathing Water Quality in 2020, 2022.
[124] EEA, European Bathing Water Quality in 2017, 2018, 2019, 2020.
[125] European Commission, Implementation Report 2016-2019.
[126] European Commission, Derogation 17.07.2020.
[127] European Commission, Annex 15 of the Staff Working Document accompanying the report on the implementation of the Nitrates Directive for the period 2016-2019
[128] Commission Recommendations for Denmark's CAP Plan, 2021, p.15
[129] Danish government, Agreement on nitrogen efforts in 2020
[130] Deal on green transition of Danish agriculture
[131] European Parliament petition: 0862/2021
[132] EEA, Water pollutant releases changes from 2010 to 2020 for the EU Member States, 29.03.2022.
[133] WISE

needed to provide biological treatment to additional 0.02 million p.e of urban wastewater (0.2%) and biological treatment with nitrogen and phosphorus removal to additional 0.07 million p.e. of urban wastewater (0.7%) (see Figure 32).

Figure 32: Proportion of urban waste water that meets all requirements of the UWWTD (collection, biological treatment, biological treatment with nitrogen and/or phosphorus removal) in compliant urban areas of the UWWTD ('compliance rate'), 2018[134]



In the 2019 EIR Denmark had four priority actions. The first was to take steps to improve monitoring of surface waters and the second was to complete the development of assessment methods for biological quality elements. The Commission cannot evaluated this until Denmark submits the third RBMP. The third priority action was to adopt legislation on nutrient pollution from agriculture to address environmental pressures and water quality issues; Denmark has done so. The fourth 2019 priority action was to integrate flood risk management cycles amongst various levels of administration.

2022 priority actions

- Maintain progress to reduce agricultural pollution.

Chemicals

The EU seeks to ensure that chemicals are produced and used in a way that minimises any significant adverse effects on human health and the environment. In October 2020, the Commission published its chemicals strategy for sustainability - 'Towards a Toxic-Free Environment'[135] which led to some systemic changes in EU chemicals legislation. The strategy is part of the EU's zero-pollution ambition – a key commitment of the European Green Deal.

The EU's chemicals legislation[136] provides baseline protection for human health and the environment. It also ensures stability and predictability for businesses operating within the internal market.

The Commission has collected information on the enforcement of REACH and CLP since 2007. In December 2020, the Commission assessed the Member States reports on implementation and enforcement of these Regulations[137], in line with REACH Article 117(1) and CLP Article 46(2). According to the latest available data, national enforcement structures have not changed much. However, it is apparent from this report that there are still many disparities in implementing REACH-CLP and notably in the area of the law enforcement. The recorded compliance levels seem to be quite stable over time, but they have worsened slightly possibly due to enforcement authorities being more effective in detecting noncompliant products/companies and more non-compliant products being put on the EU market.

In August 2021, the Commission published a measurable assessment of the enforcement[138] of the two main EU regulations on chemicals using a set of indicators tracking different aspects of enforcement.

In Denmark, responsibility for checking compliance with REACH lies with the Danish Environmental Protection Agency[139]:

As a rule, all infringements of REACH are classed as serious or very serious environmental administrative offences. If the infringement is sufficiently serious, the competent authority may decide to impose further penalties in addition to a fine. Where necessary, it may also order the provisional seizure of assets and documents.

In Denmark 4.5 person years are allocated to REACH and CLP enforcement[140]. The enforcement strategy is based on risk-based prioritisation to focus on areas with the highest risk of a breach, and areas where breaches can lead to serious risk to health and the environment. Denmark was below the EU average in the % of non-compliance cases in 2019[141] (see Figure 33).

[134] European Commission, WISE Freshwater, 2021.

[135] COM(2020) 667 final.

[136] REACH: OJ L 396, 30.12.2006, p.1. - CLP: OJ L 252, 31.12.2006, p.1 s.

[137] European Commission, Final Report, on the operation of REACH and CLP, Final report REACH-CLP MS reporting 2020.pdf (europa.eu)

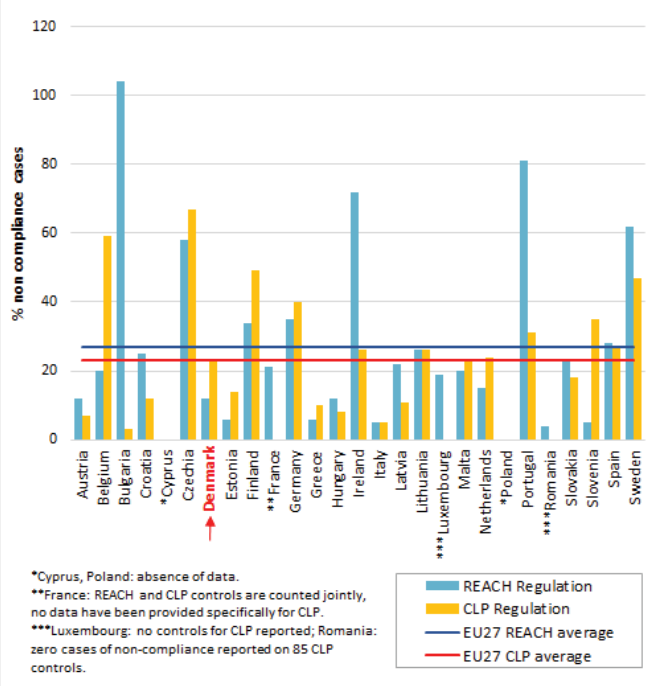
[138] European Commission, REACH and CLP enforcement: EU level enforcement indicators

[139] European Commission, Final Report, on the operation of REACH and CLP, p. 68

[140] European Commission, Final Report, on the operation of REACH and CLP, p. 74.

[141] European Commission, Final Report, on the operation of REACH and CLP, p. 78

Figure 33: Percentage % of non-compliance cases out of the total number of REACH and CLP controls during 2019 per Member State and compared to the EU average[142]



In 2021, Denmark reached a political agreement on a strategy on pesticides[143]. This was followed up in early 2022, with an agreement on biocides in agriculture[144] and on a chemicals strategy[145].

2022 priority actions

- upgrade the implementation and enforcement administrative capacity toachieve a zero tolerance for non-compliances.

[142] European Commission, Final Report, on the operation of REACH and CLP , pp.87-88, 2022.
[143] Political agreement on a pesticide strategy 2022-26
[144] Political agreements on concerted Danish efforts on biocides 2022-25
[145] Agreement on initiatives on chemicals

4. Climate action

In line with the Paris Agreement and as part of the European Green Deal, the European Climate Law sets the EU target of reaching climate neutrality by 2050 and reducing greenhouse gas (GHG) emissions by 55% by 2030 compared to 1990. The law also limits the contribution that carbon removals can make towards emission reductions in 2030 to ensure a sufficient mitigation effort.
The EU and its Member States submitted updated Nationally Determined Contribution (NDC) to the UNFCCC in December 2020.
The EU is working across all sectors and policies to cut GHG emissions and make the transition to a climate-neutral and sustainable economy, as well as addressing the unavoidable consequences of climate change.
EU climate legislation incentivises emissions reductions from power generation, industry, transport, the maritime sector and fluorinated gases (F-gases) used in products.
For road transport, EU legislation requires the GHG intensity of vehicle fuels to be cut by 6% by 2020 compared to 2010[146] and sets binding GHG emission standards for different vehicle categories[147].
Under the F-gas Regulation, the EU's F-gas emissions will be cut by two thirds by 2030 compared with 2014 levels.
From 2021, emissions and removals of GHGs from LULUCF have been included in the EU emission-reduction efforts.
The EU adaptation policy is an integral part of the European Green Deal. From 2021, Member States are required to report on their national adaptation policies[148], as the EU Climate Law recognises adaptation as a key component of the long-term global response to climate change. Member States will be required to adopt national strategies, and the EU will regularly assess progress as part of its overall governance on climate action. The updated EU adaptation strategy, published in February 2021, sets out how the EU can adapt to the unavoidable impacts of climate change and become climate resilient by 2050.

Key national climate policies and strategies

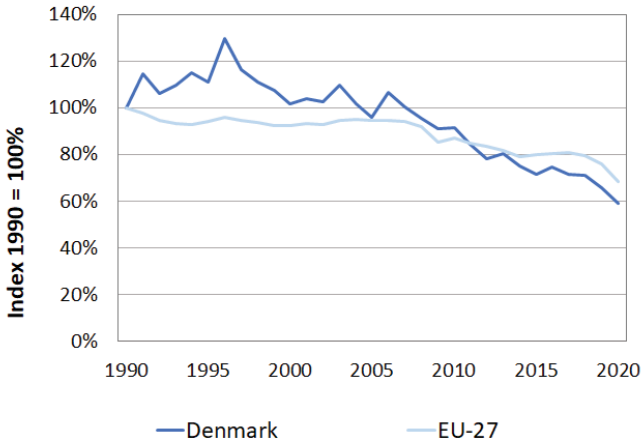
In December 2019, Denmark adopted its integrated *national energy and climate plan* (NECP) for the 2021-2030 period covering decarbonisation, deployment of renewable energy and energy efficiency. The plan will contribute to Denmark's domestic objective to reduce greenhouse gas emissions by 70% by 2030 (relative to 1990) and achieve carbon neutrality by 2050 at the latest.

