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Environmental Implementation Review 2022
Country Report - SWEDEN

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

The main challenges identified in past EIRs with regard to implementation of EU environmental policy and law by Sweden were:

- improving the still unfavourable conservation status of all grassland habitats and many of their associated species and many forest types
- halting biodiversity loss
- making additional efforts to reach the emission reduction commitments for 2020-2029 and the years after 2030.

Regarding **nature conservation**, the share of habitats in bad or poor conservation status has increased to 77.42%. Moreover, conservation statuses are uneven across groups: out of the 33 biogeographical assessments of the 16 EU **forest habitat** types protected under the EU nature directives in Sweden, only 6.06% show favourable conservation status. The situation of forested areas protected under the nature directives is severe as more than half of assessments show a bad conservation status. The wolf hunting regime has been subject to some amendments, but remains a controversial issue, and its compatibility with the Habitats Directive is the subject of an infringement procedure.

As regards **air quality**, emissions of key air pollutants have decreased significantly in Sweden in recent years. However, exceedances of PM_{10} limit values are still being found, which shows that further effort is needed in this regard. Sweden projects to reach emission reduction commitments for most air pollutants covered by the Directive for 2020-2029 and for SO_2, NMVOC and $PM_{2.5}$ for 2030 onwards. However, the projections do not demonstrate compliance with the emission reduction commitment for NO_X for 2030 onwards or the 2020-2029 and post-2030 reduction commitments for ammonia (NH_3).

On **waste management**, Sweden is not considered at risk of failing to meet EU waste recycling targets. However, Sweden's recycling rate for municipal waste stagnated over the last decade and its circular (secondary) use of material is well below the EU average. In particular, action is needed to reduce incineration (with energy recovery) of municipal waste, which remains the dominant form of waste treatment.

Sweden's performance with regard to **eco-innovation** is outstanding. The country has a highly developed eco-innovation ecosystem, which is strongly incentivised by government policy and benefits from the relatively large number of domestic cleantech investors.

EU financing continues to provide important support for environmental implementation. Sweden is due to receive 1.92 billion from the cohesion policy (ERDF and ESF) and EUR 1.06 billion from the EAFRD in 2021-2027. The country's total environmental protection investment accounted for 0.53% of its GDP in 2014-2020 (EU average: 0.7%). Overall environmental investment needs in the coming period are estimated to be at the level of at least 0.61% of Sweden's GDP annually, suggesting a potential environmental investment gap of over 0.08% of GDP compared to baseline financing levels, to be addressed by focusing on the country's environmental implementation priorities.

Part I: Thematic areas

1. Circular economy and waste management

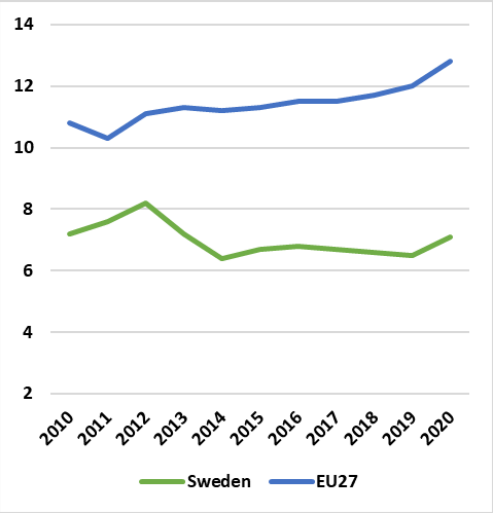
Measures towards a circular economy

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, also known as circularity rate, is defined as the ratio of the circular use of materials to the overall material use. The overall material use is measured by summing up the aggregate domestic material consumption (DMC) and the circular use of materials. 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 our economy. Large differences in the circularity rate exist between countries. To help achieve the goal in the EU circular economy action plan 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 that makes it possible to increase durability, reparability, upgradability and recyclability of products, to other measures, like: (i) 'remanufacturing'[1]; (ii) increasing the circularity in production processes; (iii) recycling; (iv) boosting eco-innovation; and (v) increasing the uptake of green public procurement.

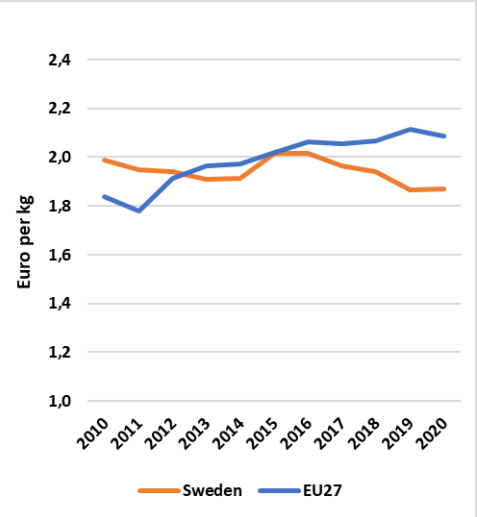
The circular (secondary) use of material in Sweden was 7.1% in 2016 and also 7.1% in 2019, compared to the EU average of 12.8%. There is therefore room and need for improvement in this regard (figure 1).

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 to minimise negative impacts on the environment and reduce dependency on volatile raw material markets. As shown in Figure 2, with EUR 1.87 generated per kg of material consumed in 2020, resource productivity in Sweden is slightly below the EU average of EUR 2.09 per kg.

Figure 2: Resource productivity 2010-2020[3]



[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.

[3] Eurostat, Resource productivity

Circular economy strategies

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

The Swedish circular economy strategy 'Circular Economy - Strategy for the transition in Sweden' was adopted in November 2020. The overall objective is the transition to a circular economy which contributes to achieving the environmental and climate objectives, as well as the Sustainable Development Goals in the 2030 Agenda.

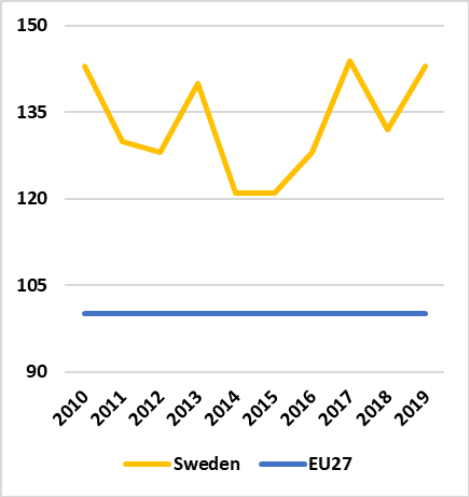
In January 2021, the country adopted a new action plan as a follow-up to the 2020 Strategy. The action plan presents more than 100 different activities along the entire lifecycle of products, but it seems to lack a concrete timeline for implementing each deliverable. The plan identifies certain sectors as priorities: plastics, textiles, renewable and bio-based material, food, the construction and property sector (including building and demolition waste) and innovation-critical materials and minerals. In addition, the Swedish government has the intention to publish another action plan, focused solely on plastics.

Eco-innovation

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

In 2021, Sweden ranked 5th on the 2021 Eco-innovation Index, with a total score of 142, making it a leader in eco-innovation. In addition, Sweden performs above the EU average for three out of five components of the Eco-innovation index of 2021: eco-innovation inputs, eco-innovation activities and eco-innovation outputs. On resource efficiency outcomes and socio-economic outcomes, the country's performance is below the EU average (see Figure 3).

Figure 3: Eco-innovation performance, 2010-2019[5]



Green public procurement (GPP)

Public procurement accounts for a large proportion of European consumption, with public authorities' purchasing power representing 14% of EU GDP. This can help drive the demand for sustainable products that meet reparability and recyclability standards. To date, reporting to monitor the uptake of GPP is voluntary.

A National strategy for green public procurement is in force in Sweden, under the National public procurement strategy of 2017. Under objective 6 of the strategy, environmentally responsible public procurement has been introduced. The National Agency for Public Procurement offers a "criteria library" containing recommendations on environmental and social requirements to be used when purchasing goods, services and works. There are three levels of environmental criteria: basic, advanced and spearhead. The criteria are available within 8 product groups.

There is no general monitoring of the percentage of public procurement procedures incorporating green criteria out of the whole volume of procurement at national level. However, the National Agency for Public Procurement has carried out a minor study and showed that 90 percent of tender documents analysed contained some form of environmental criterion, either criteria from the National Agency for Public Procurement or criteria developed by the contracting authority.

[4] Circular Economy Stakeholder Platform

[5] European Commission - Directorate-General for Environment (DG ENV), Eco-innovation Observatory, Eco-innovation index.

EU Ecolabel and the Eco Management and Audit Scheme (EMAS)

The number of EU Ecolabel products and EMAS-licensed[6] organisations in a given country provides some indication of the extent to which the private sector and national stakeholders in that country are actively engaged in the transition to a circular economy. It also shows how committed public authorities are to supporting instruments designed to promote the circular economy.

As of September 2021, Sweden had 5 521 products out of 83 590, and 41 licenses out of 2 057 registered in the EU Ecolabel scheme, showing a good take-up of products and licences[7]. Moreover, 12 organisations and 23 sites from Sweden are currently registered in EMAS[8]. In Sweden, however, the Nordic Swan, a similar ecolabel, is more known and widespread. Since the last report in 2019, there have been 2 121 new product registrations and 2 new license registrations under the EU Ecolabel, while the number of organisations registered in EMAS fell by 5.

As Sweden's circular material use rate is well below the EU average, a priority action on this is proposed.

2022 priority action

- Adopt measures to increase the circular material use rate.

Waste management

Turning waste into a resource is supported by:
(i) fully implementating 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.

This section focuses on the management of municipal waste[9], 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 and reuse are the most preferred options and are therefore at the top of the waste hierarchy. The amount of municipal waste generated is a good indicator of the effectiveness of waste-prevention measures.

After a downward trend, municipal waste generation in Sweden has started to increase in recent years. It reached 449 kg/year/inhabitant in 2019 and remains close to the EU average (502 kg/year/inhabitant), as shown in Figure 4. This indicates that Sweden's economic growth is not yet decoupled from its generation of waste.

Figure 4: Municipal waste by treatment in Sweden, 2010-2020[10]

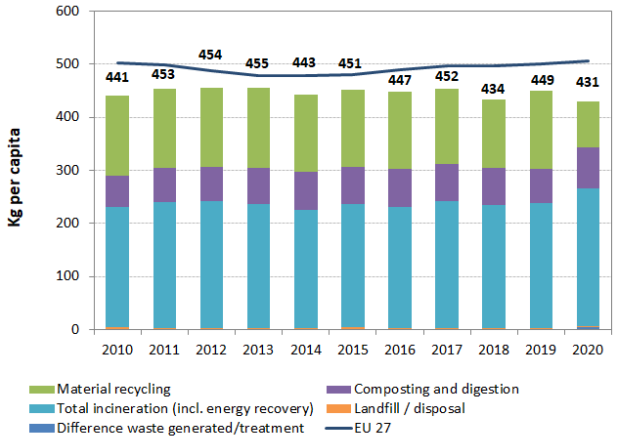
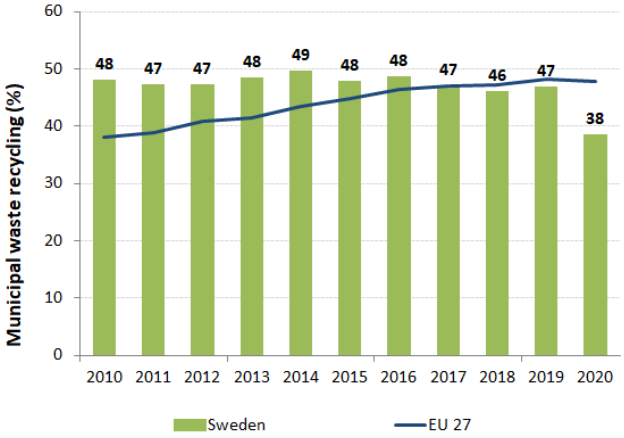


Figure 4 also shows municipal waste by treatment, in terms of kilos per capita. Incineration including energy recovery accounts for 52% and remains the dominant form of waste treatment in Sweden, while landfilling accounts for less than 1%.

The recycling rate for municipal waste in Sweden stagnated over the last decade. Sweden used to be ahead of the EU average until 2016, with the gap systematically narrowing. Since 2017, however, Sweden has been scoring below the EU average (46.6% vs. 47.7% in 2019). Figure 5 shows that Sweden needs to step up investment in recycling to meet the EU 2020 and 2025 recycling targets.

[6] EMAS is the European Commission's Eco-Management and Audit Scheme, a programme to encourage organisations to behave in a more environmentally sustainable way.
[7] European Commission, Ecolabel Facts and Figures.
[8] As of May 2018. European Commission, Eco-Management and Audit Scheme.
[9] 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, Art. 3 2b).
[10] Eurostat, Municipal waste by waste operation, April 2022.

Figure 5: Recycling rate of municipal waste, 2010-2020[11]



The Commission's Early Warning report[12] did not list Sweden as one of the countries at risk of missing the EU 2020 target of recycling 50% of municipal waste. The Commission is currently finalising its analysis of the progress on the recommendations from the 2018 Early Warning Reports as a well as an analysis of progress towards achieving the 2025 waste recycling targets. This report will be presented at the end of 2022 and will assess progress made to date.

Implementation of the 2018 waste legislative package

Sweden has notified its transposition of the 2018 waste package[13] to the Commission. A conformity assessment is now ongoing.

Waste management plans and waste prevention programmes 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. waste preventiion, separate collection for a number of specific waste streams, recycling and landfill targets). Revised plans and programmes were due on 5 July 2020.

In 2018, Sweden approved its national waste plan and waste prevention programme for 2018-2023. The document provides an overview of the targets, instruments and measures introduced in Sweden to prevent waste and realise more resource-efficient and non-toxic waste management, in accordance with the waste hierarchy.

In 2020, Sweden amended its revised waste management plan (WMP). The assessment by the Commission confirmed that the WMP meets the requirements of Article 28 of the revised Framework Directive on Waste.

Sweden has not signed or ratified the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships.

Given limited progress since the 2019 EIR, as municipal waste generation continued to increase, and in light of the Early Warning Report 2022, the priority actions are repeated.

2022 priority actions

- Introduce new policies, including economic instruments, to implement further the waste hierarchy, i.e. promote prevention, and make reuse and recycling more economically attractive.
- Shift reusable and recyclable waste away from incineration.

[11] Eurostat, Recycling rate of municipal rate, April 2022.
[12] 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 waste, SWD(2018)422 accompanying COM(2018)656.
[13] Directive (EU) 2018/851, Directive (EU) 2018/852, Directive (EU) 2018/850 and Directive (EU) 2018/849 amend the previous waste legislation and set more ambitious recycling targets for the period up to 2035.

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 deliver on the strategy's targets and are the cornerstone of European legislation aimed at conserving the EU's wildlife[14].

There is no Swedish strategy for reaching favourable conservation status of habitats and species per se. Instead, biodiversity is integrated into the broad system that specifies the overall goal guiding Sweden's environmental policy, which was adopted by the country's parliament at the turn of the century and updated since then[15].

Swedish nature conservation follows three general themes: (i) protection and management of nature; (ii) species protection; and (iii) sustainable use. The Bill on biodiversity and ecosystem services (2014) constitutes Sweden's overall strategy for biodiversity and ecosystem services for the period up to 2020.

The overarching goal of this policy, the 'generational goal', is to hand over to the next generation a society in which the major environmental problems have been solved, without increasing environmental and health problems outside Sweden's borders.

It is broken down into 16 environmental quality objectives (EQOs) covering different areas, including in particular an EQO focusing on 'a rich diversity of plant and animal life'. Six other EQOs are particularly relevant to biodiversity and the implementation of the EU Nature Directives.

Nature protection and restoration

Natura 2000[16] – the largest coordinated network of protected areas in the world – is the key instrument to achieve the Birds and Habitats Directives' objectives.

These objectives are to ensure the long-term protection, conservation and survival of Europe's most valuable and threatened species and habitats and the ecosystems they underpin. Key milestones towards meeting the objectives of the Directives are:

(i) setting up a coherent Natura 2000 network;
(ii) classifying Special Protection Areas (SPA);
(iii) designating Sites of Community Importance (SCI) as Special Areas of Conservation (SAC)[17];

setting conservation objectives and measures for all Natura 2000 sites.

Setting up a coherent network of Natura 2000 sites

Sweden hosts 89 habitat types[18] and 163 species[19] covered by the Habitats Directive. The country also hosts populations of 86 bird taxa listed in Annex I of the Birds Directive[20].

As shown in Figure 7, by 2021 12.3% of Sweden's national land area of was covered by Natura 2000 (EU average 18.5%), with Special Protection Areas (SPAs) classified under the Birds directive covering 5.9% (EU average 12.8%) and Sites of Community Importance (SCIs) under the Habitats Directive covering 12.2% (EU average 14.2%) of the Swedish territory.

The latest assessment of the Natura 2000 network

[14] These should be reinforced by the Nature Restoration Law, according to the new EU Biodiversity Strategy.
[15] Naturvårdsverket, environmental objectives

[16] 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; coverage figures do not add up because some SCIs and SPAs overlap. Special Areas of Conservation (SACs) means an SCI designated by Member States.
[17] Sites of Community Importance (SCIs) are designated pursuant to the Habitats Directive whereas Special Protection Areas (SPAs) are designated pursuant to the Birds Directive; coverage figures do not add up because some SCIs and SPAs overlap. Special Areas of Conservation (SACs) are SCIs designated by Member States.
[18] EEA, Article 17 dashboard, Annex I total, 2019.
[19] 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.
[20] EEA, Article 12 dashboard, Annex I, 2020. This counting only takes into account birds taxa for which information was requested.

shows that there are insufficiencies in designation. The related open infringement procedure indicates in particular that Sweden has still to complete the designation of its network of SPAs at sea.