In its RRP Denmark allocates 59% of available resources to climate objectives and outlines crucial reforms and investments including in relation to sustainable transport and clean and efficient production and on energy efficiency in public buildings and households. A green tax reform is also being implemented (more details in section 5).

Denmark's first *national adaptation strategy* was adopted in March 2008. It is based on the principle that all parts of society contribute to climate adaptation.

Between 1990 and 2020, economy wide greenhouse gas emissions in Denmark fell by 41%. Danish greenhouse gas emissions per person are close to the EU average (see Figure 34).

Figure 34: Total greenhouse gas emissions (incl. international aviation) in Denmark, 1990-2020



Effort sharing

For emissions not covered by the EU ETS, Member States have binding national targets under the Effort Sharing legislation[149]. Denmark's target is to reduce emissions not covered by the EU emissions trading system (such as buildings, road transport, agriculture, small industry and waste) by 20% by 2020 and by 39% by 2030, relative to the 2005 levels. Denmark has met its 2020 target (see Figure 35).

[146] The Fuel Quality Directive (Directive 98/70/EC) sets strict quality requirements for fuels used in road transport in the EU to protect human health and the environment, and to make road travel across the EU safer.
[147] Directive 98/70/EC.
[148] Article 29 of Regulation (EU) 2018/1999.

[149] Regulation (EU) 2018/842. This is for sectors currently not covered by the existing EU emissions trading sector (typically emissions from the buildings, road transport, small industry, waste, agriculture and non-CO_2 emissions from other sectors). The proposed national target will continue to cover this scope.

According to its NECP, Denmark intends to achieve reductions in line with its current Effort Sharing target for 2030.

Figure 35: Emissions and targets under the Effort Sharing Decision/ Effort Sharing Regulation in Denmark 2020 and 2030 as percentage change from 2005

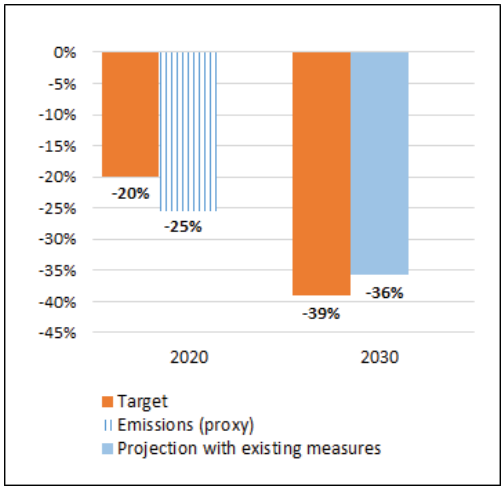
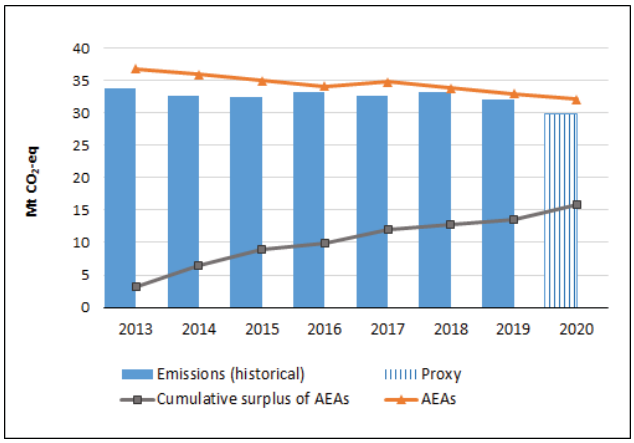


Figure 36: Emissions, annual emission allocations (AEAs) and accumulated surplus/ deficit of AEAs under the Effort Sharing Decision in Denmark 2013-2020

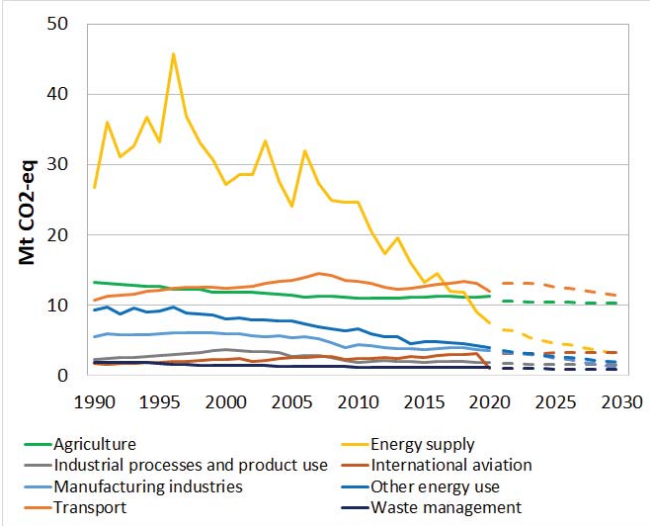


Key sectoral developments

In 2019, road transport in Denmark accounted for 26% of greenhouse gas emissions. Little progress has been made in reducing emissions from fuels and cars; compared to 2005 emissions, it only decreased by 2%. The greenhouse gases (GHG) intensity of vehicle fuels in Denmark decreased by 2.7% from 2010 to 2019. The country needs to act swiftly to meet the current reduction target of 6% by 2020.

In 2020 Denmark increased its blending mandates for the road transport sector, and by 2022 legislation has been altered to a greenhouse reduction target, which also aims to reduce the global emissions of the used bio and renewable fuels. The greenhouse gas reduction target is set to further increase in 2025, 2028 and 2030, and by 2025 the Danish government will include indirect land use criteria (ILUC), to further reduce the global impact of the use of biofuels. The Danish government presented a specific transport plan to tackle key road congestion problems and has taken action to roll out the European Rail Traffic Management System signalling on Danish railroads, which is a prerequisite for more frequent train schedules and for further electrification of the rail network. The plan also foresees investments in public transport and cycling. The Danish government also aims to phase out the sale of new traditional diesel and petrol cars as of 2030 and to increase the sale of electric vehicles.

Figure 37: Greenhouse gas emissions by sector in Denmark[150] – historical emissions 1990-2020, projections 2021-2030[151]



On buildings, it is crucial to increase energy efficiency in order to reach climate goals. In agriculture, further measures are needed to reduce emissions, both CO2 and non-CO2 emissions. Figure 37 shows emission trends by sector.

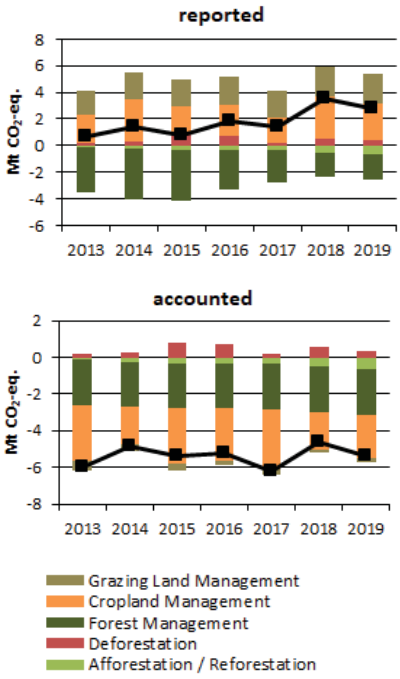
In the land use, land use change and forestry (LULUCF) sector, Denmark projects moderate net emissions by 2030. The quantities reported under the Kyoto Protocol for the LULUCF sector in Denmark show net emissions of, on average, 1.8 Mt CO2-eq for the period 2013 to 2019. In this regard, Denmark represents -0.5% of the annual average sink of -344.9 Mt CO2-eq of the EU-27. Accounting for the same period gives net average annual

[150] The sectors in the figure correspond to the following IPCC sectors: Energy supply: 1A1, 1B and 1C. Energy use in manufacturing industries: 1A2. Industrial processes and product use: 2. Transport: 1A3. Other energy use: 1A4, 1A5 and 6. Agriculture: 3. Waste: 5. International aviation: 1.D.1.a.

[151] EEA, Total GHG trends and projections.

credits of -5.4Mt CO2-eq, which corresponds to 4.7% of the EU-27 accounted sink of -115.0 Mt CO2-eq. There is an overall increasing pattern of reported net emissions. Accounted net credits show no clear trend. Denmark is one of three EU Member States with average net emissions and one of six EU Member States that show net emissions for at least one year (see Figure 38).