Considering both Natura 2000 and other nationally designated protected areas, Sweden legally protects 14.10% of its terrestrial areas[21] (EU-27 average 26.4%) and 15.5% of its marine areas (EU-27 average 10.7%)[22]. Figure 6 shows the 2020 situation at EU level for terrestrial and marine protected area coverage in meeting the biodiversity strategy 2030 target.

Figure 6: Marine & terrestrial protected area coverage, 2021[23]

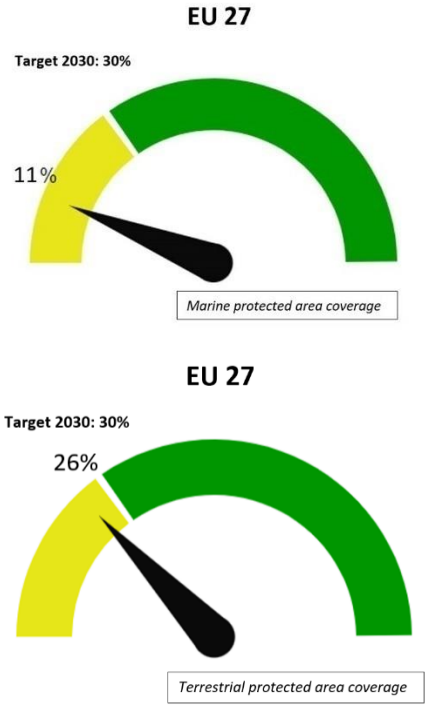
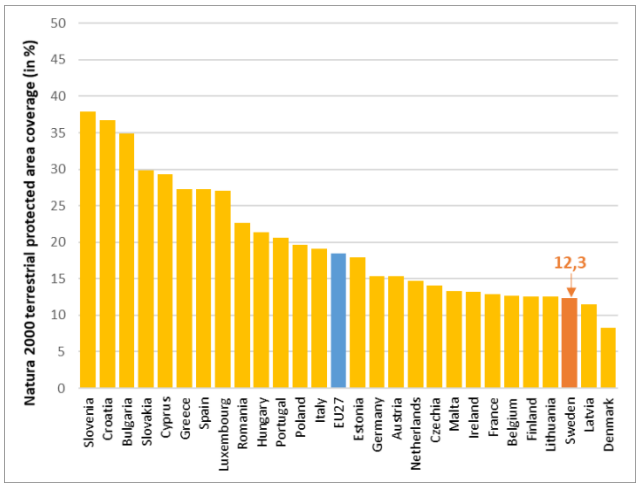


Figure 7: Natura 2000 terrestrial protected area, 2021[24]



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

Sweden is subject to an infringement due to the insufficiency of (i) the list of proposed Sites of Community Importance (pSCIs) it has sent to the Commission in accordance with Article 4(1) of the Habitats Directive, and (ii) the Special Protection Areas (SPAs) it has classified under Article 4(1) and (2) of the Birds Directive.

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

To measure the performance of Member States, Articles 17 of the Habitats Directive and 12 of the Birds Directive require reporting on progress towards maintaining or restoring the favourable conservation status of species and habitats.

According to Sweden's report on the conservation status of habitats and species covered by the Habitats Directive for 2013-2018, the share of assessments of favourable conservation statuses has been relatively stable since the last reporting period. The share of habitats in good conservation status has decreased by 3.09 pps and accounted for 22.58% in 2018 compared to the 25.67% reported under the previous reporting period (2007-2012).

As for protected species, the share of assessments in good conservation status in 2018 has increased by 1.9 pps and accounted for 47.45% compared to the 45.55% reported under the previous reporting period (2007-2012).

However, conservation statuses are uneven across

[21] EEA, share of country designated as terrestrial protected area.
[22] EEA, Protected Areas, terrestrial protected area percentage (2021) and marine protected area percentage (2019), March 2022.
[23] EU Biodiversity Strategy Dashboard, indicators A1.1.1 and A1.2.1, February 2022.
[24] EEA, Natura 2000 Barometer, February 2022.

groups: of the 33 biogeographical assessments of the 16 EU forest habitat types protected under the EU nature directives in Sweden, only 6.06% (two habitat types in the Alpine region) have favourable conservation status, while all the others have unfavourable status[25].

At the same time, the share of habitats in bad or poor conservation status has increased to 77.42% (see Figure 8), while the share of assessments for species in bad or poor conservation status has (slightly) decreased to 51.46% (see Feigure 9). The main pressures are related to agriculture and forestry, industrial and urban pollution and changes in land use, including abandonment of agricultural land. Invasive alien species are assessed as an increasing threat to biodiversity.

As regards birds, close to 58% of the breeding species showed population trends that were increasing in the short term or stable (for wintering species this figure was close to 55%), while 1/3 have bad status. There are also indicators showing that trends for bird species which are dependent on forests are going down in Sweden, with bird species linked to forests that have a more complex structure being more affected[26].

Figure 8: Assessments on conservation status for habitats for the 2007-2012 and 2013-2018 reporting periods[27]

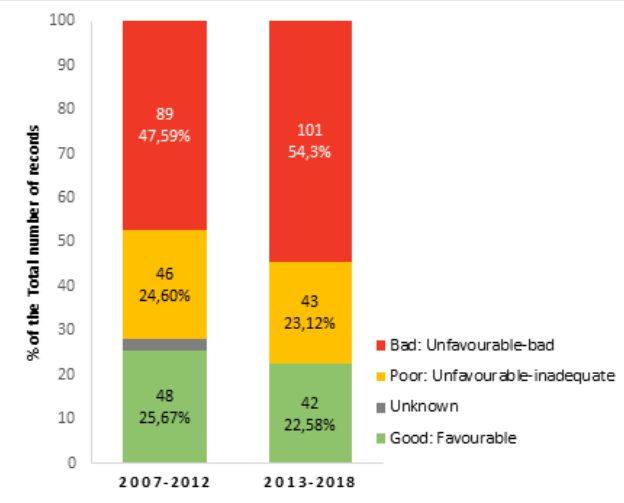
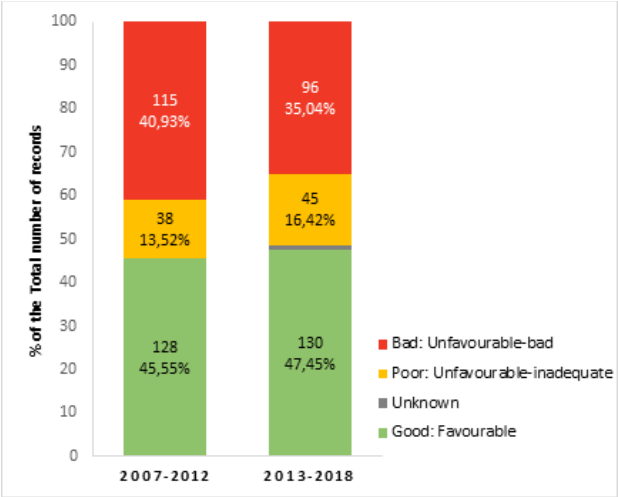


Figure 9: Assessments on conservation status for species for the 2007-2012 and 2013-2018 reporting periods[28]



At sea, not all Natura 2000 sites are effectively managed yet and not every significant disturbance of highly sensitive species is prevented.

Sweden is subject to an infringement for the licenced hunting of wolves.

The LIFE programme has been widely used in Sweden for nature purposes. Two recent example projects are:

- Ecostreams for LIFE – ECOSysTem based REstoration And Management of boreal riverS
- LIFE RestoRED – Restoration of EU Redlisted Annex I habitats, dependent on grazing or hay cutting in Natura 2000 sites in Sweden
- GRIP on LIFE – Restoration of waters in forest habitats.

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:
- 50% reduction in the overall use of – and risk from – chemical pesticides;
- 50% reduction in the use of more hazardous pesticides;
- 50% reduction in losses of nutrients from fertilisers

[25] State of Nature Report. EEA 2021.

[26] Svensk Fågeltaxering, Övervakning av fåglarnas populationsutveckling (Monitoring the population development of birds), Årsrapporterna för 2018 and 2021 (Annual Reports for 2018 and 2021)
;

[27] 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.

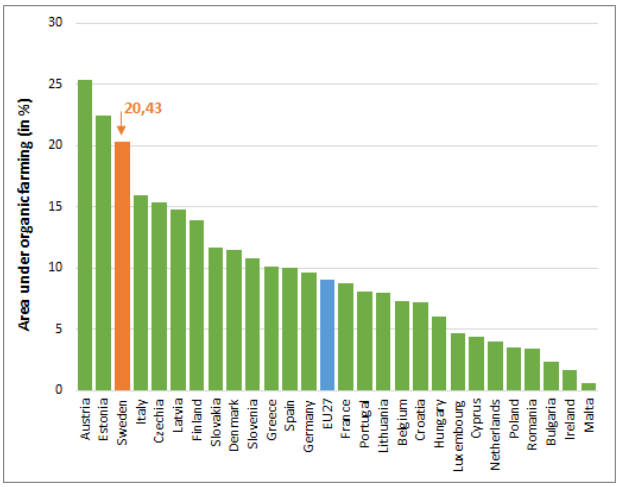
[28] EEA, Conservation status and trends of habitats and species, December 2021. Please note when comparing the figures shown for 2007-2012 and 2013-2018 these may also be affected by changes of methods or due to better data availability.

while ensuring there is no deterioration of soil fertility (which will result in 20% reduction in the use of fertilisers);
- bring back at least 10% of agricultural area under high-diversity landscape features and increasing areas under organic farming to at least 25%.

With an estimated 20.43% of its agricultural area under organic farming, Sweden ranks 3rd amoung EU Member States and is well above the EU average of 9.07% (2020 data, Eurostat).

Figure 10 shows 2021 situation and distance, at the EU level, from meeting the 2030 biodiversity strategy target for area under organic farming.

Figure 10: Share of total utilised agricultural area occupied by organic farming per Member State[29]



Swedish agriculture can play an important role in achieving the new climate and environmental goals established by the European Green Deal: Sweden manages a very valuable carbon sink at EU level, with significant forest cover (the second highest forested area as a percentage of national land area in the EU) and very carbon-rich soils.

Greenhouse gas emissions from agriculture are comparatively low, energy consumption by the agricultural and forestry sectors is below the EU average, and the use per hectare (ha) of fossil energy is the lowest in the EU. Almost half of the energy produced in Sweden comes from renewable sources, with forestry as the most important source. Due to ammonia emissions from agriculture, Sweden is at high risk of non-compliance with its ammonia emission reduction commitments for both 2020-2029 and for 2030 and beyond.

[29] Eurostat, online data code: SDG_02_40, February 2022.

The soil quality of arable land is generally satisfactory in Sweden, with relatively good and stable organic matter content and no significant soil erosion. The presence of cadmium in agricultural soil in some regions, due to high geological level, somewhat affects the crop choices in those areas.

Soil ecosystems

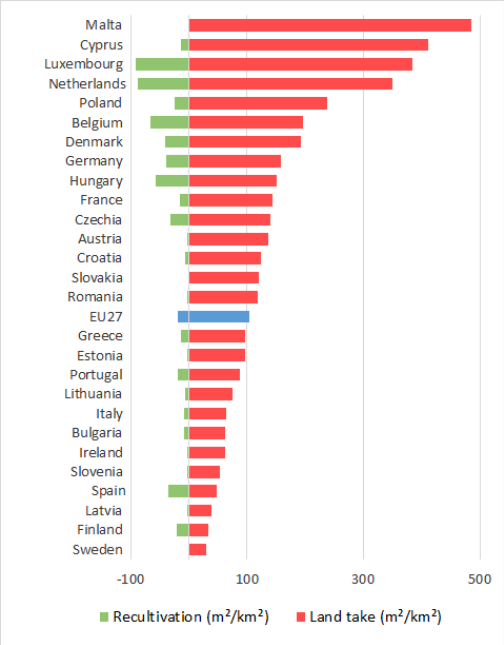
Soil is a finite and extremely fragile resource and it is increasingly degrading in the EU.
The new EU soil strategy, adopted on 17 November 2021, stresses the importance of soil protection, of sustainable soil management and of restoring degraded soils, to achieve the Green Deal objectives as well as 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 factor of degradation is the area of soil that is sealed or atificialised[30]. The land taken (land 'taken' means land that is sealed or artificialised) per year in 2012-2018 (see Figure 11) can be seen as a measure of one significant pressure on nature and biodiversity – land use change. This also constitutes an environmental pressure on people living in urbanised areas.

Sweden ranks below the EU average[31] as regards net land take, with 26.9m^2/km^2 (EU-27 average 83.8m^2/km^2, Eurostat 2018).

[30] Artificial land cover is defined as the total of roofed built-up areas (including buildings and greenhouses), artificial non-built-up areas (including sealed 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).
[31] Land take in Europe — European Environment Agency (europa.eu) fig 6

Figure 11: Land take and re-cultivation in EU27 (m2/km2), 2012-2018[32]



However, Sweden has not yet committed to set land degradation neutrality targets under the UN Convention on Combating Desertification[33].

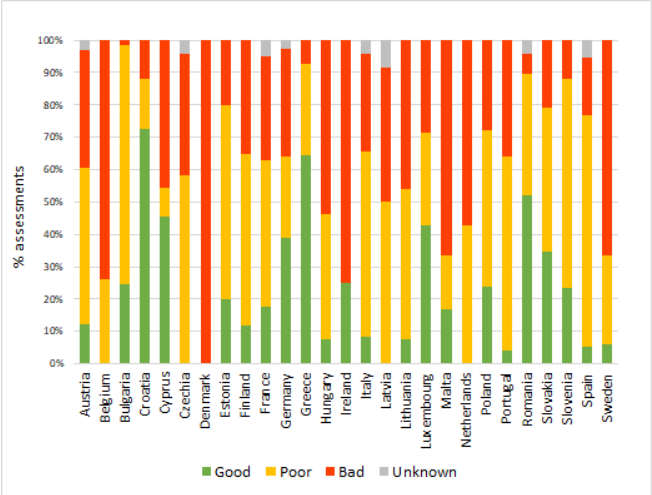
Forests and timber

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, which contribute significantly to strengthened biodiversity and climate ambitions.
Forests are important carbon sinks and conserving them is vital if the EU is to achieve climate neutrality by 2050.

Out of the 27% of EU forest area protected under the Habitats Directive, less than 15% of assessments have favourable conservation status [34]. Bad conservation status increased from 27% to 31% in the EU, compared to 2015.

In Sweden, forests cover 71.52% of the country's territory[35]. The situation of forest habitats protected under the Habitats Directive is particularly worrying, as more than half of the assessed protected forests have bad status[36]. 2 249 000 ha in Sweden are covered by primary forests[37]. Most of this area consists of formally protected areas or is exempted from harvesting. either by law or on a voluntary basis.

Figure 12: Conservation status of forests protected under the Habitats Directive in EU Member States, 2013-2018 (% assessments)[38]



The European Union Timber Regulation (EUTR)[39] prohibits the placing on the EU market of illegally harvested timber. In accordance with this Regulation, EU Member States' competent authorities must conduct regular checks on operators and traders, and apply penalties for non-compliance. With the amendment of Article 20 of the Regulation, as of 2019 the reporting frequency has been changed from every 2 years to annually, and it covers the calendar year.

In March 2017 – February 2019[40], Sweden carried out 6 checks on domestic timber operators. It also carried out 60 checks on operators importing timber. It is estimated that Sweden had 880 operators placing domestic timber types and 4 473 operators placing imported timber types onto the EU market over the reporting period.

A proposal for the Regulation on the making available on the EU market and export of products associated with deforestation and forest degradation (Deforestation Regulation) was adopted on 17 November 2021, following a request from the Council in 2019 to table a legislative proposal to address the problem and a European Parliament resolution recommending that the Commission come forward with an EU legal framework to halt and reverse EU-driven

[32] EEA, Land take in Europe, December 2021.
[33] The LDN Target Setting Programme | UNCCD
[34] EEA, State of Nature in the EU
[35] EEA, Forest information system for Europe
[36] COM SWD (2021) 652
[37] European Commission, JRC, Mapping and assessment of primary and old-growth forests in Europe, p. 13.
[38] EEA, Conservation status and trend in conservation status by habitat group - forests, January 2022.
[39] Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010.
[40] COM/2020/629 final

global deforestation. This Regulation will repeal and replace the EU Timber Regulation, as the new Deforestation Regulation will essentially integrate and improve the existing system for checking the legality of traded timber.

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 to 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 IAS and decrease the number of 'red list' species they threaten by 50%.

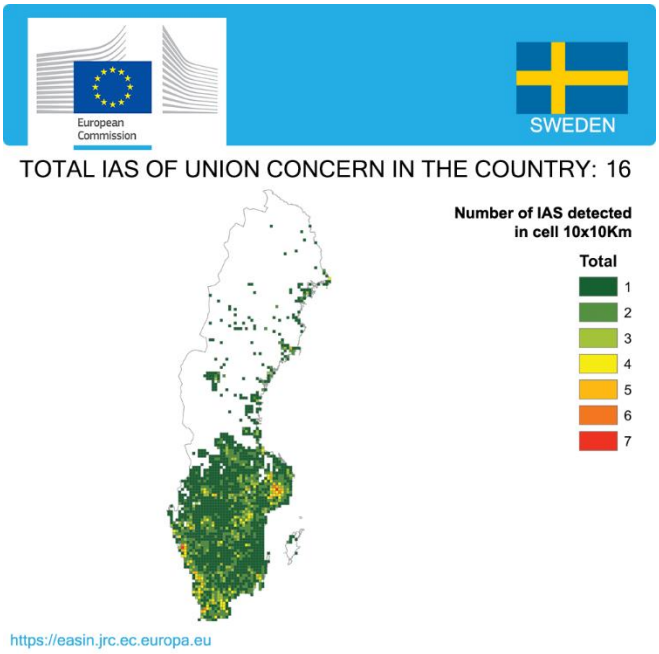
The core of the Regulation (EU) 1143/2014 on Invasive Alien Species (the IAS Regulation[41]) is the list of invasive alien species of Union concern.

The total number of IAS of Union concern is currently 66, of which: 30 are animal species; 36 are plant species; 41 are primarily terrestrial species; 23 are primarily freshwater species; 1 is a brackish-water species; and 1 is a marine species.

According to a 2021 report[42] on the review of the application of the IAS Regulation, its implementation is already starting to deliver on its objectives such as a coherent framework for addressing these species at EU level and increased awareness of the problem in general. At the same time, the 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 its implementation.

A 2021 report[43] on the baseline distribution shows that of the 66 species on the Union-concern list, 16 have been observed in the environment in Sweden. The spread can be checked in Figure 13.

Figure 13: Number of invasive alien species of EU concern, based on available georeferenced information for Sweden, 2021



2022 priority actions

- It is crucial to make progress in the short term in effective management, in particular of marine areas, and in demonstrating the effectiveness of measures in progress throughout the Natura 2000 network. It is also necessary to ensure that EU law requirements regarding the strict protection of species and derogations from them are fully implemented and enforced.
- Where conservation statuses are not favourable, large scale action has to be implemented, including restoration: drivers of degradation in coastal habitats, dunes habitats, grasslands and forests, which are the habitats with the poorest conservation statuses in Sweden, have to be adressed.
- Reversing the degradation processes at work in forest habitats and species and removing the drivers of forest biodiversity loss are key to meeting the objectives of the Nature Directives and the target under the EU BDS for 2030. This requires involving the forestry sector in management practices that are compatible with species preservation as well as in identifying and preserving areas of high ecological value for the Natura 2000 network.

[41] 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

[42] 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.

[43] 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.

Marine ecosystems

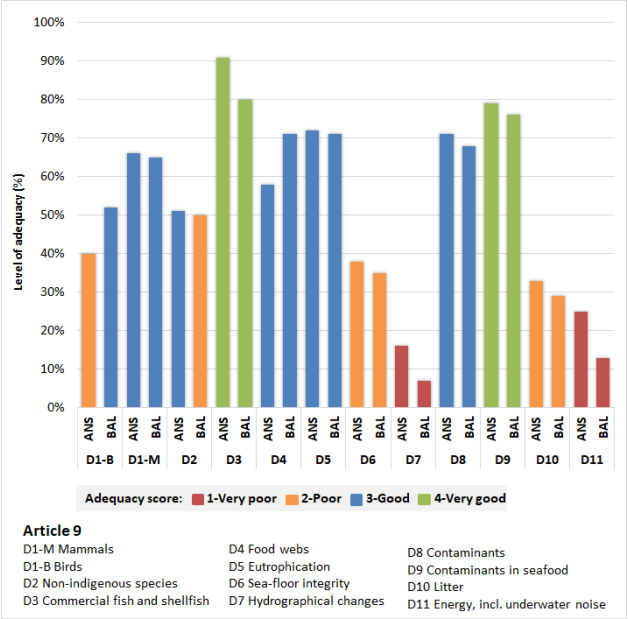
The EU Biodiversity Strategy for 2030 aims to substantially reduce the negative impacts on sensitive species and habitats in marine ecosystems and to achieve good environmental status as well as eliminate or reduce the incidental catches of protected, endangered, threatened and sensitive species to a level that allows species recovery and conservation[1].

The Marine Strategy Framework Directive (MSFD) [44] requires Member States to achieve good environmental status (GES) for their marine waters. To that end, Member States must draw up marine strategies for their marine waters, and cooperate with Member States sharing the same marine region or subregion. These marine strategies comprise different steps to be developed and implemented over 6-year cycles.

The MSFD also required Member States to draw up – by 15 October 2018 – a set of GES characteristics for each descriptor (Article 9), and to provide an initial assessment of their marine waters (Article 8). The Commission will then assess whether this constitutes an appropriate framework to meet the requirements of the Directive.

The Commission assessed Sweden's 2018 determinations of GES for each of MSFD's 11 descriptors[45] and determined their level of adequacy in relation to the Commission GES Decision[46]. A good or very good score indicates that the national determinations of GES are well aligned with the requirements of the Decision, i.e. that they provide qualitative and quantitative national environmental objectives to be achieved for their marine waters (see Figure 14).

Figure 14: Level of adequacy of GES determination by Sweden (ANS and BAL regions) with criteria set under the Commission GES Decision – Article 9 (2018 reporting exercise)[47]



Sweden has two marine sub-regions:

In ANS-NE Atlantic: Greater North Sea, 7 out of 11 determinations of GES were assessed as good or very good. The national determination of GES by Sweden is consistent with requirements set under the GES decision for 7 out of 11 descriptors.

In BAL-Baltic Sea, 6 out of 11 determinations of GES were assessed as good or very good. The national determination of GES by Sweden is consistent with requirements set under the GES decision for 6 out of 11 descriptors.

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

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

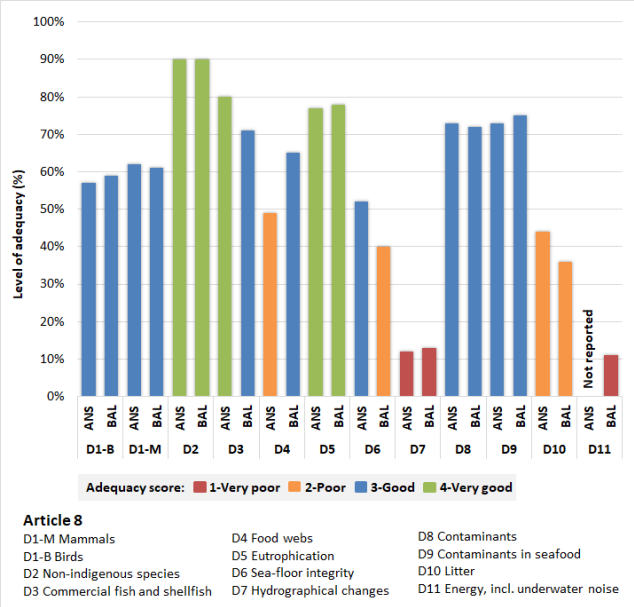
[44] Marine Strategy Framework Directive 2008/56/EC

[45] Annex I of Directive 2008/56/EC.

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

[47] 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.

Figure 15: Level of adequacy of national assessment of Sweden's marine environment (ANS and BAL regions) with criteria set under the Commission GES Decision – Article 8 (2018 reporting exercise)[48]



In the marine sub-region ANS-NE Atlantic: Greater North Sea, 7 descriptors out of 11 were scored as good or very good. Sweden's assessment of its marine environment is consistent with requirements set under the Commission GES Decision for 7 out of 11 descriptors.

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

For the ANS-NE Atlantic region, Sweden is missing data for D11 Energy, including underwater noise.

Sweden is subject to an ongoing infringement procedure relating to the protection of harbour porpoise from fishing activities.

As highlighted in the Commission's report on the implementation of the MSFD [49], while regional cooperation has improved since the adoption of the MSFD, more cooperation is needed to attain full regional coherence of the marine strategies, as required by the Directive.

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 good environmental status and use of criteria and methodological standards according to the Commission GES Decision. The above onsiderations form the basis for the 2022 priority actions.

2022 priority actions

- Ensure regional cooperation with Member States that share the same marine (sub)region to address predominant pressures.
- Implement the recommendations made by the Commission in the Staff Working Document[50] accompanying the Communication[51], in response to recommendations by Member States and regions 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.

Sweden will incorporate ecosystem services assessments within its regional action plans for green infrastructure. The country is implementing the government bill: 'A Swedish strategy for biodiversity and ecosystem services'.

Sweden has ongoing projects for communicating about ecosystem services and a research programme 'The value of ecosystem services'. All projects aim for one of the milestone targets adopted as part of Sweden's system of environmental objectives. The importance of biodiversity and the value of ecosystem services should, since 2018, be generally known and integrated into economic positions, political considerations and other decisions in society, where it is relevant and reasonable to do so.

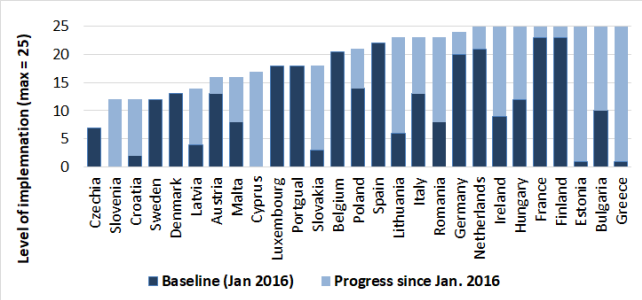
Sweden has not provided updated information and therefore no progress has been recorded since January 2016 (see Figure 16). This assessment is based on 27

[48] 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.
[49] COM(2020)259

[50] SWD(2022)1392.
[51] COM(2022)550.

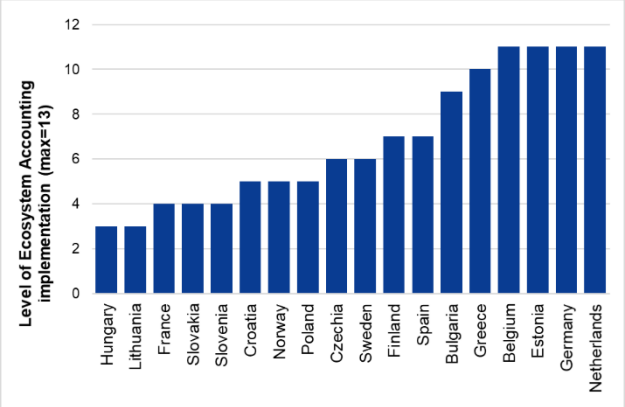
implementation questions and updated every six months.

Figure 16: ESMERALDA MAES Barometer, January 2016 – March 2021 [52]



Progress on ecosystem accounting implementation is assessed at national level, based on 13 questions (see Figure 17).

Figure 17: Ecosystem accounting Barometer, September 2021[53]



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.

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

[53] MAIA Portal, Mapping and assessment for Integrated Ecosystem Accounting (EU Horizon 2020 project), 2022. MAIA uses the System of Environmental Economic Accounting – Experimental Ecosystem Accounting (SEEA-EEA) as the methodological basis for the ecosystem accounting. The SEEA EA is an integrated an comprehensive statistical framework that is based on five core accounts: ecosystem extent, condition, services and monetary ecosystem asset.

3. Zero pollution

Clean air

EU clean-air policy 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 relevant 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.

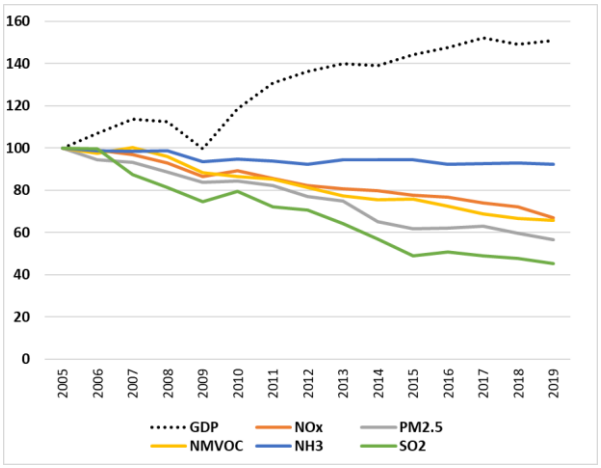
The EU has developed a comprehensive set of air quality legislation, which sets health-based air quality standards[54] and emissions reduction commitments[55] by Member State for a number of air pollutants.

Air quality in Sweden continues to give cause for concern. The latest available annual estimates by the European Environment Agency[56] point to about 2 800 premature deaths (or 26 400 years of life lost (YLL)) attributable to fine particulate matter concentrations[57] 220 premature deaths (2 200 YLL) to ozone concentrations[58] and less than 1 (less than 5 YLL) to nitrogen dioxide concentrations[59] [60].

Emissions of key air pollutants have decreased significantly in Sweden in recent years, while GDP growth has continued (see Figure 18). According to the latest projections as submitted under Article 10(2) of the Directive on National Emission reduction Commitments (NECD) [61], Sweden projects to reach those commitments for most air pollutants covered by the Directive for the period 2020 to 2029 and for SO_2, NMVOC and $PM_{2.5}$ for 2030 onwards. However, the projections do not demonstrate that Sweden will reach the emissions reduction commitment for NO_X for 2030 onwards or the commitments for ammonia for 2020-2029 or 2030 onwards. Latest inventory data submitted by Sweden, before to review by the Commission, indicate that, in 2020 Sweden is in compliance with the commitments for NO_x, NMVOC, SO_2 and $PM_{2.5}$, but not the commitment for NH_3.

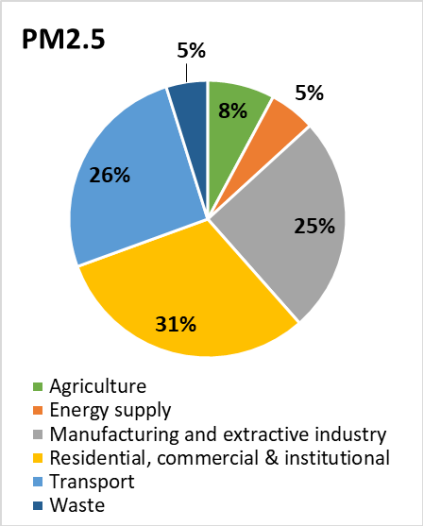
Sweden submitted its National Air Pollution Control Programme on 1 April 2019.

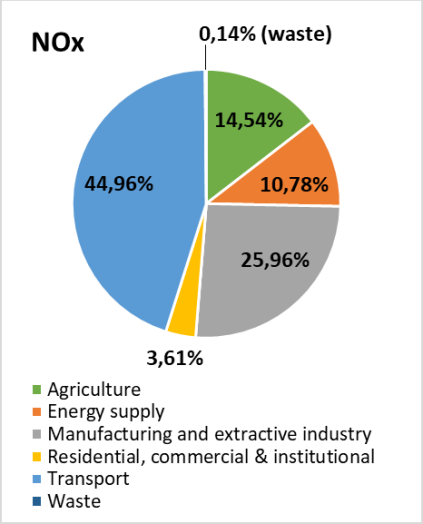
Figure 18: Emission trends of main pollutants/ GDP 2005-2019 in Sweden[62]



[54] European Commission, 2016. Air Quality Standards.
[55] Reduction of national emissions of atmospheric pollutants.
[56] European Environment Agency, Air Quality in Europe –2021 report. Please see details in this report as regards the underpinning methodology, p.106.
[57] Particulate matter (PM) is a mixture of aerosol particles (solid and liquid) covering a wide range of sizes and chemical compositions. PM10 refers to particles with a diameter of 10 micrometers and less.
[58] Low-level ozone is produced by photochemical action on pollution.
[59] NOx is emitted during fuel combustion e.g. from industrial facilities and the road transport sector. NOx is a group of gases comprising nitrogen monoxide (NO) and nitrogen dioxide (NO2).
[60] 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.
[61] Directive 2016/2284/EU.
[62] EEA.

Figure 19: PM2.5 and NOx emissions by sector in Sweden, 2019[63]





For 2020, exceedances above the limit values established by the *Ambient Air Quality Directive* were registered for carbon monoxide (CO) in one air quality zone and in one zone for particulate matter (PM_{10}). Furthermore, for several air quality zones the target values regarding ozone concentration have not been met [64].

Persistent breaches of air quality requirements, which have severe negative effects on health and the environment, are being followed up by the European Commission through infringement procedures (mainly for PM_{10} and NO_2 exceedances) covering all Member States concerned, including Sweden for exceedances of PM_{10} limit values. The aim is that appropriate measures are put in place to bring all zones into compliance.

In 2019 Sweden received priority actions calling for action to (i) reduce main emission sources and (ii) accelerate reductions in particulate matter ($PM_{2.5}$ and PM_{10}) emission and concentration. The first action is repeated below, as progress has been limited. Regarding the second one, there has been some progress, but efforts must continue, as exceedances of PM_{10} limit values are still being found.

2022 priority actions

- In the context of the National Air Pollution Control Programme (NAPCP), take action to reduce emissions from the main sources mentioned above.
- Ensure full compliance with EU air quality standards and maintain downward emissions trends for air pollutants, to reduce adverse air pollution impacts on health and the 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 Directive65 (IED). The Commission tabled a proposal in April 202266. 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 IED below is based on data reported to the EU Registry (2018)[67].

In Sweden, around 1 220 industrial installations are required to have a permit based on the IED. This

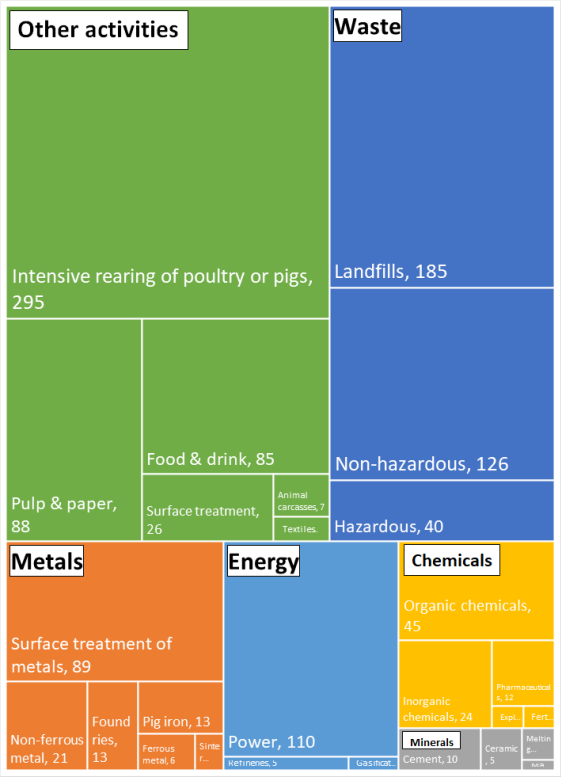
[63] EEA.
[64] EEA, Eionet Central Data Repository

[65] 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).
[66] 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).
[67] EEA, European Industrial Emissions Portal.

represents an increase of almost 200 installations since 2015, mainly in the waste management sector and the intensive rearing of poultry and pigs. The distribution of installations is shown in the Figure 20.