Figure 38: Reported and accounted emissions and removals from LULUCF in Denmark[152]



Use of revenues from the auctioning of EU ETS allowances

Total revenues from auctioning of emission allowances under the EU ETS over the years 2012-2021 exceeded EUR 1.1 billion. 100 % of auctioning revenue was spent on climate and energy purposes. In Denmark, revenues are not earmarked, for example projects have reported up to 100% of revenue each year.

2022 priority actions

- further invest in the electricity grid network to ensure that the increasing share of renewable energy can be used efficiently, for example, on system flexibility, smart grids and storage.

[152] The differences between reported and accounted emissions from LULUCF under the Kyoto Protocol are described in the '*explanatory note on LULUCF – accounted and reported quantities under the Kyoto Protocol*'.

Part II: Enabling framework: implementation tools

5. Financing

Environmental investment needs in the European Union

Financing environmental measures is essential for their success. Although most financing comes from national sources, various EU funds contribute significantly, helping to close the financing gaps.
Post-2020, environmental implementation will also be supported by the EU's COVID-19 Recovery Fund (via the RRF) and the 'do no significant harm' principle which runs across the EU budget. The renewed commitments made at COP26 (Glasgow, October-November 2021) and the Biodiversity Convention (April-May 2022)[153] will also be reflected in the EU budget.

Overall environmental investment gaps (EU27)

The EU's green transition investment needs cover a range of interlinked areas. The additional investment needs in addition to the baseline figures (i.e. the gap between what is needed and what is forecast to be invested if no additional action is taken) for climate, energy and transport were estimated at EUR 390 billion per year (EU27)[154], with a further EUR 130 billion needed to achieve the EU's core environmental objectives[155]. Climate adaptation costs can also be significant, reaching a total of EUR 35-62 billion (narrower scope) or EUR 158-518 billion (wider scope) per year[156]. Those investment needs to reflect the implementation objectives for 2020 to 2030 (except for climate adaptation the costs of which are expected to be spread over a longer time horizon).

A preliminary update of the EU's core environmental investment gap is provided in Table 1[157]. Almost 40% of the environmental investment needs relate to dealing with pollution, accounting for nearly two-thirds of the total gap if combined with water management. The investment gap in circular economy and waste is estimated to be between EUR 13-28 billion per year, depending on levels of circularity implemented. The annual biodiversity financing gap is estimated at around EUR 20 billion.

Table 1: Estimated breakdown of the EU's environmental investment gaps, by environmental objective, 2021-2030 per year[158]

Environmental objective	Estimated investment gap (EU-27, per year)	
	EUR billion	%
Pollution prevention & control	42.8	39%
Water management & industries	26.6	24%
Circular economy & waste	13.0	12%
Biodiversity & ecosystems[159]	21.5	20%
R & D & I and other	6.2	6%
Total	**110.1**	**100%**

Environmental investment needs in Denmark

Climate is a political priority in Denmark. In 2020, the Danish parliament passed a climate law with a commitment to reducing greenhouse gas emissions by 70% (compared to 1990 levels) by 2030. The Danish Minister of Finance has positioned the green transition as

[153] The Convention on Biological Diversity
[154] SWD(2021)621
[155] SWD(2020) 98 final/2
[156] SWD(2018)292.
[157] With decreases due to Brexit and some reconciliation among the objectives. Source: DG Environment, 'Study supporting EU green investment needs analysis' (ongoing, 2021-2023) and DG Environment internal analysis 'Environmental investment needs and financing in the EU's green transition' July 2020.

[158] European Commission, DG Environment, 'Study supporting EU green investment needs analysis' (ongoing, 2021-2023) and DG Environment internal analysis 'Environmental Investment needs and financing in the EU's green transition', July 2020.
[159] To meet the needs of the 2030 biodiversity strategy (Natura 2000, green infrastructure), at least EUR 20 billion a year should be unlocked for nature (COM/2020/380 final). To fully cover the strategy (including restoration) EUR 30-35 billion may be needed, indicating a gap of EUR 10-20 billion a year compared to the current baseline expenditure.

a core policy priority. The following environmental investment needs have been identified by sector.

Pollution prevention & control

The EU's First Clean Air Outlook[160] under the clean air programme estimated that the total air pollution control costs for Denmark to reach the NECD Emission Reduction Requirements [161] by 2030 amount to EUR 1 113 million per year, including EUR 807 million for capital investment (assuming it meets its 2030 climate and energy targets)[162].

The Second EU's Clean Air Outlook[163] suggests that, if all relevant legislation adopted up to 2018 (including all air pollution and the 2030 climate and energy targets set in 2018) delivered their full benefits and if Member States also implemented the measures announced in their NAPCPs, the EU would largely achieve the reductions of air pollutant emissions that correspond to the obligations under the NECD for 2030, except for ammonia (NH_3) emissions in 15 Member States, including Denmark.

Water management

According to the OECD[164], in Denmark surface water is scarce. As a result, groundwater is the main source of drinking water. Although Denmark has abundant groundwater resources, some regions experience pressure on groundwater. Urbanisation and a significant increase in demand for irrigation will increase competition for water resources, including groundwater. Intrusion of saltwater from sea level rise may affect the quality of groundwater. Despite high levels of expenditure on water supply and sanitation, there remains a small compliance gap with wastewater treatment. EU funding has provided a significant share of past public funding over the past decade. It is also estimated that Denmark will need to invest an additional cumulative EUR 1 938 million by 2030 for drinking water and sanitation over current spending levels, corresponding to a need of around EUR 190 million investment (capital expenditure) per year, most of which (over 90%) for wastewater)[165]. Moreover, the recent sixth Water Framework Directive and Floods Directive[166] Implementation Report and the financial - economic study[167] accompanying it, are also a relevant source of information in this domain.

Waste & the circular economy

According to a Commission study[168] to meet the recycling targets for municipal waste and packaging waste, Denmark still needs to invest an additional EUR 290 million (around EUR 41.5 million per year) between 2021-2027 in collection, recycling reprocessors, biowaste treatment, waste sorting facilities and waste registry digitalisation. Of this, biowaste treatment facility replacement costs are EUR 26 million for 2021-27 (or 3.7 million per year).

This does not include investment necessary for other key waste streams (plastics, textiles, furniture) or to unlock a higher uptake of circularity and waste prevention across the economy.

Biodiversity and ecosystems

The prioritised action framework (PAF) adopted by the Member States under Article 8 of the Habitats Directive present the conservation priorities for the Natura 2000 network and its supporting green infrastructure, their costs and planned funding sources for the current budget (2021-2027). Denmark has not yet submitted a finalised PAF, which was expected by the end of 2021[169].

To note that PAF costs exclude the additional costs to implement the biodiversity strategy to 2030, for instance on increased protection and restoration.

EU environmental funding 2014-2020

The multiannual financial framework (MFF) for the years 2014-2020 allocated almost EUR 960 billion (in commitments, 2011 prices)[170] for the EU. The commitment to achieving the green transition included a

[160] International Institute for Applied Systems Analysis (IIASA), *Progress towards the achievement of the EU's air quality and emissions objectives,* 2018.

[161] Covering the reductions of and the emission ceilings for 5 atmospheric pollutants, SOx, NOx, PM2.5, NH3 and VOC by 2030, compared to 2005. Source: Progress towards the achievement of the EU's air quality and emissions objectives, IIASA 2018. (page 29). Requirements are based on Directive (EU) 2016/2284.

[162] Directive (EU) 2003/35/EC repealing Directive (EU) 2011/81/EC

[163] COM(2021) 3 Final and Report Annex.

[164] OECD, *Financing Water Supply, Sanitation and Flood Protection: Challenges and Options*, 2020.

[165] OECD, *Financing a Water Secure Future*, 2022. Country Fact Sheet Denmark, Country Fact Sheet Denmark, Page 4

[166] Water Framework Directive and Floods Directive Implementation Reports – DG Environment – European Commission.

[167] European Commission, Directorate-General for Environment, Economic data related to the implementation of the WFD and the FD and the financing of measures, Final report, 2021.

[168] European Commission, Study on investment needs in the waste sector and on the financing of municipal waste management in Member States, 2019, p.61. This is an EU-wide study; a caveat to attach to reasoning in the paragraph is that the level of recycling in Denmark is not directly linked to the level of investments in recycling plants in Denmark. As a small open economy most of Denmark's recyclable waste is exported for material recycling.

[169] The N2K Group, *Strengthening investments in Natura 2000 and improving synergies with EU funding instruments report to the European Commission*, 2021.

[170] Council Regulation (EU, Euratom) No 1311/2013.

20% climate spending target and funding opportunities for the environment, in particular, under the European Structural and Investment (ESI) Funds[171]. The 2014-2020 budget was subsequently topped up with over EUR 50 billion (current prices) from REACT-EU programme for cohesion policy action against coronavirus (COVID-19)[172].

Denmark received EUR 1 955.6 million from the ESI funds over 2014-2020 to invest in job creation and a sustainable and healthy economy and environment. Planned direct environmental investment amounted to EUR 180.1 million with a further EUR 32.9 million identified as indirect environmental investment value, totalling EUR 213 million (Table 2). Figure 39 gives an overview of (planned) individual ESI funds earmarked specially for Denmark (EU amounts, without national amounts) for the 2014-2020 period and the environmental investments it comprises. REACT-EU investments are focused on green technologies and addressing climate change (carbon capture).

Figure 39: ESI Funds allocated to Denmark, including environmental investments, 2014-2020[173]

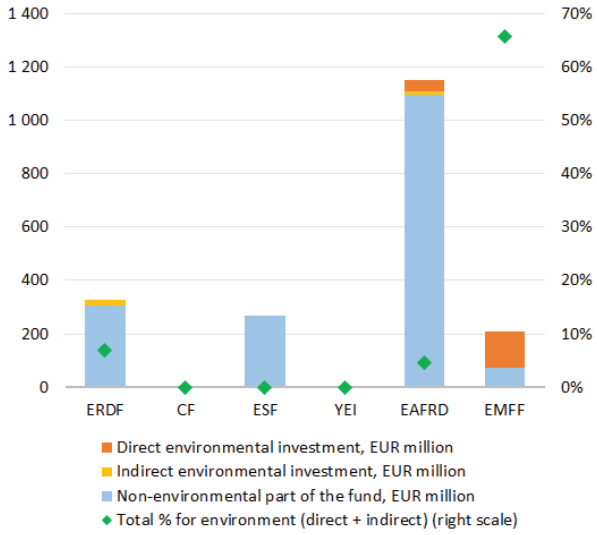


Table 2: Direct and indirect environmental investments under the ESI Funds in Denmark, 2014-2020[174]

Instrument	Allocations for the environment (EUR million)
Under Cohesion policy (ERDF)	**23.1**
Direct environmental investments	0.0
Indirect environmental investments	23.1
energy efficiency	18.5
business development, R&I	4.6
Under EAFRD/rural development	**52.8**
Direct environmental investments	43.1
climate and risk management	43.1
Indirect environmental investments	9.8
renewable energy	4.2
energy efficiency	5.6

[171] The European Structural and Investment (ESI) funds include the European Regional Development Fund (ERDF), the Cohesion Fund (CF) which does not apply to Denmark, the European Social Fund (ESF) with the Youth Employment Initiative (YEI), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF).

[172] Regulation (EU) 2020/2221.

[173] European Commission, DG Environment - DG Environment analysis based on ESI Funds Open Data Portal (cohesiondata.ec.europa.eu), Integration of environmental concerns in Cohesion Policy Funds (COWI, 2017), Regulation (EU) No 1303/2013,Regulation (EU) 2021/1060 and Implementing Regulation (EU) No 215/2014. Cut-off date for data: December 2021. Environmental investments here are captured via the combined use of intervention fields and coefficients under Regulation (EU) No 1303/2013 and Regulation (EU) 2021/1060 allowing for a more precise identification and valuation of relevant environmental investments. N.B. Indirect environmental investments are valued using the Annex I environmental coefficients of Regulation (EU) 2021/1060 (as opposed to the full value).

[174] European Commission, DG Environment - Data analysis. The values of environmental investments identified here in the specific environmental areas may differ from the tracking values at cohesiondata.ec.europa.eu, e.g. for clean air or biodiversity due to two factors: the set of environmental coefficients used and the range of funds assessed. DG Environment's analysis here covered the full range of ESI Funds. See also previous footnote.

Under EMFF	**137.0**
Direct environmental investments	137.0
environment protection & resource efficiency	137.0
Indirect environmental investments	0.0
Under ESI Funds total	**213.0**
Direct environmental investments	180.1
Indirect environmental investments	32.9

Funding for the environment from the ESI funds has also been supplemented by other EU funding programmes available to all Member States, such as, the LIFE programme, Horizon 2020 or loans from the European Investment Bank (EIB), that add up to an estimated total of EU environmental financing of EUR 316 million for Denmark in 2014-2020

The LIFE programme[175] is entirely dedicated to environmental and climate objectives. It finances demonstration and best practices to prepare the roll-out ofgreen solutions. Between 2014-2020 period, Denmark received EU funding for 11 LIFE projects (for nature and environment) with EUR 49 million from the LIFE programme (out of 1 028 EU27 LIFE projects with a total EU contribution of EUR 1.74 billion).

In 2014-2020, the Horizon 2020 programme allocated some EUR 53.6 million to Denmark for the environment, in particular, for climate action, the circular economy and natural resources, with a total environmental share of 3.1% from Denmark's Horizon 2020 allocation[176]. Denmark did not use funding under the European Fund for Strategic Investments,for projects with a dedicated environmental objective[177]. The environment-related EIB loans to Denmark amounted to 0.5 million (supporting waste and water), out of an overall EUR 4.7 billion EIB lent to Denmark in the period[178][179]. The country ranks 17 in size in terms of total EIB lending.

In 2020, the EIB provided EUR 24.2 billion to fight climate change, 37% of its total financing and EUR 1.8 billion (3% of financing) for the environment[180].

[175] European Commission, LIFE Programme.
[176] EASME
[177] Approved and signed EFSI financing - EIB, 2015-2020
[178] EIB loans in EU countries in 2014-2020.
[179] EIB, Activity Report, 2021.
[180] The EIB Group jointly works with the European Commission in implementing several programmes that finance environmental implementation: InvestEU, the successor of EFSI, Pillar II and III of the Just Transition Mechanism. The EIB Group is a key implementing partner for InvestEU with responsibility for managing 75% of the overall budget capacity of the mandate.

EU environmental funding 2021-2027

The 2020 European Green Deal investment plan calls for upon EUR 1 trillion in green investments (public and private) by 2030. The EU's multiannual budget for 2021-2027 and the NextGenerationEU (NGEU) Fund will mobilise EUR 2.018 trillion (in current prices) to support the COVID-19 recovery and the EU's long-term priorities, including environmental protection[181]. Following the EU Green Deal's[182] 'do no harm' pledge and the Interinstitutional Agreement on the 2021-2027 MFF[183], 30% of the EU budget will support climate action efforts and 7.5% (as of 2024) and 10% (as of 2026) will support biodiversity. These latter targets require increased programming of financial resources for biodiversity, specifically under the 2021-2027 Cohesion policy and the 2023-2027 common agricultural policy.

Sustainable finance significantly increases transparency on environmental sustainability (a goal promoted by the EU Taxonomy)[184], strengthens non-financial reporting requirements and facilitates green bond issuance (by the EU green bond standard[185]). Reinforced by the renewed sustainable finance strategy (2020)[186] it will increase investment flows to climate and environmental action. To help finance climate adaptation measures, the new strategy on adaptation to climate change[187] can help close the insurance protection gap from climate-related events that are uninsured[188]. The EIB will align 50% of its lending with climate and environment by 2025[189] with an EUR 250 billion contribution to the Green Deal investment plan by 2027.

Table 3: Key 2021-2027 EU funds allocated to Denmark (current prices)

Instrument	Country funding allocation (million EUR)

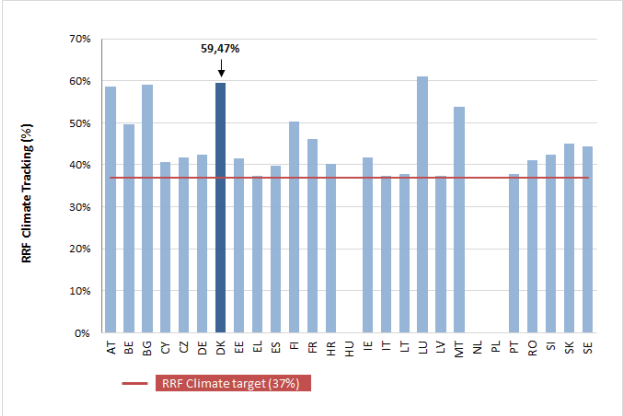
[181] European Commission, 2021-2027 long-term EU budget & NextGenerationEU.
[182] COM/2019/640 final.
[183] Interinstitutional Agreement, OJ L 433I.
[184] European Commission, EU taxonomy for sustainable activities
[185] EU Green Bond Standard - 2021/0191 (COD).
[186] COM (2021) 390 Final - European Commission, Strategy for Financing the Transition to a Sustainable Economy.
[187] COM(2021) 82 final.
[188] The strategy would support improved insurance gap coverage including through the natural catastrophe markets as reflected with the EIOPA (the Association for European Insurance and Occupational Pension Authorities) dashboard on insurance protection gap for natural catastrophes. See: The pilot dashboard on insurance protection gap for natural catastrophes).
[189] EIB Climate Bank Roadmap 2021-2025, November 2020.