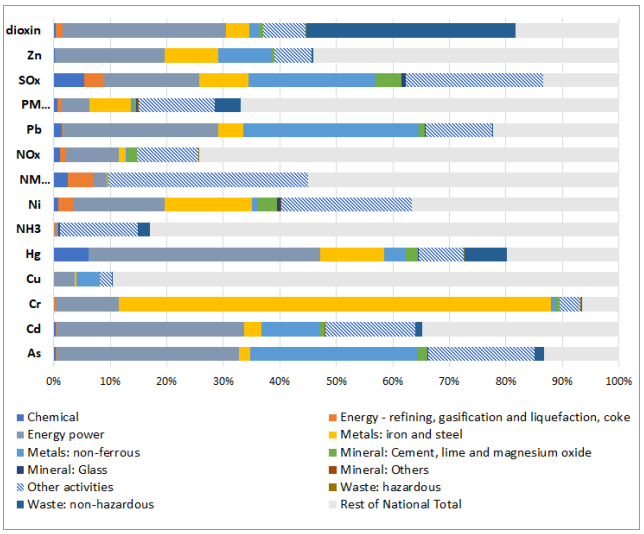
The industrial sectors in Sweden with most IED installations in 2018 are the waste management sector (29%), followed by intensive rearing of poultry and pigs (24%) and the energy sector (9%).

Figure 20: Number of IED industrial installations per sector in Sweden, 2018[68]



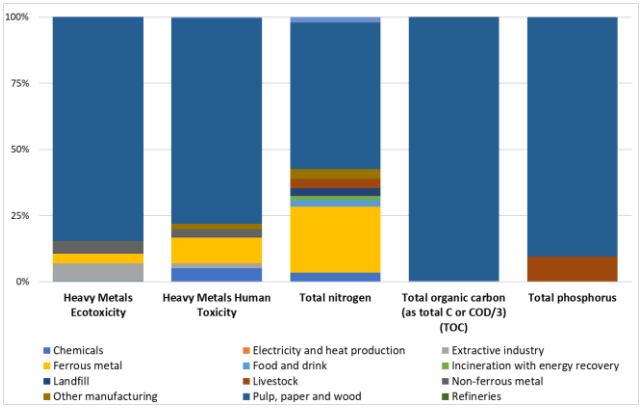
The industrial sectors identified as contributing the largest burden to the environment for emissions to air were the energy – power sector for arsenic (As), cadmium (Cd), mercury (Hg) and zinc (Zn); manure management for ammonia (NH3); pulp and paper industry for nickel (Ni), nitrogen oxides (NOx), particulate matter (PM 2.5) and sulphur oxides (SOx); solvent use for non methane volatile organic compounds (NMVOC); metal production for chromium (Cr), copper (Cu) and lead (Pb); and waste management for dioxins. The breakdown is shown in Figure 21.

Figure 21: Emissions to air from IED sectors and rest of national total air emissions in Sweden, 2018[69]



The environmental burdens for industrial emissions to water mainly result from the production of chemicals for heavy metals, nitrogen, phosphorous and total organic carbon. The breakdown, based on E-PRTR data, is presented in Figure 22.

Figure 22: Relative releases to water from industry in Sweden, 2018[70]



The EU approach taken to enforcement under the IED creates strong rights for citizens to have access to relevant information and participate in the permitting process. This empowers citizens and NGOs to ensure that permits are appropriately granted and their conditions complied with.

As part of environmental inspection, competent authorities undertake site visits to IED installations to

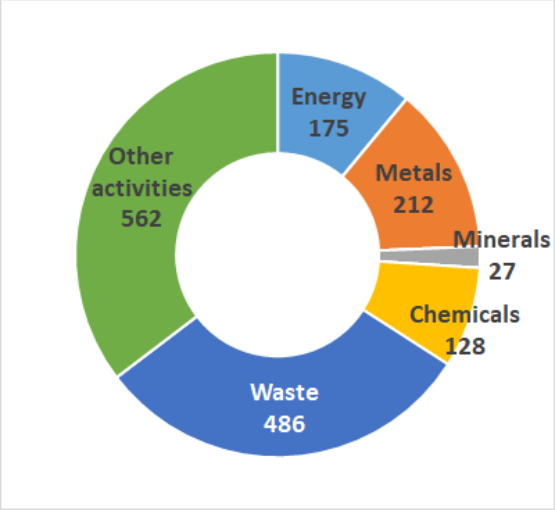
[68] EEA, EU Registry, European Industrial Emissions Portal (data retrieved on 3 November 2021).

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

[70] EEA, E-PRTR, European Industrial Emissions Portal.The heavy metals are presented 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).

take samples and to gather necessary information. According to Article 23(4) of the IED, site visits must be carried out between once a year and once every 3 years, depending on the environmental risks posed by the installations. In 2018, Sweden undertook 1 590 site visits, most of them to installations in the waste management sector (31%), followed by intensive rearing of poultry or pigs (16%) and the energy sector (10%), as shown in Figure 23

Figure 23: Number of inspections in IED installations in Sweden in 2018[71]



The development of Best Available Techniques (BAT) Reference Documents (BREFs) and BAT conclusions ensures good collaboration with stakeholders and enables a better implementation of the IED[72]. Since the last EIR report, the Commission adopted BAT conclusions for i) waste incineration, ii) the food, drink and milk industries and iii) 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. This should result in considerable and continuous reductions in pollution.

In 2019, Sweden received priority actions to review permits and strengthen control and enforcement to ensure compliance with newly adopted BAT conclusions. These actions have been followed up by the Commission through the reporting by Sweden to the EU Registry and the Commission is currently verifying with Sweden the reported information about the permits granted for each installation in the scope of the IED.

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

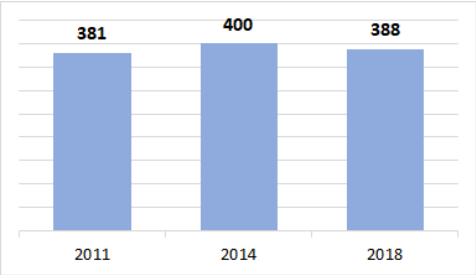
Major industrial accidents prevention – SEVESO

The main objectives of EU policy on major industrial accident prevention 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;
(iii) continuously improve prevention, preparedness and response to major accidents.
The cornerstone of the policy is the Directive 2012/18/EU (the Seveso-III Directive)[73].

The overview below of industrial plants regulated by Seveso-III Directive (hereafter 'Seveso establishments'), is based on data reported to the eSPIRS database (2018)[74] and the Sweden report on the implementation of the Seveso-III Directive for 2015-2018[75].

In Sweden, of the 388 Seveso establishments, 184 are categorised as lower-tier establishments (LTE) and 204 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 evolution in the number of Seveso establishments is presented in Figure 24.

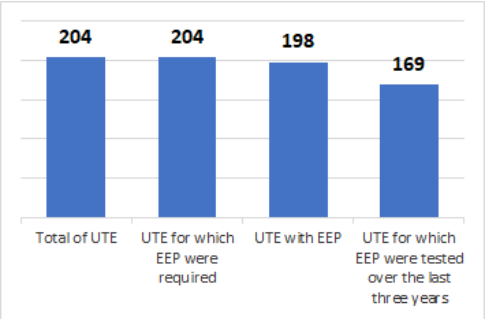
Figure 24: Number of Seveso establishments in Sweden, 2011, 2014 and 2018[76]



According to Sweden, the External Emergency Plan (EEP) is required for 204 UTE. In 2018, 198 UTE had an EEP and 169 of these EEP had been tested over the last 3 years. The summary is shown in Figure 25. Drawing up EEPs is essential to allow proper preparation and effective implementation of the necessary action to protect the environment and the population in the event of a major industrial accident occurring at an establishment.

[73] Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances
[74] European Commission, Seveso Plants Information Retrieval System.
[75] As provided for by Article 21(2) of the Seveso-III Directive
[76] 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.

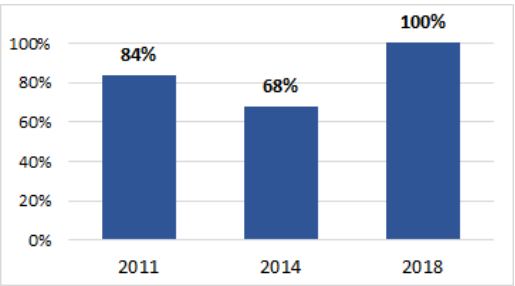
Figure 25: Situation regarding EEP in Sweden, 2018[77]



The information to the public referred to in annex V of 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 the Seveso establishments in Sweden.

The share of UTE for which information on safety measures and requisite behaviours were actively made available to the public over the last years are presented in Figure 26.

Figure 26: Share of UTE for which information on safety measures and requisite behaviours were actively made available to the public in Sweden, 2011, 2014 and 2018[78]



[77] 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.

[78] 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.

2022 priority actions

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

Noise

The Environmental Noise Directive[79] 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. Its main instruments in this respect are noise mapping and planning. A key target under the 2030 zero-pollution action plan is to reduce by 30% the share of people 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[80]. In Sweden, the number of people exposed to noise increased by 9% between 2012 and 2017. Based on a limited set of data[81], environmental noise in Sweden is estimated to cause at least 160 premature deaths and 600 hospital admissions annually[82]. Moreover, some 90 000 people suffer from disturbed sleep.

On the basis of the latest full set of information that has been analysed, noise mapping of agglomerations, roads and railways is complete.

In the 2019 EIR, Sweden received a priority action to complete noise action plans, and there has been substantial progress as detailed above. Therefore, no priority action is proposed for 2022.

[79] Directive 2002/49/EC

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

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

[82] 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 health impact calculations, 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.

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 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 [83] is the cornerstone of the EU water policy in the 21st century. The Water Framework Directive and other water-related legislation[84] set the framework for sustainable and integrated water management, which aims at a high level of protection of water resources, prevention of further deterioration and restoration to good status.

By March 2022, Member States have to report the third generation of their river basin management plans (RBMPs) under the WFD. The Commission will assess the reported status and progress, checking how the findings identified in the assessment of the second RBMPs [85] have been addressed. Sweden has not yet reported its 3rd generation of RBMPs[86].

In December 2021 the Commission published the 6th Implementation report [87], which assesses implementation of the Water Framework and Floods directives. It includes an interim assessment of progress on i) the implementation of the programmes of measures and ii) monitoring the 'new' priority substances. The assessment report for Sweden [88] showed that the effectiveness of the measures and their contribution to achieving the objectives of the Water Framework Directive in 2021 have shown positive progress overall.

Progress is quite similar in the different river basin districts (RBDs). It was estimated that for 50% of measures, the objectives would be met in 2021. Four measures have not yet started, but new legislation will enable the start of at least two of these measures. There are, however, no prospective indicator gaps reported for 2027. Identified indicator gaps for key type measure are expected to be fully closed by 2027.

Based on the 2nd RBMPs reporting and data published 2020[89], in Sweden 36.8% of all surface water bodies[90] reach good ecological status and 100% have poor chemical status. For groundwaters, 2.3% failed to achieve good chemical status and 0.3.% are in poor quantitative status.

Figure 27 illustrates the proportion of surface water bodies in Sweden and other European countries that failed to achieve good ecological status.

Figure 27: Proportion of surface water bodies (rivers, lakes, transitional and coastal waters) in less than good ecological status per River Basin District[91]

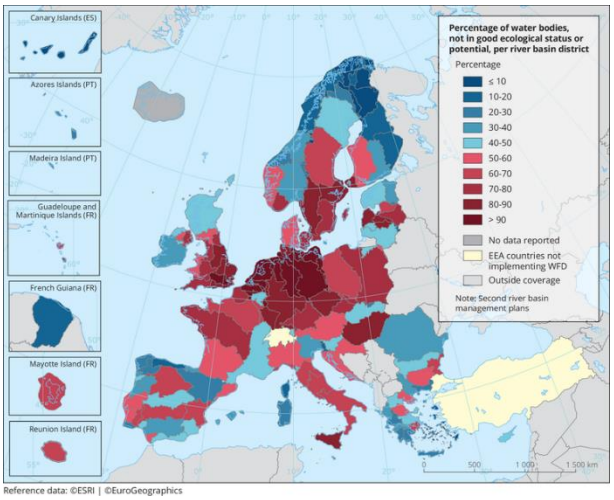
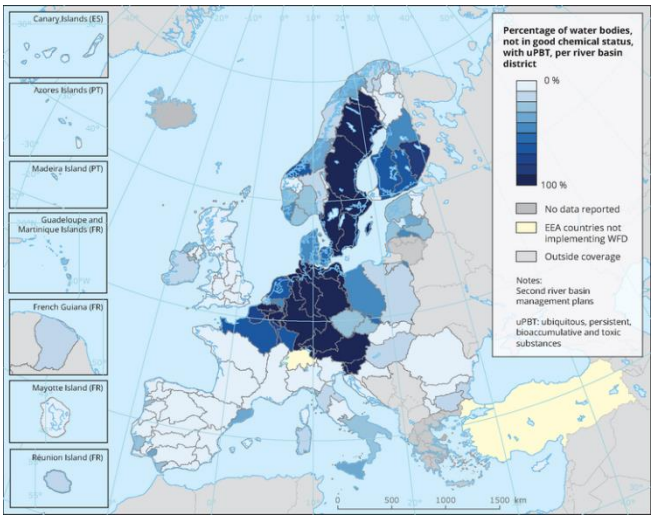


Figure 28 presents the percentage of surface water bodies in Sweden and other European countries failing to achieve good chemical status. For Sweden, the percentage is 100%, if one includes water bodies failing due to substances behaving as ubiquitous PBTs (persistent, bio-accumulative, toxic). Without uPBTs, 1% of surface water bodies are failing good chemical status.

[83] The Water Framework Directive (2000/60/EC).
[84] 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) and the Industrial Emissions Directive (2010/75/EU).
[85] 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.
[86] Based on information provided in April 2022 by Swedish authorities.
[87] See the 6th Implementation Report of the WFD and FD.
[88] 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: Sweden, 2022.
[89] WISE Freshwater (europa.eu)
[90] Rivers, lakes, transitional, coastal, territorial
[91] EEA, 2021.

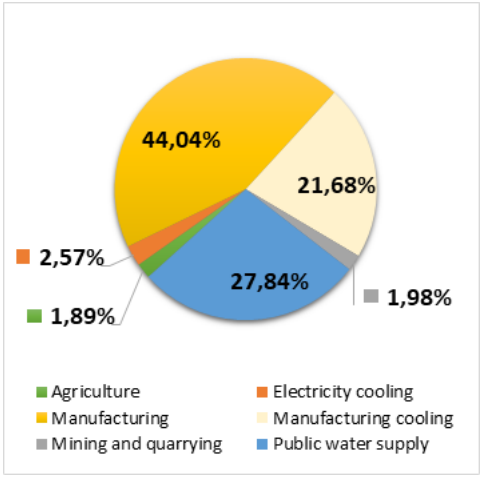
Figure 28: Percentage of surface water bodies not achieving good chemical status[92]



Under the IED framework, it should be stressed that Sweden showed a significant decrease over the last decade (20.2%) in releases to water of heavy metals like Cd, Hg, Ni, PL and (5.8%) in total organic carbon (TOC)[93].

Total water abstracted annually (corresponding to 2019 baseline) in Sweden from surface and groundwater sources is 2827.48 hm^3 (EEA, 2022). The percentage for water abstraction per sector is 1.89% for agriculture, 27.84% for public water supply, 2.57% for electricity cooling, 44.04% for manufacturing, 21.68% for manufacturing cooling and 1.98% for mining and quarrying, as illustrated in Figure 29. Sweden uses different registers to record water abstractions. Small abstractions do not require permits in Sweden, although prior notification to the competent authority is needed for this.

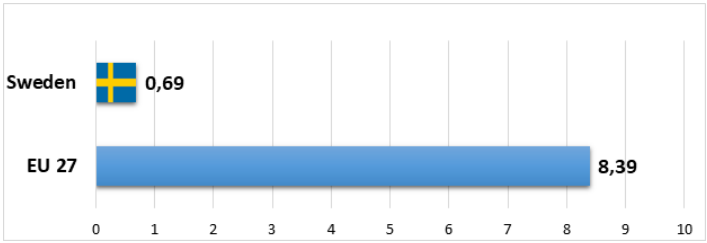
Figure 29: Water abstraction per sector in Sweden[94]



In Sweden, the water exploitation index plus (WEI+)[95] is 0.69%, which is significantly lower than the 20% that is generally considered to be an indication of water scarcity.

Figure 30 presents the WEI+ index in Sweden and other European countries. Sweden is ranked 21st (from high to low index) at EU level in terms of WEI+ .