Cohesion policy ERDF ESF+ ETC (ERDF)	**Total: 518.6**[190] 247.2[191] 119.6 153
Just Transition Fund	**88.9** [192]
EAFRD/rural development under CAP strategic plans 2023-2027[193]	**379.7**[194]
European Maritime, Fisheries and Aquaculture Fund (EMFAF)	**201.0**[195]
Recovery and Resilience Facility (RRF) 2021 – 2026[196]	**1 551.4**[197] (grants)

As part of the EU's Recovery Package, Denmark requested EUR 1.511 billion from the RRF, all in the form of grants. A 59.5% share of RRF funding for Denmark relates to measures that do contribute to the country's climate and environmental objectives. This puts Denmark among the top Member States (EU average: 45.3%). Denmark also stands above the 37% climate expenditure target, the minimum level required under the RRF Regulation (see Figure 40)[198]. The main green priorities under the RRP for Denmark are to achieve a green transition in agriculture, energy efficiency and green heating, green tax reform, sustainable transport and to fund green research and development.

Overall, the plan ensures that direct actions can be taken at local level to contribute to the green transition, while protecting or restoring the environment, and in compliance with the Do No Significant Harm (DNSH) principle [199].

Figure 40: Climate expenditure in RRPs, 2021-2026[200]



The partnership agreement 2021-27 for Denmark allocates ERDF funding to invest in promoting the circular economy and EMFAP to restore water bodies to good ecological status, both under priority objective 2 (low carbon). Denmark satisfies the enabling condition for a waste management plan allowing to fund investments in the circular economy. However, the enabling condition for a prioritised action framework for investments in nature and biodiversity is not fulfilled as a final version yet to be submitted.

Under the NextGenerationEU Fund, the Commission will issue up to EUR 250 billion of EU green bonds (one third of the NGEU) until 2026 that meet the general spirit of the DNSH principle. But this will not be subject to the current delegated acts on the EU Taxonomy and will not fully align with the proposed EU green bond standard.

In addition to EU funds earmarked specifically for Denmark in the 2021-2027 period, there are also funding programmes available at EU level and are open to all Member States. These include, among others, the LIFE programme[201] (EUR 5.4 billion), Horizon Europe (EUR 95.5 billion)[202], the Connecting Europe Facility[203] (EUR 33.7 billion)[204] and the funds due to be mobilised under

[190] European Commission, 2021-2027 Cohesion policy EU budget allocations.
[191] N.B. it is expected to transfer EUR 106 million from ETC to ERDF giving a total of EUR 247.2 million.
[192] European Commission, 2021-2027 Cohesion policy EU budget allocations.
[193] European Commission, CAP strategic plans.
[194] Regulation (EU) 2021/2115, Annex XI.
[195] Regulation (EU) 2021/1139, Annex V.
[196] The actual reforms and investments under the RRF must be implemented by 31 December 2026.
[197] Council Implementinng Decision, FIN 515.
[198] Regulation (EU) 2021/241.
[199] COM(2021) 1054 final.

[200] European Commission. The contributions to climate objectives have been calculated using Annex VI of the RRF Regulation (EU) 2021/241.
[201] European Commission, LIFE Programme.
[202] European Commission, Multiannual financial framework 2021-2027 (in commitments) - Current prices.
[203] The CEF (Transport) includes also EUR 11.3 billion transferred from the Cohesion Fund. 30% of the transferred amount will be made available, on a competitive basis, to all Member States eligible for the Cohesion Fund. The remaining 70% will be allocated in line with the national allocations until 31 December 2023. Any unspent amount, by that date, under national allocations will be pooled to support all Cohesion Fund's Member States.
[204] Regulation (EU) 2021/1153.

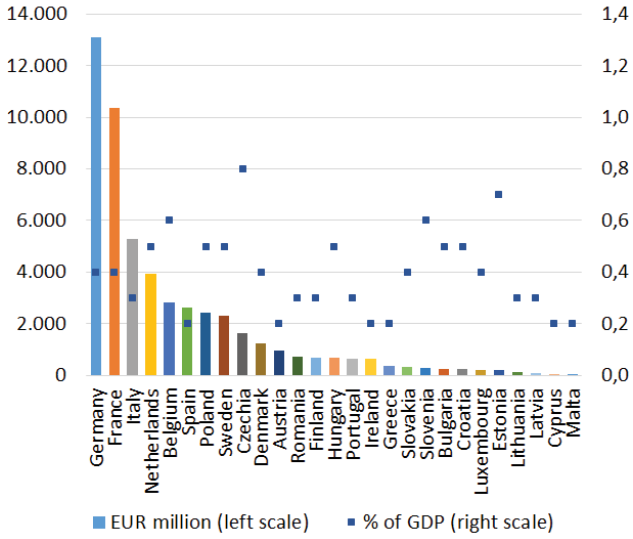
InvestEU[205]. They will also support the green transition, including research and innovation projects on environmental protection (Horizon Europe)[206], clean transport and energy (the Connecting Europe Facility)[207] or sustainable infrastructure (InvestEU)[208].

National environmental protection expenditure

Total national spending on environmental protection (all current and capital expenditure)[209] in the EU27 was EUR 272.6 billion in 2020, representing 2% of the common GDP and quite stable over time. Although in absolute figures expenditure is concentrated in a few countries , as a share of GDP, most countries spend between 1-2%; Denmark spends around 2%.

Of the above total, the EU27's capital expenditure (Capex) on environmental protection (i.e. investment) amounted to EUR 56.3 billion in 2018, falling to EUR 54.5 billion in 2020, representing around 0.4% of GDP. Most Member States invested 0.2-0.5% of their GDP in environmental protection. Denmark invested 0.4% of GDP in 2018. During 2014-2020, this totalled around EUR 376 billion of environmental investment in the EU27, and EUR 9.1 billion for Denmark (see Figure 41).

Figure 41: Direct and indirect environmental protection investments in the EU-27 (EUR million and % of GDP), 2018[210]

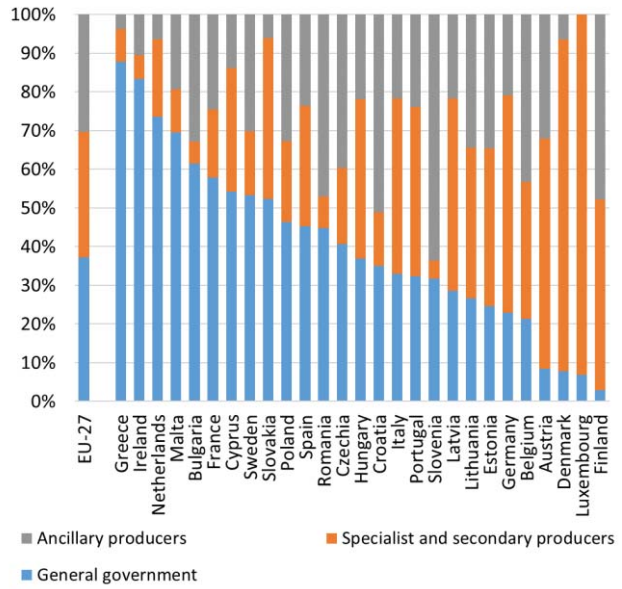


By institutional sector, 7.7% of Denmark's environmental protection investments (capital expenditure) came from the general government, 86% from specialist producers (of environmental services, mainly waste and wastewater companies and 6.4% from the business sector's (ancillary producers, i.e. whose environmental activities are usually ancillary to the core ones) expenditure. At EU level, 37% comes from governments, 33% from specialist producers and 30% from industry (business).

[205] The InvestEU Fund is expected to mobilise over EUR 372 billion in investment through an EU budget guarantee of EUR 26.2 billion to back the investment of financial partners such as the EIB Group and others.
[206] European Commission, Horizon Europe.
[207] European Commission, Connecting Europe Facility.
[208] European Union, InvestEU.
[209] At economy level, including final consumption, intermediate consumption and capital expenditure of households, corporations and governments related to environmental protection goods and services. It excludes EU funds, while may include some international expenditure in addition to domestic expenditure. Data source: Environmental Protection Expenditure Accounts (EPEA), Eurostat. EPEA accounts are based on the CEPA 2000 classification, excluding climate, energy and circular economy

[210] Eurostat, Environmental Protection Expenditure Account, 2021.

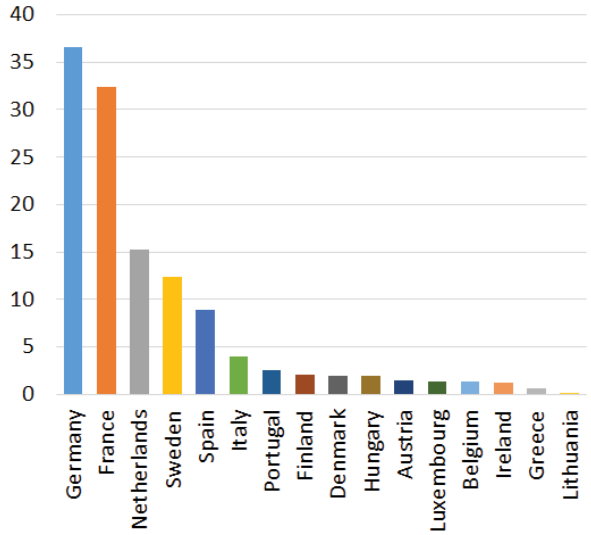
Figure 42: EU-27 Member States' environmental protection investments (Capex) by institutional sectors (Total economy = 100%), 2018[211]



A breakdown of investment by environmental topic is only partially available, at the level of institutional sectors (rather than at economy level), due to different reporting patterns[212]. At Denmark's general government level, a significant share of environmental protection investments (around 60%) went on environmental research and development and 21% on biodiversity in 2018 (based on available data that are not comprehensive or fully validated). In terms of the country's specialist producers, 76% of investment were received by wastewater and 24% by waste management bodies. In the business sector, 41% of investment went on air protection, 20% on wastewater and 9% on waste, the most significant areas of investment (see Figure 42).

The total annual European green bond issuance in 2020 was USD 156 billion (EUR 137 billion[213]), rising from USD 117 billion (EUR 105 billion) in 2019, including some non-EU European countries. By EU27 Member States only 2020 annual green bond issuance was EUR 124 billion, including EUR 1.95 billion issued by Denmark. 83% of the green bonds issued by European countries served energy, buildings or transport objectives between 2014-2020, 8% supported water and waste, and an additional 6% for land use – with links to ecosystem conservation & restoration, based on the Climate Bonds Taxonomy being broadly similar to the EU Taxonomy[214] (see Figure 43).

Figure 43: Annual EU green bond issuance in 2020 (EUR billion)[215]



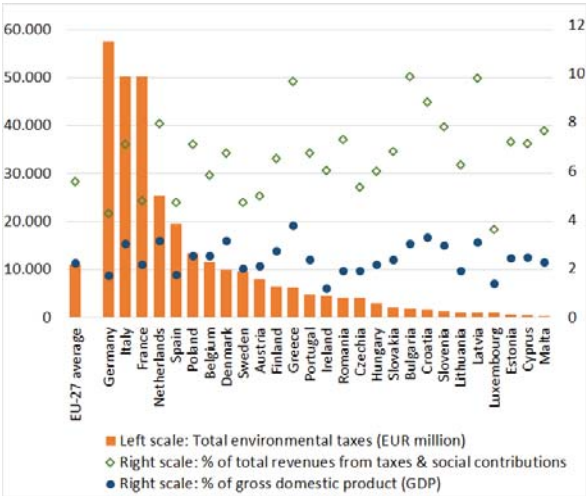
Green budget tools

Green taxation and tax reform

In absolute terms, Denmark's revenue from environmentally related taxes remains around the EU average in 2020, as shown in Figure 44. Within this, energy and transport taxation represent the highest share with 52.2% and 42.5% in 2020, while pollution/resource tax accounted for 5.3%. In terms of % of GDP, environmental taxes accounted for 3.17% in 2020, the third highest in the EU (EU average is 2.24 %).

[211] Eurostat, Environmental Protection Expenditure Accounts (env_epe).
[212] Data reporting differs for the three institutional sectors, leading to aggregation difficulties. Specialist companies provide comprehensive data across all environmental areas (CEPA 1-9), while this is less the case for general government and industry that often report (the non-obligatory) data in merged categories only (making it difficult to provide a breakdown) or not at all.
[213] At Eurostat's annual average EUR/USD exchange rates.
[214] Interactive Data Platform at www.climatebonds.net. Further information on Climate Bonds Taxonomy.
[215] Climate Bonds Initiative, 2022.

Figure 44: Environmental taxes in the EU-27, 2020[216]



The 2019 European Green Deal underlines that well-designed tax reforms can boost economic growth and resilience, foster a fairer society and a just transition, by sending the right price signals and incentives to economic actors. The Green Deal creates the context for broad-based tax reforms, for the removal of fossil fuel subsidies, shifting the tax burden from labour to pollution, and for factoring in social considerations[217]. The application of the 'polluter pays principle' [218] stipulating that polluters should bear the cost of measures to prevent, control and remedy pollution is facilitated by the EU Commission's TSI flagship on greening taxes.

In Denmark there are many examples of green tax reform[219], notably on phosphorus and pesticides. Denmark could consider bringing in a system of tradable livestock rights to reduce ammonia.

Environmentally-harmful subsidies

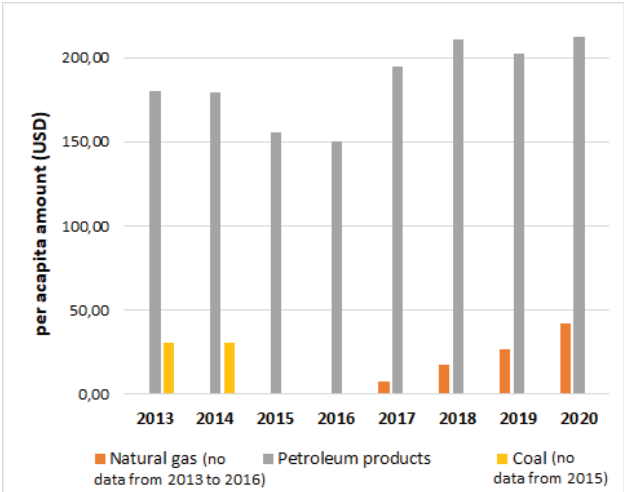
Addressing and removing environmentally harmful subsidies is a further step towards wider fiscal reforms[220].

Fossil fuel subsidies are costly for public budgets and undermin the achievement of the Green Deal objectives. In many cases they also go against incentives for green investments and distort the playing field. Fossil fuel subsidies fluctuate around EUR 55 billion in the EU since 2015. They rose by 4% between 2015 and 2019, however some countries, such as Latvia, Lithuania Sweden, Greece or Ireland, managed to decrease them. In the EU, subsidies for petroleum products, in sectors such as transport and agriculture, continued to rise over this period, whereas subsidies on coal and lignite fell, largely owing to the falling role of solid fuels in electricity generation. As a share of GDP, fossil fuel subsidies ranged from 1.2% in Hungary to less than 0.1% in Luxembourg in 2019 (0.4% on EU average). Total fossil fuel subsidies amounted to EUR 1.4 billion in Denmark in 2019 – representing 0.4% of GDP (around the EU-average).

In 2020, the total amount of fossil fuel subsidies fell to EUR 52 billion (due to falling consumption trends amid the COVID-19-related restrictions). Unless action is taken by the Member States , these subsidies are likely to rebound as economic activity picks up from 2020[221].

Further details of the situation in Denmark are shown in Figure 45.

Figure 45: Trends in natural gas, petroleum products and coal subsidies in Denmark[222]



% GDP	2013	2014	2015	2016	2017	2018	2019	2020
Natural gas	No data	No data	No data	No data	0,01	0,03	0,04	0,07
Petroleum products	0,30	0,29	0,29	0,27	0,34	0,34	0,34	0,34
Coal	0,05	0,05	No data	No data	No data	No data	No data	No data

Current green budgeting practices

Green budgeting encompasses multiple climate and environmental tagging and tracking practices in budgets with some Member States already using green budgeting

[216] Eurostat, Environmental taxes accounts (env_eta).
[217] European Commission, The European Green Deal, COM (2019/640 final), p.17
[218] Article 191(2) of the Treaty on the Functioning of the European Union: "Union policy on the environment (…) shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay".
[219] European Commission, 2021, Ensuring that Polluters Pay - Denmark
[220] European Commission, Study on assessing th environmental fiscal reform potential for the EU 28, 2016.
[221] State of the Energy Union reports, COM(2021) 950 and Annex
[222] OECD, Fossil Fuel Subsidy Tracker..

elements.[223] Green budgeting helps identify and track green expenditure and green revenues to increase transparency on the environmental implications of budgetary policies, improve policy coherence and supporting green policies (including climate and environmental objectives).[224]

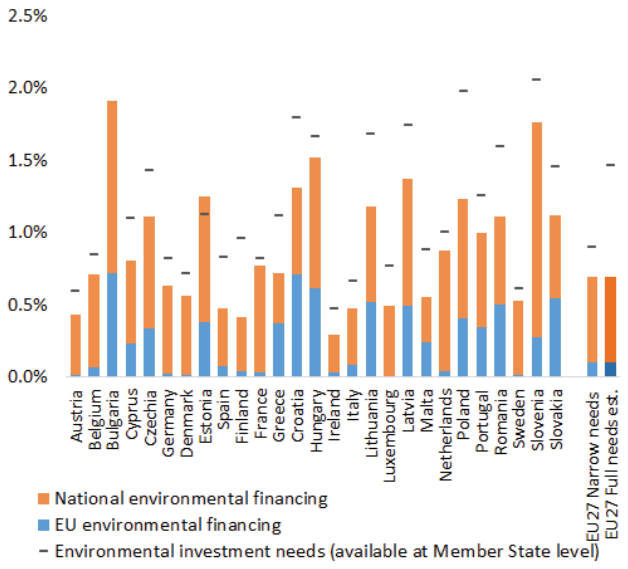
The EU has also developed climate proofing and sustainability proofing guidance to assess project eligibility and compliance with environmental legislation and criteria.[225] The European Commission drew up a green budgeting reference framework[226] and launched a technical support flagship (TSI) on green budgeting in 2021 to assist Member States in drafting or developing national green budgeting frameworks to improve policy coherence and for the green transition. Denmark participated in the European Commission's green budgeting project with a training 24 February 2022[227].