Figure 30 : Water exploitation index plus (WEI+) inside EU, 2017[96]



Sweden boosts water investments by giving grants for investments that minimize microplastics and other emerging pollutants (pharmaceuticals) via stormwater. Moreover, in 2020 a memo document [97] was published by the Swedish water authorities as a supportive tool for municipal decision-makers providing good arguments for more water measures and sharing examples of how much benefit these measures have for water and how much value can be produced.

Floods Directive

As mentioned above, in December 2021 the Commission

[92] EEA, December 2019.
[93] EEA, June 2021

[94] European Environment Agency, Water abstraction by source and economic sector in Europe, 2022.
[95] 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.
[96] EEA, Water exploitation Index Plus, 2022.
[97] Nyttan med bättre vatten | Vattenmyndigheterna

published the 6th Implementation Report. It includes the review and update of the preliminary flood risk assessments during the second cycle (2016-2021).

The assessment report [98] showed that the Preliminary Flood Risk Assessment (PFRA) contains most of the relevant information in an understandable and accessible form. The report includes information on how the types of flooding included and the maps are different in the second cycle compared to the first one. The report explains the new data and information that have been included, in particular new and improved elevation data and the inclusion of climate change considerations in flood calculations. The assessment identified some areas for further improvement related to the assessment of pluvial floods and the consideration of long-term developments, alongside climate change.

Sweden has reported its 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 new report, as done in 2019.

Sweden and Finland have good cooperation on flood management. Sweden has carried out a joint project and flood mapping with Finland on a shared Area of Potential Significant Flood Risk (APSFR) within the international River Basin District RBD SE1TO sharing the River Torne with Finland.

Drinking Water Directive

On the Drinking Water Directive, no new assessment of the quality of Drinking Water is available since the EIR 2019. The quality of drinking water in Sweden has not been indicated as an area of concern.

The recast Directive 2020/2184 entered into force on 12 January 2021, Member States have until 12 January 2023 to transpose it into their national legal system. Sweden will have to comply with these reviewed quality standards.

Bathing Water Directive

Regarding the Bathing Water Directive, it should be highlighted that in 2020, out of the 445 Swedish bathing waters, 79.3% were of excellent quality [99] (Figure 31). The evolution is shown in Figure 32.

Figure 31: Bathing water quality in Europe in the 2020 season[100]

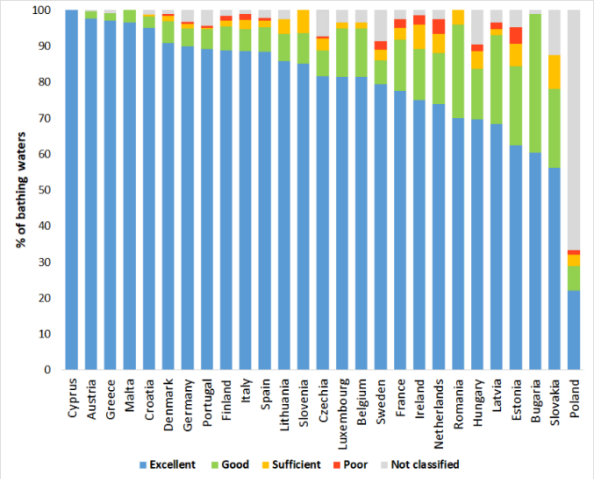
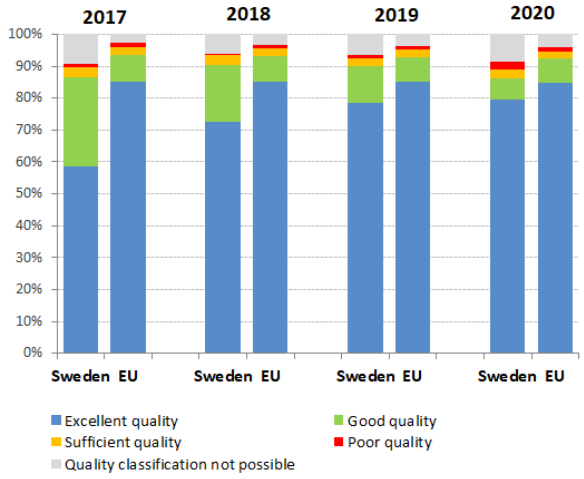


Figure 32: Sweden, bathing water quality 2017-2020[101]



**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[102], referring to 2016-2019[103], warns that nitrates are still causing harmful pollution to water in the EU. Excessive nitrates in water are harmful to both human health and 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.

[98] European Commission, Directorate-General for Environment, Assessment of Second Cycle Preliminary Flood Risk Assessments and Identification of Areas of Potential Significant Flood Risk under the Floods Directive : Member State : Sweden, 2022

[99] EEA, Bathing Water Quality in 2020, 2022.

[100] EEA, Bathing Water Quality in 2020, 2022

[101] EEA, European Bathing Water Quality in 2017, 2018, 2019, 2020.

[102] Implementation of the Nitrates Directive in the EU

[103] European Commission, implementation report 2016-2019.

Sweden has a low livestock density and a low surplus of nitrogen and phosphorus. There is a well-developed network of monitoring stations. The groundwater quality is generally very good, but there are a number of monitoring stations showing eutrophication. Eutrophication affects inland waters inside Nitrate Vulnerable Zones (NVZ) and coastal waters.

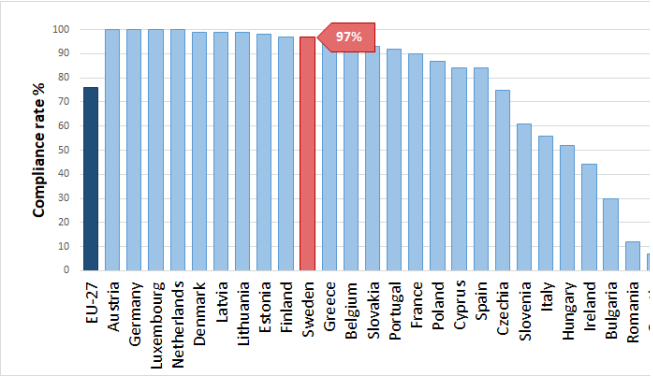
The action programme was revised in 2022.

Urban Waste Water Treatment Directive

Sweden has over the years encountered some difficulties in meeting its obligations under the Urban Waste Water Treatment Directive (UWWTD). According to the last available data [104], the overall compliance rate in Sweden is 97%, which is higher than the EU average of 76% in 2018.

Regarding the amount of urban wastewater which still needs to be collected or treated according to the requirements of the UWWTD, further efforts are needed to provide biological treatment for an additional 0.10 million p.e of urban waste water (0.8%) and biological treatment with nitrogen and/or phosphorus removal to additional 0.34 million p.e. of urban waste water (3.0%).

Figure 33: The 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 [105]



On 2 September 2021, the Court of Justice of the European Union found Sweden in breach of the Urban Waste Water Treatment in respect of several agglomerations. The Commission expects Sweden to notify the measures that it will take to comply with the ruling.

2022 priority actions

- Assess new physical modifications of water bodies in line with Article 4(7) of the Water Framework Directive. In these assessments alternative options and adequate mitigation measures have to be considered.
- Reinforce action programme to better address eutrophication issues for inland waters and marine waters.
- Complete the implementation of the Urban Waste Water Treatment Directive for all agglomerations, by building up the necessary infrastructure.

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'[106], 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 [107] provides baseline protection for human health and the environment. It also ensures stability and predictability for businesses operating within the single market.

Since 2007, the Commission has gathered information on the enforcement the Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals ('the REACH Regulation') and the Regulation on Classification, Labelling and Packaging ('CLP Regulation').

In December 2020, the Commission assessed the Member States reports on the implementation and enforcement of these Regulations[108], 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 the implementation of the REACH and CLP regulations and notably in the area of the law enforcement. Recorded compliance levels seem to be quite stable over time, but with a slight worsening trend, which is likely due to i) enforcement authorities being more effective in detecting noncompliant products/companies and ii) more non-compliant products being put on the EU market. In August 2021, the Commission published a measurable assessment of the enforcement[109] of these two main EU

[104] WISE – Country profiles on urban waste water treatment - Sweden
[105] European Commission, WISE Freshwater, 2021.

[106] COM(2020) 667 final
[107] REACH: OJ L 396, 30.12.2006, p.1. - CLP: OJ L 252, 31.12.2006, p.1
[108] European Commission, Final report REACH-CLP MS reporting 2020.
[109] European Commission, REACH and CLP enforcement: EU level enforcement indicators.

Regulations on chemicals using a set of indicators on different aspects of enforcement.

Responsibility for checking compliance with REACH in Sweden lies with the following authorities[110]:

- Swedish Chemicals Agency
- Swedish Work Environment Authority
- Swedish National County Boards
- Swedish Municipal Authorities

Sweden has deviced and implemented enforcement strategies for both REACH and CLP[111] on a risk-based approach – companies are selected in those areas where there is potential for improvement:

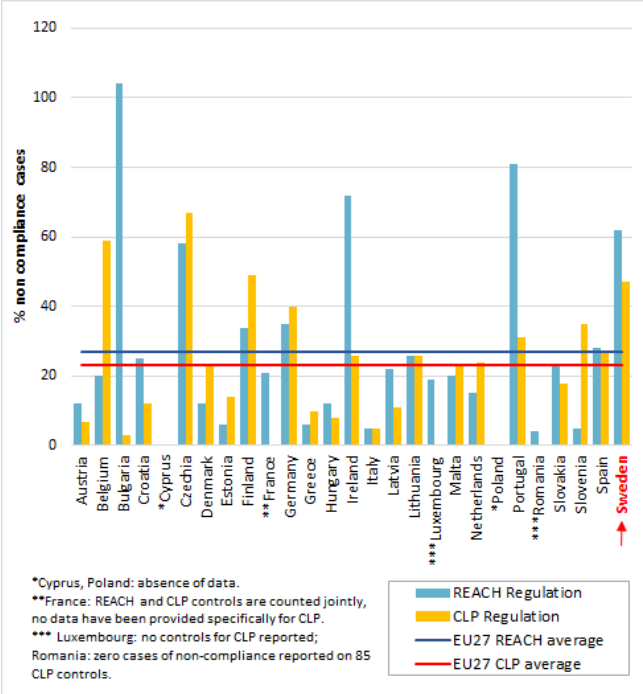
- companies that import/manufacture products which contain substances of high concern;
- companies that have high-volume products with a wide circulation;
- products containing hazardous substances and used by sensitive groups, such as children;
- when new regulations come into force;
- where there is knowledge of poor compliance with existing regulations etc.

Enforcement action is based on a product register containing information on chemicals manufactured or imported to Sweden. For articles, companies are monitored through trade associations, customs, advertising, the internet etc

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. That authority may also, where necessary, order the provisional seizure of assets and documents.

In Sweden 9 000 - 9 500 man-hours annually are allocated to REACH and 7 700 man-hours to CLP enforcement[112], not including the work done by staff members of the 300 national and the 290 municipal authorities. More than 3 000 REACH and CLP controls were carried out in the reporting period (2019). Although the actual level of expertise has increased since the last reporting round, it is still not sufficient for some specific tasks under REACH, namely in relation to risk management and some specific areas of concern such as nanomaterials and endocrine disruptors. The significant percentage of non-compliance cases in the total number of REACH and CLP controls should be noted [113].

Figure 34: 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[114]



2022 priority actions

- Upgrade implementation and enforcement administrative capacities to enable zero tolerance for non-compliances.

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

[111] Final report_REACH-CLP MS reporting_2020.pdf (europa.eu), p. 76.

[112] European Commission, Final Report, on the operationof REACH and CLP, Final report_REACH-CLP MS reporting_2020.pdf (europa.eu), p. 75.

[113] Final report_REACH-CLP MS reporting_2020.pdf (europa.eu), p. 87-88

[114] European Commission, Final Report, on the operation of REACH and CLP, pp.87-88, 2022.

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[115] and sets binding GHG emission standards for different vehicle categories[116].

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[117], 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

Sweden has combined sustained economic growth with successful efforts to reduce greenhouse gas (GHG) emissions over a longer period. It is among the EU Member States with the lowest GHG emissions per capita. Its national GHG emission reduction targets aims at a reduction in non-ETS emissions (from sectors outside the EU's emissions trading system)[118] by 2030 of at least 63% compared to 1990 levels. This translates to a 59% reduction compared to 2005 (of which 8 percentage points may be reached with 'complementary measures', (these may include bio-CCS[119], an increased LULUCF[120]-sink and verified emission rights produced and purchased from outside Sweden). This target is more ambitious than its current EU commitments under the Effort Sharing Regulation, which require Sweden to cut emissions by 40% in 2030 compared to 2005 levels. According to a decision in the Swedish parliament in 2017, Sweden must reach carbon neutrality by 2045. The national carbon neutrality target is formulated as a reduction in total emissions, excluding LULUCF, of by 85%. The remaining emissions should be offset by the use of complementary measures. The climate law that was also adopted in 2017 requires current and future governments to pursue policies based on national climate objectives. The law contains elements that ensure climate action is integrated into budget planning as well as policy follow-up. *The Swedish Climate Policy Council* - an independent expert body – assesses whether the overall policy decided by the government is in line with the climate objectives.

Sweden has an integrated *National Energy and Climate Plan* (NECP) for 2021-2030, which builds on long-term energy and climate plans and roadmaps and is also consistent with *Sweden's Long-term Strategy for Reducing Greenhouse Gas Emissions.* To achieve carbon neutrality by 2045, the government has recognised the need for further measures. Its climate policy action plan, published in December 2019, presents 132 measures across different sectors. The focus is on reducing GHG emissions from the transport sector. More broadly, the government is continuing its policy of significant pricing of emissions, to reduce them while at the same time considering a shift from labour and corporate taxes towards environmental taxes.

The *National Strategy for Climate Change Adaptation* includes Sweden's climate change adaptation goals,

[115] 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.

[116] Directive 98/70/EC.

[117] Article 29 of Regulation (EU) 2018/1999.

[118] Sectors currently outside of the European Emission Trading System (ETS) include buildings, road and domestic maritime transport, agriculture, waste and small industries, and F-gases.

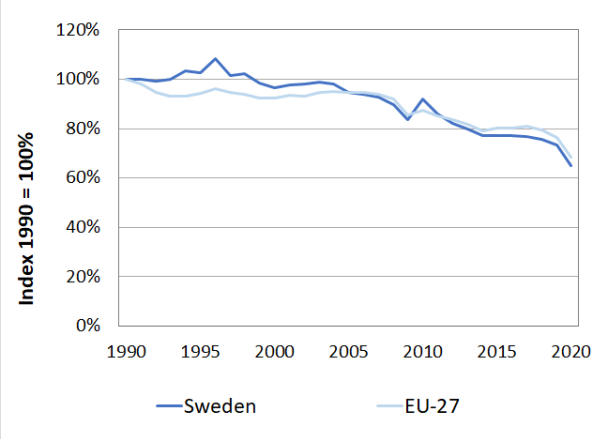
[119] carbon capture and storage

[120] land use, land-use change and forestry

guiding principles, organisation and distribution of responsibilities, monitoring, financing principles and knowledge-boosting initiatives. The strategy is evaluated in 5-year cycles and will next be updated in 2023, supported by an Expert Council on Adaptation, which the Government has nominated. The government's Ordinance on Agencies' Climate Change Adaptation (2019) regulates the work done on climate change adaptation by 32 agencies and all county administrative boards.

Between 1990 and 2020, economy-wide greenhouse gas emissions in Sweden decreased by 35%. It is among the EU Member States with the lowest GHG emissions per capita (see Figure 35).

Figure 35: Total greenhouse gas emissions (incl. international aviation) in Sweden, 1990-2020



Effort sharing

For emissions not covered by the EU's emissions trading system (ETS), Member States have binding national targets under the EU's Effort Sharing legislation. Sweden has a target of reducing greenhouse gas emissions in the non-ETS sectors (buildings, road and domestic maritime transport, agriculture, waste and small industries) by 17% by 2020 and 40% by 2030, compared to 2005 levels (see Figure 36). The country's emissions in 2019 from these sectors were well below its 2020 target. Sweden has decided not to sell or bank its surplus of annual emissions allocations (AEAs), thus contributing to its overachievement of the EU climate target.

In its National Energy and Climate Plan, Sweden projects to achieve reductions in line with its current EU target for 2030 (see Figure 37).

Figure 36: Emissions and targets under the Effort Sharing Decision / Effort Sharing Regulation in Sweden, 2020 and 2030 as percentage change from 2005

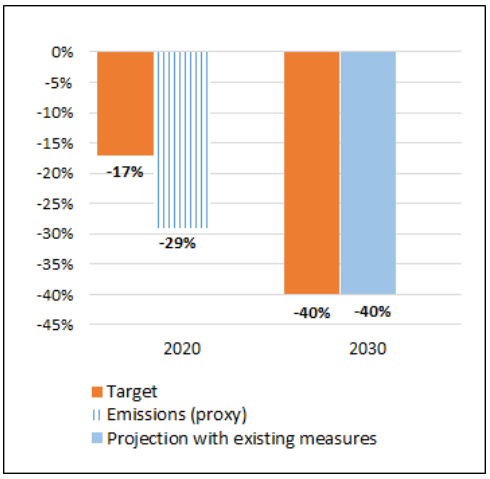
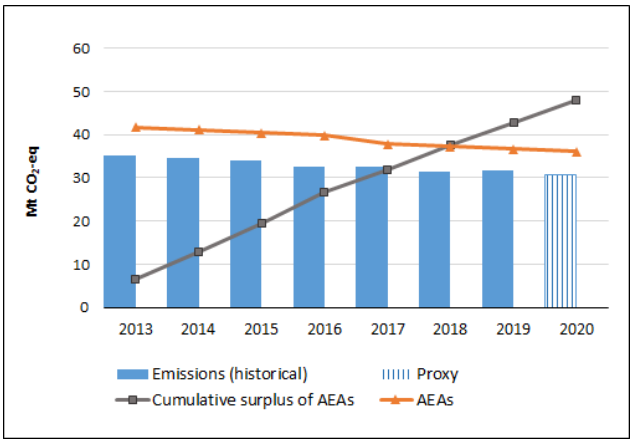


Figure 37: Emissions, annual emission allocations (AEAs) and accumulated surplus/ deficit of AEAs under the Effort Sharing Decision in Sweden, 2013-2020



Key sectoral developments

In road transport, the GHG intensity of vehicle fuels in Sweden decreased by 18.6%, meaning that Sweden substantially overachieved the current EU-wide reduction obligation of 6% by 2020. There are several types of action that Member States can take in this regard, for example, i) further expanding the use of electricity in road transport ii) supporting the use of biofuels, and advanced biofuels in particular, iii) incentivising the development and deployment of renewable fuels of non-biological origin and iv) reducing upstream emissions before refining processes.