Denmark has a new macroeconomic model, GreenREFORM, under development (a dynamic computable general model). The aim with the model is to enable the fiscal and economic planning to support the green transition. The model is being developed by the independent governmental institution the DREAM group, and the project is primarily financed by the Danish Ministry of Finance, which also contributes to the model development and intends to implement and use the model when it is ready. The model is designed to assess the future economic and fiscal impacts of climate and environmental policies, and the climate and environmental impacts of economic policies. GreenREFORM describes the energy use and emission of pollutants in the energy and air emissions accounts produced by Statistics Denmark from all Danish businesses, households, and the public sector. The model also describes the effect on emissions from environmental taxes, subsidies, and other regulations. The model produces annual projections up to 2100, which aids medium-to-long-term fiscal and economic analysis. The projections enable an assessment of the effect of future economic developments on the climate and environment and whether these developments are consistent with climate and environmental targets. This functionality will enable Denmark to position climate and environmental policy centrally when preparing its medium-term fiscal framework[228].

Overall financing compared to the needs

The overall environmental financing for investments is estimated to reach 0.6-0.7% of GDP in the 2014-2020 period in the European Union, taking into account major EU funds and national financing. This ranged from 0.3% (Ireland) to 1.91% (Bulgaria), linked to the level of environmental challenges in the Member States. In the 2021-2027 period, the overall EU environmental investment needs are estimated to range between 0.9-1.5% of the projected GDP (2021-2027), suggesting a potential environmental financing gap of 0.6-0.8% of GDP at EU level, previous financing levels maintained (see Figure 46)[229].

Figure 46: Total environmental financing baseline (2014-2020) and estimated needs (2020 - 2030) in the EU27 (% of GDP)[230]



Denmark's environmental financing for investments is estimated to have been 0.57% of GDP in 2014-2020, almost exclusively from national sources. From 2021-2027, the environmental investment needs of the

[223] European Commission, Green Budgeting Practices in the EU: A First Review, 2021. The term tagging is explained on p.7.
[224] European Commission, European Commission Green Budgeting Reference Framework. European Commission, Green Budgeting in the EU Key insights from the 2021 Commission survey.
[225] European Commission, Technical guidance on sustainability proofing for the InvestEU Fund.
[226] European Commission, Green Budgeting Reference Framework, based on the review of the OECD Paris Collaborative on Green Budgeting initiative, 2017.
[227] Green budgeting TSI participation
[228] OECD, European Commission, IMF, 2021 Green Budgeting: Towards Common Principles, p.12
[229] Source: DG Environment data analysis. EU financing sources covered: ESI Funds (ERDF, CF, ESF, YEI, EAFRD, EMFF), Horizon 2020, LIFE, EFSI (EU amount), EIB loans. National financing: total national environmental protection capital expenditure (investments) - source: Eurostat EPEA dataset. Cut-off date for data: end 2021. N.B. The total financing may be higher, in particular through further indirect investments, requiring further analysis in the future.
[230] Eurostat; ESI Funds Open Data, 2021.

country are estimated to be at least 0.72% of GDP (with partial information available at country level, excluding e.g. nature protection costs in the lack of a finalised PAF, water protection and 'higher circularity needs' for example related to 2022 Commission proposal on sustainable product policy and eco-design[231]), suggesting an environmental financing gap of at least 0.15% of the GDP, likely to be higher when also accounting for needs currently estimated at EU level only (e.g. water protetion, circularity, biodiversity strategy etc.) to be addressed by mobilising additional financing for environmental implementation priorities.

2022 priority actions

No priority actions were proposed for Denmark in the 2019 and none are proposed for 2022. It can be highlighted that, based on the data available, the share of private environmental financing in Denmark is high (over 80%) that can provide useful examples for other Member States on using more effectively the involvement of private financing.

[231] European Commission, Sustainable product policy and design

6. Environmental governance

Information, public participation and access to justice

Citizens can more effectively protect the environment if they can rely on the three 'pillars' of the Aarhus Convention:
(i) access to information;
(ii) public participation in decision making;
(iii) access to justice in environmental matters.
It is of crucial importance to public authorities, the public and businesses that environmental information is shared efficiently and effectively[232]. Public participation allows authorities to make decisions that take public concerns into account. Access to justice is a set of guarantees that allows citizens and NGOs to use national courts to protect the environment[233]. It includes the right to bring legal challenges ('legal standing')[234].

Environmental information

This section focuses on Denmark's implementation of the INSPIRE Directive[235]. The aim of the INSPIRE (Infrastructure for Spatial Information in Europe)[236] is to establish a European spatial data infrastructure to share environmental spatial information between public authorities across Europe, assist in policy-making across boundaries and facilitate public access to this information. Geographic information is needed for good governance at all levels and should be readily and transparently available. Denmark's implementation of the INSPIRE Directive could be better. Slow progress has been made on data identification and documentation, and implementation levels are good. However, more efforts are needed to make data more widely accessible (see Table 4).

Table 4: Country dashboard on the implementation of the INSPIRE Directive, 2016-2020[237]

	2016	2020
Effective coordination and data sharing		
Ensure effective coordination	■	■
Data sharing without obstacle	■	■
INSPIRE performance indicators		
i. Conformity of metadata	■	■
ii. Conformity of spatial data sets[238]	■	■
iii. Accessibility of spatial data sets through view and download services	■	■
iv. Conformity of network services	■	■

Legend

■ Implementation of this provision is well advanced or (nearly) completed. Outstanding issues are minor and can be addressed easily. Percentage: >89%

■ Implementation of this provision has started and made some or substantial progress but is still not close to be complete. Percentage: 31–89%

■ Implementation of this provision is falling significantly behind. Serious efforts are necessary to close implementation gap. Percentage: <31%

Denmark had a priority action in 2019 on the need to improve access to spatial data and services and make stronger links to the country INSPIRE portals, where some progress can be seen. Therefore no priority action is proposed in 2022.

Public participation

Planning authorities responsible for implementing Environmental Impact Assessment (EIA) may be at national, municipality, or local level, depending on the nature of the project. The planning authority in question must publish the hearing on its own website, and the process may be conducted using the national portal "*Høringsportalen*"[239]. The long-term ambition is to make *Høringsportalen* a single point of entry for all public

[232] The Aarhus Convention, the Access to Environmental Information Directive (Directive 2003/4/EC) and the INSPIRE Directive (Directive 2007/2/EC) together create a legal foundation for the sharing of environmental information between public authorities and with the public. This EIR focuses on the INSPIRE Directive's implementation.
[233] These guarantees are explained in the Commission Notice on access to justice in environmental matters, OJL 275, 18.8.2017 and a related Citizen's Guide.
[234] This EIR focuses on the means implemented by Member States to guarantee rights of access to justice, legal standing and to overcome other major barriers to bringing cases on nature and air pollution.
[235] INSPIRE
[236] INSPIRE
[237] INSPIRE knowledge base Denmark, 2021.
[238] In 2016, the deadlines for implementation of the spatial data interoperability were still in the future: 23.11.2017 for Annex I data and 21.10.2020 for Annex II and III data. This conformity indicator will in many cases never reach 100% as most countries provide as-is-data sets in addition to the INSPIRE harmonised data sets
[239] Høringsportalen

hearings in Denmark irrespective of the competent authority (government, national authorities, municipal councils etc.). Currently the use of the portal is only mandatory for state authorities in all EIA and Strategic Environment Assessment (SEA) procedures, and only for limited cases for municipalities and local authorities. The wide range of administrations responsible for EIA and SEA procedures results in a lack of available data at national level on public participation. Extending the use of the national portal would clearly facilitate data collation and publication on participation rates.

As regards the EIA Directive, Denmark is currently subject to an infringement procedure[240]. The shortcomings include unclear national rules for adopting projects by legislative acts, incorrect application of the provisions governing consultation of the public and authorities and incorrect national provisions on the required content of development consent decisions.

Access to justice

Physical and legal persons, including NGOs, may challenge environmental adminsitrative decisions.

The Danish Act on Environmental Assessment applies a very broad scope and definition for any type of plans or programmes, including informal plans or programmes. The administrative appeals boards provide information on how to submit an administrative appeal in environmental matters. In general, a digital platform must be used for administrative appeals. The Environmental Protection Agency (EPA) also provides information on access to justice in environmental matters.

In general, there are no options for administrative appeals regarding executive regulations and/or generally applicable legally binding normative instruments. If, however, such executive regulations are to be considered a plan or a programme falling under the scope of the SEA requirements under the Act on Environmental Assessment, the rules on administrative appeals in the Environmental Assessment Act will apply as regards the environmental assessment.

There are no specific rules however on judicial review of executive regulations. The general rule on judicial review in Section 63 of the Danish Constitution also includes access to review executive regulations and their legality. Thus, executive regulations can only be challenged in courts e.g. as regards their legal basis in the relevant legislation and their compliance with EU law.

[240] European Commission, October 2021 infringements package key decisions

It can be concluded that Denmark has a system of regular supervision of regulatory legally binding acts but it is hardly accessible for members of the public and NGOs, who can only call alert bodies or officials entitled to initiate an extraordinary supervision procedure.

2022 priority actions

- make spatial data more widely accessible and prioritise environmental datasets in the implementation of the INSPIRE Directive, especially those identified as high-value spatial datasets for implementing environmental legislation;
- improve access to courts by the public concerned when challenging administrative or regulatory decisions and omissions, in particular under water, nature and air quality;
- consider collating and publishing data from Høringsportalen (national hearings portal) on public participation.

Compliance assurance

Environmental compliance assurance covers all the work undertaken by public authorities to ensure that industries, farmers and others fulfil their obligations to protect water, air and nature, and manage waste[241].
It includes support measures provided by the authorities such as:
(i) compliance promotion [242];
(ii) inspections and other checks that they carry out, i.e. compliance monitoring [243];
(iii) the steps that they take to stop breaches, impose sanctions and require damage to be remedied, i.e. enforcement[244].
Citizen science and complaints enable authorities to focus their efforts better. Environmental liability[245] ensures that the polluter pays to remedy any damage.

Compliance promotion and monitoring

Comprehensive information is available online on technical and regulatory aspects of the Nature Directives and the Nitrates Directive. In addition, the EPA has published guidance to help livestock farmers understand

[241] The concept is explained in detail in the Communication on EU actions to improve environmental compliance and governance COM(2018)10 and the related Commission staff working document, SWD(2018)10.
[242] This EIR focuses on the help given to farmers to comply with nature and nitrates legislation.
[243] This EIR focuses on inspections of major industrial installations.
[244] This EIR focuses on the availability of enforcement data and co-ordination between authorities to tackle environmental crime.
[245] The Environmental Liability Directive, 2004/35, creates the framework.

and comply with the environmental requirements of the Nitrates Directive[246]. Farmers can find guidance on matters such as permit requirements and other regulatory requirements, and administrative procedures, in a searchable format. Although government information on nature protection specifically aimed at farmers is limited, the EPA website on Natura 2000 includes a section addressed to landowners of Natura 2000 sites with a section about nature in agriculture[247].

Responsibility for permitting under the IED, and for monitoring compliance, is shared between the EPA, and municipalities, which are responsible for some specific categories of industry. The EPA sets out formal guidelines for inspections, including those carried out by municipalities. Information on inspections, including reports, and on other permitting activities is submitted to the EPA via its Digital Environmental Administration (DMA)[248]. Reports are not published, but may be requested by members of the public under freedom of information legislation. Denmark does not publish environmental statistics or annual activity reports linked to these environmental inspections.

Complaint handling and citizen science

The EPA has guidance on submitting complaints, and contact information, on its website[249]. The various departments are listed with links to their functions, contact information and opening hours. Information is also provided on the confidentiality and anonymity of complaints in order for citizens to feel safe in their communication with the authorities. There is also specific 'whistleblower' information for citizens who want to contact an authority anonymously[250]. The information on the EPA website is, however, brief and may not be easy for people to navigate.

The Environment and Food Complaint Board has more detailed and accessible information on its website[251]. Most significantly it contains a 'Klageportalen' (Complaint Portal) that provides a secure access to submit complaints. The Board's website also gives comprehensive guidance on the use of the Portal, and explains what happens after submitting a complaint[252].

Statistics on the use of public complaints or whistleblowing cases do not appear to be compiled.

[246] Danish EPA Guidance on livestock farming
[247] Nature in Agriculture f
[248] Digital Environmental Administration
[249] Contact the Danish Environmental Protection Agency
[250] The Ministry of the Environment's handling of inquiries from citizens about possible offences
[251] Environment and Food Complaints Board
[252] FAQ on "Klageportalen

Enforcement

Denmark does not keep a publicly available database of environmental prosecutions. The EPA formerly published an annual overview of environmental criminal cases but it has not provided this information for years.

Cooperation and coordination among the Danish bodies responsible for tackling environmental crime appears to function well, despite the lack of formal agreements. The police have developed informal cooperation with the EPA to better prepare cases that are to be referred to them. The Director of Public Prosecutions Office runs courses on handling environmental crime cases, which it also makes available also to staff from the EPA, police, and courts service.

Environmental Liability Directive (ELD)

The EPA has a web page specifically for ELD cases[253]; although only two cases has been published so far, as only 'serious' damages are considered falling within the ELD. Prevention cases do not seem to be included. In each case, a full description of the investigation carried out and final decision are provided. Neither appear to have resulted in financial costs to the private sector. There does not appear to be an overview of environmental damage cases under other legislation. Denmark has not updated its legislation on financial security since the 2019 EIR, although some Danish insurance companies do offer cover for ELD liabilities. Furthermore, the Commission urged Denmark in 2019 to correctly incorporate rules on environmental liability into its national law, to ensure sufficient protection for the public. This case is now closed, but Denmark is still subject to an infringement procedure for failure to correctly transpose Article 12(1), first sub-paragraph of the ELD with regard to the prevention and remedying of environmental damage as interpreted by the CJEU in Case C-529/15.

In 2019 Denmark had four priority actions. The first was to better inform the public about compliance promotion, monitoring and enforcement, where there has been limited progress. The second and third were related to the ELD on extending insurance cover and improving financial security for liabilities and publishing information on environmental damage, where there has been limited progress. The fourth was on publishing information on the outcome of enforcement action and the follow-up of detected cross-compliance on breaches on nitrates and nature; here too there has been limited progress.

2022 priority actions

[253] Environmental damage (Environmental Liability Directive)

- improve the availability of practical information for farmers on compliance with the Nature Directives;
- improve the publicly available information on the follow-up to complaints and to environmental inspections, including through the publication of regular summary data;
- improve the information provided on ELD cases, including data on costs.

Effectiveness of environmental administrations

Those involved in implementing environmental legislation at EU, national, regional and local levels need to have the knowledge, tools and capacity to ensure that the legislation and the governance of the enforcement process bring about the intended benefits.

Administrative capacity and quality

Denmark ranks first out of 180 in the 2020 Environmental Performance Index[254]. At present, the number of complaints and infringements in the environmental field can be considered below the EU average.

Denmark has an advanced use of digital or innovative solutions in environmental policy as mentioned under Compliance Assurance, under the Technical Support Instrument and also on water policy (see section 3).

Coordination and integration

As mentioned in the 2017 and 2019 EIR Reports, the transposition of the revised EIA Directive[255] provided an opportunity to streamline the regulatory framework on environmental assessments. Denmark transposed the revised Directive; there is currently an infringement open, covering public consultation.

The Commission encourages the streamlining of the environmental assessments in order to reduce duplication and avoid overlaps in environmental assessments applicable to projects. Moreover, streamlining helps reducing unnecessary administrative burden and accelerates decision-making, without compromising the quality of the environmental assessment procedure[256].

In the 2019 EIR Denmark had a priority action on further improving its overall environmental governance. The evidence presented here is that there has been some progress, so no priority action is proposed for 2022.

Reforms through the Commission's technical support instrument

The Commission supports environmental implementation and the green transition, not only through the EU financing programmess, but also granting technical assistance such as the technical support instrument (TSI). The Commission's 2021 TSI supported a project related to energy transition in Denmark. Then under the TSI 2022, Denmark is running two projects of environmental relevance: i) the development of resilient, innovative and human centred digital government service, which is applied to the circular economy, and ii) the Digitilisation of the East Atlantic Flyway for birds in the Wadden Sea (together with Germany and The Netherlands).

TAIEX EIR peer to peer projects

The TAIEX EIR peer to peer tool[257] has been launched by the Commission to facilitating peer-to-peer learning between environmental authorities. During the reporting period, Denmark has taken part in three TAIEX EIR multicountry workshop on EU Timber Regulation Nordic Baltic Competent Authorities (2019), ammonia reducing technology and measures (2021) and zero pollution (2022).

[254] Environmental Performance Index

[255] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

[256] The Commission issued a guidance document in 2016 on setting up coordinated and/or joint procedures that are simultaneously subject to assessments under the EIA Directive, Habitats Directive, Water Framework Directive, and the Industrial Emissions Directive, OJ C 273, 27.7.2016, p. 1.

[257] TAIEX - Environmental Implementation Review - PEER TO PEER - Environment - European Commission.