In 2019 road transport represented 28% of the total greenhouse gas emissions in Sweden. Improving Sweden's transport infrastructure and making it climate friendly is a key challenge. Emissions have decreased by 24% compared to 2005. The national objective is to decrease emissions from domestic transport (except aviation) by at least 70% by 2030 from 2010 levels. Recent initiatives for long-term investment have focused on making transport sustainable by upgrading the different transport modes, in particular railways. In July 2018, a greenhouse gas emissions reduction obligation for petrol and diesel, in conjunction with fuel tax reforms, called the Fuel Change, was implemented. The emission reduction obligation establishes an obligation on petrol and diesel suppliers to reduce carbon dioxide emissions, by gradually increasing blending with sustainable biofuels. The reduction obligation scheme makes an important contribution to phasing out fossil fuels in road transport. Since 2021, Sweden also has an emissions reduction obligation for aviation.

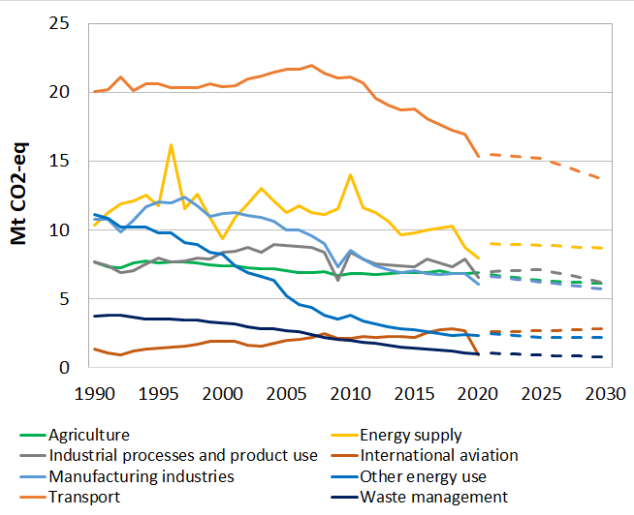
A number of measures have been adopted to support charging infrastructure for electric vehicles in rural areas. The government has introduced a new climate bonus for electric lorries and electric working machines, merged it with the existing electric bus bonus and boosted the funding by SEK 20 million for 2020, bringing it to SEK 120 million. In addition, the eco-bonus system, designed to promote a shift in goods transport from road to ship, is being prolonged, with SEK 50 million per year until 2022. Sweden's maritime transport sector is also preparing to end the use of fossil fuels domestically by 2045, in line with the national climate objectives.

To further reduce emissions from buildings, energy efficiency investments are needed, as the building sector has a role to play in meeting energy efficiency and climate targets for 2030 and beyond. Sweden has presented a comprehensive set of energy efficiency measures for the buildings sector in its national long-term renovation strategy. Implementing this strategy will go a long way towards increasing energy efficiency, but more effort is needed to reach EU energy efficiency targets. In addition, Sweden plans to carry out the renovation of its building stock in stages, depending on the age of the building. In particular, priority would need to be given to improving the energy efficiency of the worst performing buildings and to reducing energy poverty.

Emission from agriculture have not decreased and are comparable to their 2005 levels.

Figure 38 shows GHG emissions by sector.

Figure 38: Greenhouse gas emissions by sector in Sweden[121] – historical emissions 1990-2019, projections 2021-2030[122]



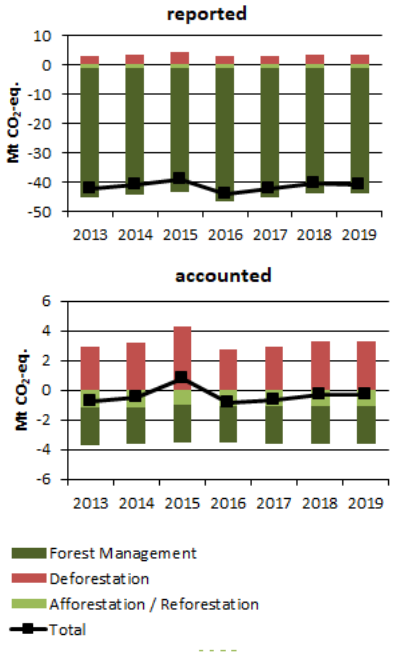
Sweden expects the LULUCF sector to continue to contribute annual net removals in future. Projections indicate a small decrease in net removals by 2030, under existing measures. Reported quantities under the Kyoto Protocol for the LULUCF sector in Sweden show net removals of, -41.4 Mt CO2-eq on average for 2013-2019. In this regard, Sweden contributes 12.0% to the EU27's annual average sink of -344.9 Mt CO2-eq (see Figure 39).

Figure 39: Reported and accounted emissions and removals from LULUCF in Sweden[123]

[121] 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.

[122] European Environmental Agency, Total GHG trends and projections.

[123] 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*'.



Use of revenues from the auctioning of EU ETS allowances

The total revenues from auctioning of emissions allowances under the EU ETS over 2013-2020 were EUR 834.5 million. Revenues are not earmarked but example projects have been reported for at least the minimum required spending on energy and climate.

2022 priority actions

- Increase the sustainability of the transport sector
- Support further renewable energy production as decarbonisation of industry and the electrification of road transport will require significant investments in new wind power and renewable electricity generation
- Support investment in new electricity transmission and distribution infrastructure, as well as sector integration and energy storage technologies
- Ensure the sustainable use of biomass, as biomass use is likely to increase. Biofuels will continue to play an important role for decarbonisation and electrification, including by serving the cause of clean transport and the decarbonisation of industrial processes.
- Support investment in energy efficiency by renovating buildings

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 measures will also be supported by the EU's COVID-19 Recovery Fund (via the Recovery and Resilience Facility) and the 'do no significant harm'' principle across the EU budget. The renewed commitments made at COP26 (Glasgow, October-November 2021), and the Biodiversity Convention COP15 (April-May 2022)[124] will also be reflected in the EU budget.

Overall environmental investment gaps (EU27)

The EU's investment needs for the green transition cover a range of interlinked areas. The additional investment needs over baselines (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 in 2021 to be EUR 390 billion a year (EU27) [125], with a further EUR 130 billion a year to deliver the EU's core environmental objectives[126]. The costs of climate adaptation can also be significant, and are estimated to reach a total of EUR 35-62 billion (narrower scope) or EUR 158-518 billion (wider scope) per year[127]. Those investment needs reflect the implementation objectives to 2020 and to 2030 (except for climate change adaptation, the costs of which are expected to last over a longer time horizon).

A preliminary update of the EU's core environmental investment gap is provided in Table 1[128]. Almost 40% of the environmental investment needs relate to dealing with pollution, which accounts for nearly two-thirds of the total if combined with water management. The investment gap in circular economy and waste is estimated at EUR 13-28 billion a 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 needs, by environmental objective[129]

Environmental objective	Estimated investment gap (EU-27, p.a.)	
	EUR billion	%
Pollution prevention & control	42.8	39%
Water management & industries	26.6	24%
Circular economy & waste	13.0	12%
Biodiversity & ecosystems[130]	21.5	20%
R & D & I and other	6.2	6%
Total	**110.1**	**100%**

Environmental investment needs in Sweden

There is a shift in investment priorities in most Member States of the EU towards support for climate, energy and transport policies, as reflected in national RRPs.

For Sweden, the following environmental investment needs have been identified by sector.

[124] The Convention on Biological Diversity (cbd.int); Post-2020 Global Biodiversity Framework | IUCN.
[125] SWD(2021) 621, accompanying proposal COM(2021) 557 to amend the REDII Directive (EU) 2018/2001.
[126] SWD (2020) 98 final/2
[127] SWD(2018)292 Impact assessment accompanying the LIFE Regulation
[128] With decreases due to Brexit and some reconciliation among the objectives. Source: DG ENV "Study supporting EU green investment needs analysis" (ongoing, 2021-2023) and DG ENV internal analysis "Environmental investment needs and financing in the EU's green transition" July 2020.
[129] 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.
[130] 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) while to fully cover the strategy (including restoration) EUR 30-35 billion may be needed. This indicates a gap of EUR 10-20 billion a year compared to current baseline expenditure.

Pollution prevention & control

The EU's first Clean Air Outlook[131] under the clean air programme estimated that the total air pollution control costs for Sweden to reach NECD emission reduction requirements (ERRs)[132] by 2030 amount to EUR 1.2 billion per year. This includes EUR 742 million for capital investment and assumes the 2030 climate and energy targets are met.

The second Clean Air Outlook [133] suggests that the EU would largely achieve the reductions in air pollutant emissions that correspond to the obligations under the NEC Directive for 2030, if: (i) all relevant legislation adopted up to 2018 is implemented (including all air pollution and the 2030 climate and energy targets set in 2018); and (ii) Member States also implemented the measures announced in their national air pollution control programmes. The only exception is for ammonia for 15 Member States, including Sweden.

Water management

According to the OECD study 'Financing Water Supply Sanitation and Flood Protection (2020)'[134], Sweden relies on a mix of conventional (e.g. groundwater and fresh water) and non-conventional (e.g. artificial recharge) resources for its water supply.

EU funding has provided a significant share of public funding over the past decade[135]. It is also estimated that Sweden will need to invest an additional cumulative EUR 2.1 billion by 2030 over baselines for drinking water and sanitation – corresponding to around EUR 210 million of investment needed (capital expenditure) per year, with over 90% of that relating to wastewater[136]. Moreover, the recent 6th Water Framework Directive and Floods Directive Implementation Report[137] and the financial/economic study[138] accompanying it, are also a relevant source of information in this regard.

Waste & circular economy

According to a Commission study[139], to meet the recycling targets for municipal waste and packaging waste, Sweden still needs to invest an additional EUR 313 million over baselines (around 44.7 million per year) in 2021-2027 in collection, recycling reprocessors, biowaste treatment and waste sorting facilities, and waste registry digitalisation. This does not include investment necessary for other key waste streams (plastics, textile, furniture) or to prompt a higher uptake of circularity and waste prevention across the economy .

Biodiversity & ecosystems

The recently submitted priority action framework (PAF) for Sweden shows that nature protection costs (including Natura 2000) in 2021-27 are EUR 5.44 billion – or around EUR 777.3 million per year (including EUR 240 million of annual one-off costs)[140]. This does not cover additional costs for implementing the 2030 biodiversity strategy, including costs relating to increased protection and restoration.

EU environmental funding 2014-2020

The multiannual financial framework (MFF) for 2014-2020 allocated almost EUR 960 billion (in commitments, 2011 prices)[141] for the EU to spend over this period. That commitment to green transition included a 20% climate spending target. It also included funding opportunities for the environment, in particular, under the European Structural and Investment (ESI) Funds[142]. The 2014-2020 budget was subsequently topped up with over EUR 50 billion (current prices) from REACT-EU for cohesion policy action against coronavirus (COVID-19)[143].

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

[132] 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 Directive (EU) 2016/2284

[133] COM(2021) 3 final. International Institute for Applied Systems Analysis (IIASA), Support to the development of the Second Clean Air Outlook, 2020 and Annex

[134] OECD, Financing Water Supply, Sanitation and Flood Protection: Challenges and Options, 2020

[135] OECD, Financing Water Supply, Sanitation and Flood Protection: Challenges and Options, 2020

[136] OECD, Sweden - Country fact sheet - Financing Water Supply, Sanitation and Flood Protection https://www.oecd.org/environment/resources/latestdocuments/2/

[137] European Commission, Water Framework Directive and Floods Directive Implementation Reports.

[138] 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. Publications Office, 2021.

[139] European Commision, *Study on investment needs in the waste sector and on the financing of municipal waste management in Member States,* 2019.

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

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

[142] The European Structural and Investment (ESI) Funds include the European Regional Development Fund (ERDF), the Cohesion Fund (CF) which Sweden does not recei, 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).

[143] Regulation (EU) 2020/2221.

Sweden received EUR 4.54 billion from the ESI Funds over 2014-2020 to invest in job creation and a sustainable and healthy European economy and environment. The planned direct environmental investment amounted to EUR 94.9 million, with further 99.3 million identified as indirect environmental investment value, totalling EUR 194.2 million (Table 2). Figure 40 provides an overview of (planned) individual ESI Funds earmarked specifically for Sweden (EU amounts, without national amounts) for 2014-2020 and the environmental investments contained.

Figure 40: 2014-2020 ESI Funds allocated to Sweden, including environmental investment[144]

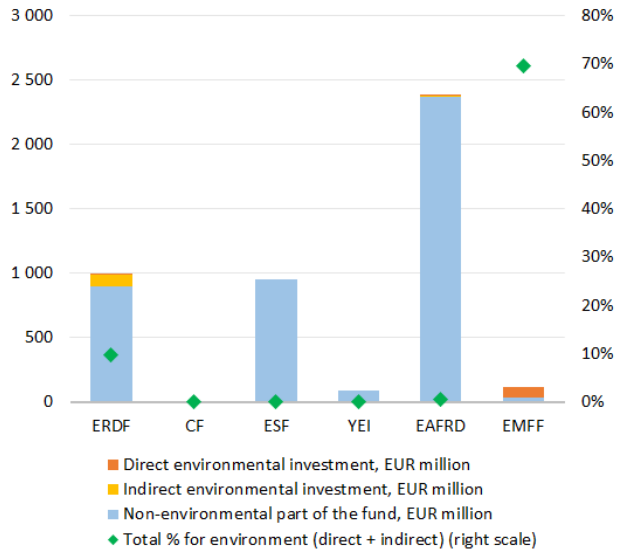


Table 2: Direct and indirect environmental investments under the ESI Funds in Sweden 2014-2020[145]

Instrument	Allocations for the environment (EUR million)
Under Cohesion policy (ERDF)	**96.9**
Direct environmental investments	1.3
climate and risk management	1.3
Indirect environmental investments	95.5
renewable energy	1.3
energy efficiency	32.0
sustainable transport	24.3
business development, R&I	38.0
Under EAFRD/rural development	**13.7**
Direct environmental investments	9.9
climate and risk management	9.9
Indirect environmental investments	3.8
renewable energy	3.8
Under EMFF	**83.6**
Direct environmental investments	83.6
environment protection & resource efficiency	83.6
Under ESI Funds total	**194.2**
Direct environmental investments	94.9
Indirect environmental investments	99.3

Funding for the environment from the ESI Funds has been also 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). This adds up to an estimated total of EUR 655 million of EU environmental financing for Sweden in 2014-2020.

The LIFE programme[146] is entirely dedicated to environmental and climate objectives. It finances pilot and best practice actions for green solutions to be deployed. In 2014-2020, Sweden received EU support for 21 LIFE projects (for nature and environment) with EUR 89.9 million from the LIFE programme (out of 1 028 EU-27 LIFE projects with a total EU contribution of EUR 1.74 billion)[147].

[144] European Commission, DG Environment - Data analysis, 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 investment here is 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 investment. N.B. indirect environmental investment is valued using the Annex I environmental coefficients from Regulation (EU) 2021/1060 (as opposed to full value).

[145] European Commission, DG Environment - Data analysis. The values for 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 previous footnote.

[146] European Commission, LIFE Programme.

[147] Source: CINEA

In 2014-2020, Horizon 2020 allocated Sweden EUR 90.2 million for the environment – specifically for climate action, circular economy and raw materials, which is 3.9% of Sweden's total allocation[148]. From the European Fund for Strategic Investments (EFSI), Sweden received a total of EUR 1 849 million in financing. Of this, EUR 256 million related to direct environmental projects, with a further EUR 120 million indirect investment value from other projects[149].

The environment-related EIB loans to Sweden amounted to EUR 161.6 million (supporting mostly water and sewerage), out of an overall EUR 12.6 billion EIB lending to Sweden in the period[150]. The country ranks 8th in size in total EIB lending.

In 2020, the EIB provided EUR 24.2 billion in funding across Europe to fight climate change, 37% of its total financing. It also provided EUR 1.8 billion (3% of its financing) for the environment[151].

EU environmental funding 2021-2027

The 2020 European Green Deal investment plan calls for EUR 1 trillion green investment (public and private) to be made across the EU by 2030. The 2021-2027 multiannual financial framework (MFF) and the NextGenerationEU programme will together mobilise EUR 2.018 trillion (in current prices) to support the recovery from COVID-19 and the EU's long-term priorities, including environmental protection[152].

Following the EU Green Deal's[153] pledge to 'do no harm' and the Interinstitutional Agreement on the 2021-2027 MFF[154], 30% of the EU budget will support climate efforts, while biodiversity will receive 7.5% of the EU budget as of 2024 and 10% as of 2026, specifically under the 2021-2027 cohesion policy and the 2023-2027 CAP .

Sustainable finance significantly increases transparency on environmental sustainability (a goal promoted by the EU Taxonomy)[155]. It also strengthens non-financial reporting requirements and facilitates the issuance of green bond (by developing the EU green bond standard[156]). Reinforced by the renewed sustainable finance strategy (2020)[157], sustainable finance will increase investment flows to climate and environment. The new strategy on adaptation to climate change[158] can help to close the insurance-protection gap, which currently leaves many risks from climate-related events uninsured[159]. The EIB will align 50% of its lending with climate and environment by 2025[160] with an EUR 250 billion contribution to the Green Deal investment plan by 2027.

Table 3 gives an overview of the EU funds earmarked specifically for Sweden for 2021-2027. These funds are also supplemented by other EU funding programmes that are available to all Member States.

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

Instrument	Country funding allocation (million EUR)
Cohesion policy	**Total: 1 925.5** [161]
ERDF	862.5
ESF+	706.9
ETC (ERDF)	356.1
Just Transition Fund	**155.7** [162]
EAFRD/rural development under CAP Strategic Plans 2023-2027 [163]	**1 059.4** [164]
European Maritime, Fisheries and Aquaculture Fund (EMFAF)	**115.9** [165]

[148] EASME , accessed: 15-12-2021.
[149] Approved and signed EFSI financing - EIB, 2015-2020: Source: https://www.eib.org/en/products/mandates-partnerships/efsi/index.htm.
[150] EIB loans in EU countries in 2014-2020. Source: EIB Open Data Portal:
[151] EIB 2020 Activity Report. The EIB Group jointly works with the European Commission in implementing several programs that finance environmental implementation: InvestEU, the successor of EFSI, Pillar II and III of the Just Transition Mechanism. The EIB Group stands as a key implementing partner for InvestEU with responsibility for managing 75% of the overall budgetary capacity of the mandate.
[152] European Commission, 2021-2027 long-term EU budget & NextGenerationEU.
[153] COM/2019/640 final.
[154] Interinstitutional Agreement, OJ L 433I.
[155] European Commission, EU taxonomy for sustainable activities
[156] EU Green Bond Standard - 2021/0191 (COD).
[157] COM (2021) 390 Final - European Commission, Strategy for Financing the Transition to a Sustainable Economy.
[158] COM(2021) 82 final.
[159] 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 | Eiopa (europa.eu).
[160] EIB Climate Bank Roadmap 2021-2025, November 2020
[161] European Commission, 2021-2027 Cohesion policy EU budget allocations.
[162] European Commission, 2021-2027 Cohesion policy EU budget allocations.
[163] European Commission, CAP strategic plans.
[164] Regulation (EU) 2021/2115, Annex XI.
[165] Regulation (EU) 2021/1139, Annex V.

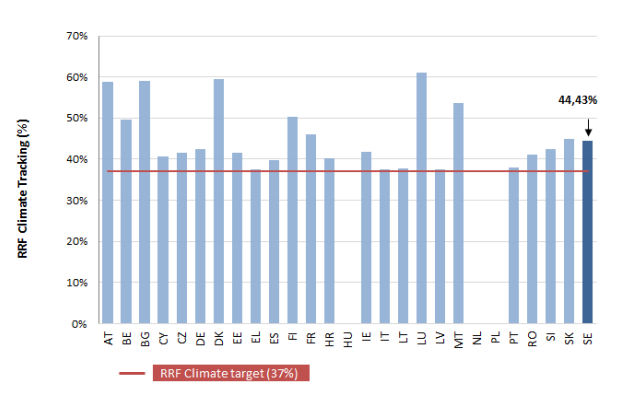
Recovery and Resilience Facility (RRF) 2021 – 2026 [166]	**3 288.5** [167]

In Sweden, the programming for most EU funds (cohesion policy funds, EAFRD and EMFAF) is ongoing.

Sweden's Recovery and Resilience Plan (RRP) amounts to EUR 3.3 billion. Sweden has requested only non-repayable financial support under the RRF. This represents some 0.7% of 2019 GDP. The plan is structured along five components aimed at tackling Sweden's structural challenges, which the COVID-19 crisis exacerbated. Measures included in the plan complement the national economic measures introduced by Sweden in response to the COVID-19 pandemic and its economic fall-out and are consistent with the 2021 National Reform Programme. The plan consists of 27 measures (12 investments and 15 reforms).

The reforms and investments in the plan can be expected to significantly contribute to the green transition. Overall, 44.43% of the recovery and resilience plan's total allocation contributes to the climate objectives (see Figure 41). Measures focus on decarbonising industry and transport in Sweden. In particular, component 1 contains dedicated measures to decrease process-related emissions and decarbonise the industry through research and development projects, and to support local and regional projects on CO2 emission reductions, including electric charging stations. Moreover, component 1 is expected to help protect valuable nature and thus biodiversity in Swedish forests, by establishing formally protected areas of nature reserves. In addition, component 5 includes investment support for energy efficiency and building renovation, to reduce primary energy consumption and carbon dioxide emissions in the housing sector.

Figure 41: Climate expenditure in RRPs[168]



By 2026, under NextGenerationEU, the Commission will issue up to EUR 250 billion of EU green bonds (one third of all bonds issued under NextGenerationEU) that will comply with the general spirit of the 'do no significant harm' principle. However, this EUR 250 billion in green bonds will not be subject to the currently developed delegated acts related to the EU Taxonomy and will not fully align with the proposed EU standard for green bonds standard.

In addition to EU funds earmarked specifically for Sweden in 2021-2027, there are also funding programmes that can been accessed at EU level and which are open to all Member States. These include the LIFE programme[169] (EUR 5.4 billion), Horizon Europe (EUR 95.5 billion)[170], the Connecting Europe Facility[171], (EUR 33.7 billion)[172] or the funds to be mobilised via the InvestEU[173] [174] programme. These other sources of funding will also support the green transition, including research and innovation activities for environmental protection (Horizon Europe)[192], clean transport and energy (the Connecting Europe Facility)[193] and sustainable infrastructure (InvestEU)[194].

[166] The actual reforms and investments under the RRF have to be implemented until 31 December 2026.
[167] Sweden's RRP endorsed by the European Commission on 29 March 2022

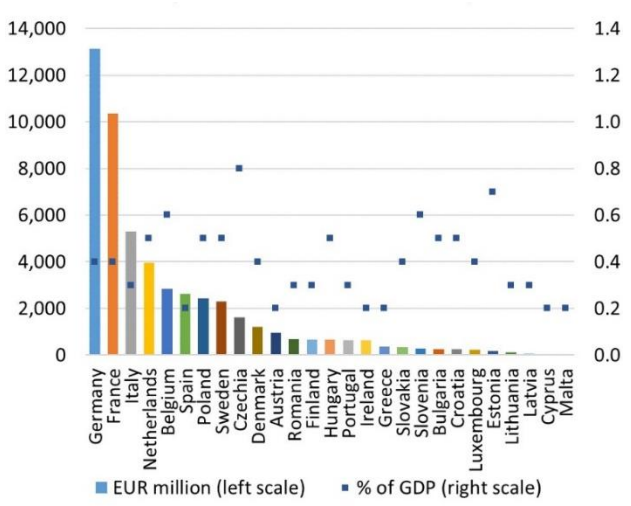
[168] European Commission. The contributions to climate objectives have been calculated using Annex VI of the RRF Regulation (EU) 2021/241.
[169] European Commission, LIFE Programme.
[170] European Commission, Multiannual financial framework 2021-2027 (in commitments) - Current prices.
[171] The CEF (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 respect the national envelopes until 31 December 2023. Any unspent amount, by that date, under national envelopes will support all Cohesion Fund's Member States.
[172] Regulation (EU) 2021/1153.
[173] The InvestEU Fund is envisaged to mobilise over EUR 372 billion of investment through an EU budget guarantee of EUR 26.2 billion to back the investment of financial partners such as the European Investment Bank (EIB) Group and others.
[174] European Commission, Horizon Europe.

National expenditure on environmental protection

Total national expenditure on environmental protection (including all relevant current and capital expenditure)[175] in the EU-27 was EUR 272.6 billion in 2020, representing 2% of the EU-27 GDP. This percentage has remained quite stable over time. Although the largest absolute amounts of expenditure are concentrated in a few countries, most countries spend 1-2% of their GDP on environmental protection, with Sweden dedicating 2.1% of its GDP (see Figure 42).

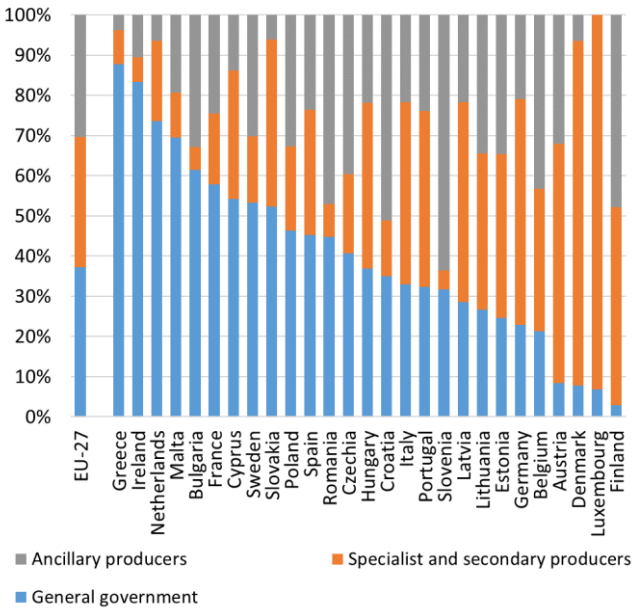
Of this spending, the EU-27's capital expenditure (Capex) on environmental protection (i.e. investment) amounted to EUR 56.3 billion in 2018, falling to EUR 54.5 billion in 2020, representing around 0.4% of GDP. Most Member States invested 0.2-0.5% of their GDP in environmental protection, with Sweden dedicating 0.5%. During 2014-2020, this totalled around EUR 376 billion of environmental investment in the EU-27, and EUR 13.4 billion for Sweden.

Figure 42: Environmental protection investment in the EU-27 (2018, EUR million and % of GDP)[176]



By institutional sector, around 53% of Sweden's environmental protection investment (capital expenditure) came from the general government, another 17% from specialist producers (of environmental protection services, e.g. waste and water companies) and 30% from the classic industry (or business) sector, in which businesses normally pursue environmental activities as ancillary to their main activities. At EU level, 37% comes from governments, 33% from specialist producers and 30% from industry (business), see Figure 43.

Figure 43: EU-27 Member States' environmental protection investment (Capex) by institutional sector (Total economy = 100%), 2018[177]



A partial breakdown of investment by environmental topic is available, at the level of institutional sectors only (rather than at economy level), due to different reporting patterns[178]. At Sweden's general government level, 50% of environmental protection investment went to waste management, 39% to wastewater and 5% to air pollution in 2018. For the country's specialist producers, 69% of the relevant investment was received by waste management and 30% by wastewater. As regards industry (businesses), 32% of environmental investment went to protection from air pollution, 28% to protecting biodiversity, 12% to wastewater and 10% to waste management, to name the most significant items.

In 2020, total annual European green bond issuance[179] (also including some non-EU countries) was USD 156

[175] 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 beyond domestic. Data source: Environmental Protection Expenditure Accounts (EPEA), Eurostat. EPEA accounts are based on the CEPA 2000 classification, excluding climate, energy and circular economy.

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

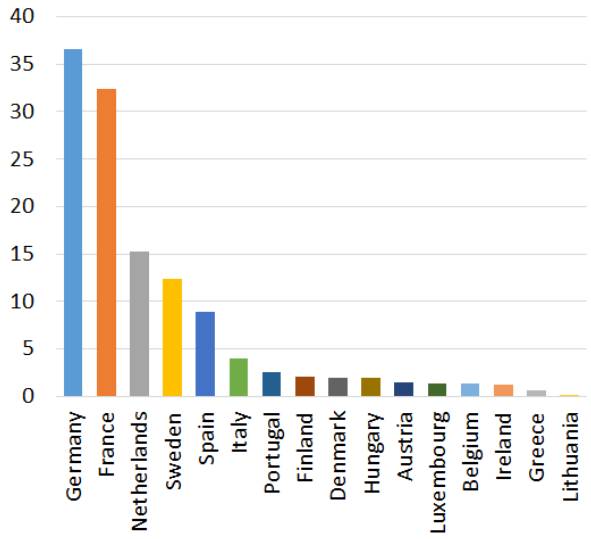
[177] Eurostat, Environmental Protection Expenditure Accounts (env_epe).

[178] Data reporting is different for the 3 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 (with difficulty to split) or not at all.

[179] Green bonds were created to fund projects that have positive environmental and/or climate benefits. The majority of green bonds issued are green "use of proceeds" or asset-linked bonds. The very first

billion (EUR 137 billion[180]), up from USD 117 billion (EUR 105 billion) in 2019. Looking only at EU-27 Member States, green bond issuance in 2020 was EUR 124 billion. In 2014-2020, 83% of the green bonds issued by European countries served objectives in energy, buildings or transport, while 8% supported water and waste, with a further 6% supporting sustainable land use – with links to ecosystem conservation & restoration. The data based on the climate bonds taxonomy, which is broadly similar to the EU Taxonomy[181]. Of this 2020 EU green bond issuance, Sweden had EUR 12.42 billion worth of issuance (see Figure 44 below).

Figure 44: Annual EU green bond issuance in 2020 (EUR billion)[182]

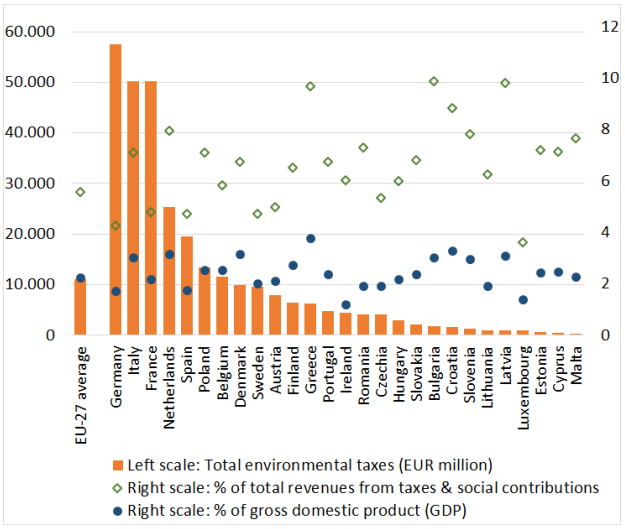


Green budget tools

Green taxation and tax reform

Sweden's revenue from environmentally relevant taxes is below the average in the EU. Environmental taxes stood at 2.02% of GDP in 2020 (EU-27 average: 2.24%). The largest portion of environmental taxes were energy taxes (1.52% of GDP, against the EU average of 1.74%). Transport taxes represented 0.44% of GDP (slightly above the EU average of 0.42%), and taxes on pollution and resources were at 0.06%, which is below the EU average of 0.08% (see Figure 45). In the same year, environmental taxes totalled 4.73% of total revenues from tax and social security contributions (below the EU average of 5.57%)[183].

Figure 45: Environmental taxes in the EU27 (2020)[184]



The 2019 European Green Deal underlines that well-designed tax reforms can boost economic growth and resilience, and promote a fairer society and a fair transition. Tax reforms can contribute to this by sending the right price signals and incentives to economic actors. The Green Deal creates the context for broad-based tax reforms, the removal of fossil fuel subsidies, and a shift in the tax burden from labour to pollution. It does this while simultaneously taking account of social considerations [185]. The Green Deal promotes the 'polluter pays principle' (PPP)[186], which stipulates that polluters should bear the cost of measures to prevent, control and remedy pollution. This principle is facilitated by the Commission's technical support instrument (TSI) project on greening taxes[187].

According to a Commission study on green taxation and other economic instruments (2021), Sweden applies polluter pays economic instruments on water and waste, as water consumption charges and pay-as-you-throw, respectively [188].

green bond was issued in 2007 with the AAA-rated issuance from multilateral institutions, the European Investment Bank (EIB) and the World Bank.

[180] At Eurostat's annual average EUR/USD exchange rates.

[181] Interactive Data Platform at www.climatebonds.net. Further information on Climate Bonds Taxonomy: https://www.climatebonds.net/standard/taxonomy

[182] Climate Bonds Initiative, 2022.

[183] European Commission, Ensuring that polluters pay - Sweden.

[184] Eurostat, Environmental taxes accounts (env_eta).

[185] COM (2019/640 final), p.17

[186] 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".

[187] European Commission, Greening taxes- applying polluter pays principle in practice.

[188] European Commission, Green taxation and other economic instruments, 2021

Environmentally-harmful subsidies

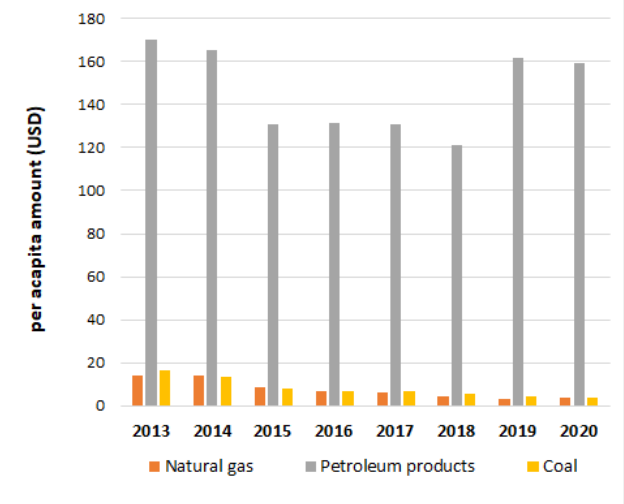
Addressing and removing environmentally-harmful subsidies (EHS) is a further step towards wider fiscal reforms[189].

Fossil fuel subsidies are costly for public budgets and make it difficult to achieve the objectives of the Green Deal. In many cases they can also counteract incentives for green investment. Annual fossil fuel subsidies have been around EUR 55 billion in the EU since 2015. They rose by 4% between 2015 and 2019, although some countries (such as Latvia, Lithuania, Sweden, Greece and Ireland) managed to decrease them in this period. In the EU, subsidies on petroleum products in sectors such as transport and agriculture continued to increase in 2015-2019. However, subsidies for coal and lignite decreased, due to the diminishing 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 Malta in 2019 (with an EU average of 0.4%). In 2019, the total fossil fuel subsidies in Sweden amounted to EUR 2.5 billion, representing 0.52% of the GDP.

In 2020, the EU-27's total fossil fuel subsidies decreased to EUR 52 billion (due to falling consumption trends amid the COVID-19-related restrictions). Without Member State action, these subsidies are likely to rebound as economic activity picks up from 2020[190].

Environmentally-harmful subsidies in Sweden are shown in Figure 46.

Figure 46: Trends in natural gas, petroleum products and coal subsidies in Sweden[191]



% GDP	2013	2014	2015	2016	2017	2018	2019	2020
Natural gas	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Petroleum	0,003	0,003	0,003	0,002	0,002	0,002	0,003	0,003
Coal	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Sweden allocated more than the EU average to fossil-fuel subsidies, and more than it did to renewable energy subsidies[192].

Current green budgeting practices

Green budgeting encompasses various climate and environmental tagging and tracking practices in budgets. Some EU Member states already use certain green budgeting practices[193]. Green budgeting helps identify and track green expenditure and green revenues, to increase transparency on the envrionmental impliactions of budgetary policies. This is aimed at improving policy coherence and supporting green policies (including climate end environmental objectives)[194].

The Commission has also drawn up climate-proofing and sustainability-proofing guidance, as tools to assess

[189] European Commission, Study on assessing th environmental fiscal reform potential for the EU 28, 2016 https://ec.europa.eu/environment/integration/green_semester/pdf/Eunomia%20EFR%20Final%20Report%20MAIN%20REPORT.pdf

[190] See table on EU FFS data in 2019 which is based on (for info) COM(2021) 950 and Annex.

[191] OECD, Fossil Fuel Subsidies Tracker.

[192] European Court of Auditors, Energy taxation, carbon pricing and energy subsidies, 2022

[193] European Commission, Green Budgeting Practices in the EU: A First Review, 2021 and OECD, Public Governance Directorate, Climate Change and Long-term Fiscal Sustainability, Working Paper, February 2021. Climate Change and Long-term Fiscal Sustainability. Tagging is explained in European Commission, Green budgeting practices in the EU: a first review , 2021 (p.7)

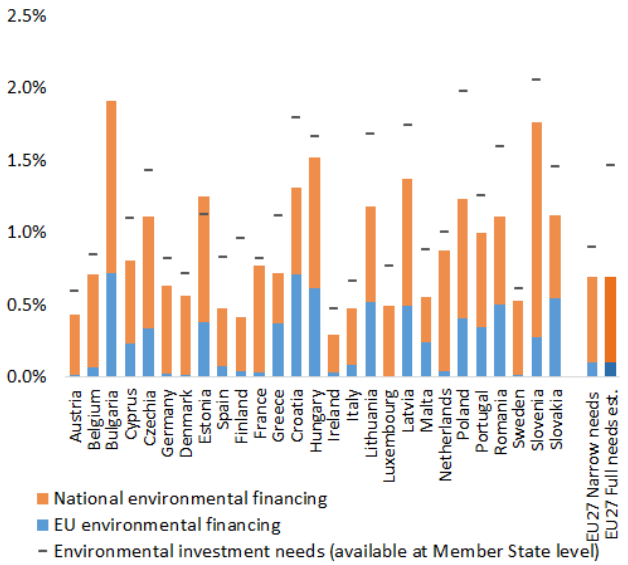
[194] European Commission, European Commission Green Budgeting Reference Framework. European Commission, Green Budgeting in the EU Key insights from the 2021 Commission survey.

project eligibility and compliance with environmental legislation and criteria[195]. The Commission developed a green budgeting reference framework[196] and launched a TSI project on green budgeting to help Member States develop their own national green budgeting frameworks to improve policy coherence and support the green transition. Sweden participates in the Commission's green-budgeting TSI, which started in 2021.

Overall financing compared to the needs

The EU's overall financing for environmental investment is estimated to have been 0.6-0.7% of GDP in 2014-2020, comprising both major EU funds and national financing. This ranged from 0.3% (Ireland) to 1.91% (Bulgaria), depending on the level of environmental challenges in different countries. In 2021-2027 it is estimated that the EU's overall environmental investment needs will range between 0.9-1.5% of the projected GDP for the EU-27 (2021-2027), suggesting an additional financing need (gap) of 0.6-0.8% of total EU GDP, unchanged financing levels assumed[197].

Figure 47: Total environmental financing baseline (2014-2020) and estimated needs (2020-2030) in the EU-27 (% of GDP)[198]



Sweden's financing for environmental investment came to an estimated 0.53% of GDP (EU average: 0.7%) in 2014-2020, almost exclusively from national sources (see Figure 47). Environmental investment needs in 2021-2027 are estimated to reach over 0.61% of GDP (covering needs for which a country-level breakdown is available), suggesting an additional environmental financing need (gap) of at least 0.08% of GDP. And this is likely to be higher when needs that are currently estimated at EU-level only (e.g. water protection, higher circularity, biodiversity strategy etc.) are accounted for.

2022 priority actions

- Ensure a sufficient level of financing in the coming years through the EU funds, the RRP and national financing, to cover the investment needs for environmental priorities.

[195] European Commission, Technical guidance on sustainability proofing for the InvestEU Fund.

[196] European Commission, Green Budgeting Reference Framework, based on the review of the OECD Paris Collaborative on Green Budgeting initiative, 2017.

[197] 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.

[198] Eurostat; ESI Funds Open Data, 2021.

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) and access to justice in environmental eatters.
It is of crucial importance to public authorities, the public, and businesses that environmental information is shared efficiently and effectively[199]. 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[200]. It includes the right to bring legal challenges ('legal standing')[201].

Environmental information

This section focuses on the implementation of the INSPIRE Directive. The Directive aims at establishing a European spatial data infrastructure for sharing environmental spatial information between public authorities across Europe, assisting in policy-making across boundaries and facilitating public access to this information. Geographic information is needed for good governance at all levels and should be readily and transparently available.

Sweden's implementation of the INSPIRE Directive is good. Its performance has been reviewed based on the Sweden's 2021 country fiche[202]. Data identification and documentation have made good progress, and implementation levels are good. However, more effort is needed to prioritise environmental datasets in implementation, especially those identified as high-value spatial datasets for implementing environmental legislation[203].

Table 4: Country dashboard on the implementation of the INSPIRE Directive (2016-2020) [204]

	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 [205]	■	■
iii. Accessibility of spatial data sets through view and download services	■	■
iv. Conformity of network services	■	■

Legend

- ■ Implementation of this requirement is well advanced or (nearly) completed. Outstanding issues are minor and can be addressed easily. Percentage: >89%
- ■ Implementation of this requirement has started and made some or substantial progress but is still not close to be complete. Percentage: 31–89%
- ■ Implementation of this requirement is falling significantly behind. Serious efforts are necessary to close implementation gap. Percentage: <31%

Public participation

Publication of the initiation of environmental impact assesment (EIA) and strategic environmental assessment (SEA) procedures, and the possibility for the public to submit views regarding plans or projects which require an EIA or SEA are a mandatory part of the procedures. However, centralised statistical information regarding the level of public participation in decision-making processes regarding EIA and SEA procedures has not been found on

[199] 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 report focuses on the implementation of the INSPIRE Directive.
[200] These guarantees are explained in the Commission Notice on access to justice in environmental matters, OJ L 275, 18.8.2017 and a related Citizen's Guide.
[201] This EIR report focuses on the means implemented by Member States to guarantee rights of access to justice and legal standing and to overcome other major barriers to bringing cases on nature and air pollution.
[202] INSPIRE knowledge base Sweden, 2021.
[203] European Commission, List of high-value spatial data sets
[204] INSPIRE knowledge base
[205] In 2016, the deadlines for implementating 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. It must be also considered that this conformity indicator will in many cases never reach 100% conformity, as most of the countries provide as-is-data sets in addition to the INSPIRE aligned data-sets.

the relevant websites. The websites of individual County Administrative Boards and permitting authorities provide information for those seeking a permit as well as information on public participation in environmental impact assessments.

Access to justice

NGOs do not need to demonstrate an interest in the specific case to have standing in an environmental court case or in cases which have significant effects on the environment, but the NGOs have to meet some conditions in connection with their legal status and operation.

In Sweden, the SEA is an intrinsic part of the planning procedure, and this assessment is not made separately to the decision regarding the plan or programme. The SEA can be approved only if the direct and indirect impacts of the plan or programme are deemed to be adequately described in accordance with the Code. If they are approved, this will be noted in the decision concerning the plan or programme.

Because of this system, the SEA, or any part of it, such as the screening, scoping or final authorisation of the EIA itself, cannot be appealed separately. However, the EIA including both its procedural requirements and the information it contains in a specific case can be challenged when appealing the plan as such.

Plans and programmes in general are not binding for the public under Swedish law, they are only indicative or binding for authorities. They are not therefore considered to be decisions that can be appealed by individuals or NGOs. There is no legal remedy against these legal instruments. An exception is municipal comprehensive and regional planning according to the Planning and Building Act, which may be challenged through legal review.

There is a system of regular supervision of regulatory legally binding acts via the Chancellor of Justice or the Parliamentary Ombudsmen, but it is hardly accessible for the members of the public and NGOs; they can only bring them to the attention of those bodies or officials who are entitled to initiate an extraordinary supervision procedure.

There is no organised communication about where to find the rules on access to justice that are available in Sweden. However, rudimentary information may be found on the websites of some of the main environmental protection authorities, such as the Swedish Environmental Protection Agency (SEPA)[206], and the National Board of Housing, Building and Planning [207]. Some general information on access to justice can also be found on the website of the Swedish Courts[208].

In 2019, a priority action was addressed to Sweden about access to justice, namely to better inform the public about their rights in this field. It is concluded that there has been only limited progress made.

2022 priority actions

- Prioritise environmental datasets in implementating the INSPIRE Directive, especially those identified as high-value spatial datasets for implementing environmental legislation.
- Better inform the public about their rights to access to justice, in particular by including links on national judical and administrative websites to the Commission eJustice fact-sheets on access to justice in environmental matters[209].
- Improve access to courts for the public concerned when it comes to challenging administrative or regulatory decisions, in particular in the areas of planning related to water, nature and air quality.
- Measure, and track, the level of public participation in EIA procedures, to identify whether the full benefit of public views is being effectively integrated into the decision-making process, and whether steps at national or local level are needed to encourage higher levels of 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[210]. It includes support measures provided by the authorities such as:
(i) compliance promotion[211];
(ii) inspections and other checks that they carry out, i.e. compliance monitoring[212];

[206] Naturvårdsverket, Towards a better environment
[207] Boverket
[208] Sveriges Domstolar
[209] Access to justice in environmental matters
[210] 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.
[211] This EIR report focuses on the help given to farmers to comply with nature and nitrates legislation.
[212]

(iii) the steps that they take to stop breaches, impose sanctions and require damage to be remediated, i.e. enforcement[213].
Citizen science and complaints enable authorities to better focus their efforts. Environmental liability[214] ensures that the polluter pays to remedy any damage.

Compliance promotion and monitoring

Full and detailed information on the designation and management of Natura 2000 sites is provided on the website of the SEPA; and links to this information are provided by the Swedish Board of Agriculture. However, the information provided, except for information on the greening elements of Common Agricultural Policy (CAP) direct payments, is not framed in terms of practical advice for farmers and land managers. Instead this is executed through the CAP support system and reported by the Board of Agriculture. In 2020, the Swedish Board of Agriculture updated their regulation for protecting the cultural and natural values of farmland[215].

For the Nitrates Directive, significantly more practical information is provided by the Swedish Board of Agriculture (the competent authority for implementing the directive). Its website provides a wide range of information, guidance and tools related to manure, fertilizer use, and farm management practices that support the implementation of rules under the Nitrates Directive[216]. The online information includes direct advice and tools for farmers, as well as downloadable publications on relevant topics such as reducing nutrient loss and self-monitoring for compliance. The publications also include more technical/topical support such as fertiliser-need calculations and manure management.

Detailed information on the planning of inspections of installations covered by the Industrial Emissions Directive is not published. Inspection reports are recorded with the supervisory authority, and – although not published– are public documents which can be requested by any interested party. In addition, permit holders are required to report annually on their compliance with their permit conditions, and these reports are also public documents which may be requested. SEPA is required by law to report to the government on its supervision under the Environmental Code (chapter 3 of the Ordinance on Environmental Supervision). This report is available on SEPA's website and the results are also published as 'open data' [217].

Complaint handling and citizen science

A range of online tools is available; the Police Authority website has a page on environmental crime, and encourages citizens to report suspected environmental crimes by calling the national emergency number[218]. The website of the Prosecution Authority has a page on environmental crime providing details of how citizens can report suspected environmental crimes directly to the Police or the Prosecution Authority[219], with relevant contact information. The public can also report suspected breaches of the chemicals legislation on the website of the Swedish Chemicals Agency[220], via a simple form with drop-down menus. The person reporting the breach can choose to be anonymous and can also ask to get feedback on the report. In addition, the general public can make complaints to the Parliamentary Ombudsmen if they suspect a public authority is not acting in accordance with the law, or, for example to make complaints about management in environmental cases[221].

While no summary of available information seems to be published, there are government initiatives and policy documents encouraging the use of citizen science. Specifically in terms of using citizen information to improve compliance, recent campaigns include "Open eye" (Öppet öga)[222], which was launched by SEPA and county administrative boards in 2016, encouraging citizens to report suspected environmental crimes. The campaign is ongoing and an updated folder about it is available on the website of the county administrative boards[223].

Enforcement

The Swedish National Council for Crime Prevention (Brottsförebyggande rådet or Brå) is a knowledge centre for the criminal justice system. Brå is responsible for official crime statistics, and provides detailed statistics on environmental crime. Brå defines 'environmental crime' as 'polluting land, air or water or otherwise affecting the

[213] This EIR report focuses on inspections of major industrial installations.

This EIR report focuses on the availability of enforcement data and coordination between authorities to tackle environmental crime.

[214] The Environmental Liability Directive, 2004/35, creates the framework.

[215] SJVFS 2020:2

[216] Jordbruksverket:

[217] Öppna data available from Naturvårdverket

[218] Police Authority

[219] Swedish Prosecution Authority.

[220] Report a chemical safety issue - Kemikalieinspektionen

[221] Parliamentary Ombudsmen

[222] Svenska Dagbladet, Öppet öga" kamp mot naturbrott

[223] lansstyrelsen.se)

environment so that it can harm animals and plants or human health.' According to Brå, the most commonly reported and prosecuted violations of the Environmental Code are environmental crimes (e.g. pollution or inconvenience), unauthorised environmental activities (certain activities carried out without a permit or without following the conditions in the permit) and fly-tipping[224]. The website contains information about what is considered an environmental crime, and the number of crimes reported, prosecuted and solved by year.

Enforcement of the environmental law is to a large extent decentralised in Sweden and is carried out by the County Administrative Boards (CAB) and municipalities. Environmental Cooperation Sweden (Miljösamverkan Sverige) is a national agency for cooperation between the CABs, SEPA, the Swedish Board of Agriculture and the Swedish Agency for Marine and Water Management [225]. The overall aim of the agency is to ensure authority is exercised in a more uniform manner when enforcing compliance with the environmental legislation. To that end, the agency produces operational checklists and other documents designed to support inspectors when checking compliance with environmental law.

Waste legislation is recognised as a particular area requiring inter-agency cooperation. In February 2021 the Swedish Government mandated a range of bodies (SEPA, the CABs, the Swedish Police Authority, the Swedish Prosecution Authority, the Swedish Coast Guard and the Swedish Customs) to present a report on the situation regarding illegal waste management and proposals for measures to further prevent and deter crime in the waste area. The reports are due to be completed in March 2022.

Environmental Liability Directive

There does not appear to be a central database recording cases under the Environmental Liability Directive (ELD)or other instances of environmental damage. There is a national database managed by the CABs where contaminated, remedied or areas/sites that are assumed to be contaminated are registered[226]. The registered areas have been identified and inventoried by the CABs using guidelines from the SEPA[227]. However, they have not been linked to the ELD in order to ensure implementation of the polluter pays principle.

2022 priority actions

- Develop a national database of environmental damage cases, highlighting cases under the Environmental Liability Directive and providing full information on relevant financial sanctions.

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

Sweden ranks 8th out of 180 in the 2020 Environmental Performance Index [228]. At present, the number of complaints and infringements in the environmental field can be considered below the EU average. Overall, during the last decade an improvement can be observed in the implementation of EU environmental law in the different sectors. For instance, there has been progress regarding the implementation of the environmental assessments. A recent package of legislation aimed at speeding-up the licencing of the 'projects of national interest' raised some doubts but no serious problems have been identified when it was implemented.

Sweden performs well on digital public services. The country is a frontrunner in the delivery of digital public services among EU countries. It ranked third in the EU27 in the 2021 edition of the Digital Economy and Society Index (DESI), scoring 66.1 compared to the EU-average of 50.7[229].

SEPA offers a wide range of e-services in relation to extended producer responsibility (EPR), NOx emissions declarations, trans-frontier shipments of waste (Nordic TFS) or the Waste Registry.

Coordination and integration

As mentioned in the 201 and 2019 EIR Report, the transposition of the revised EIA Directive[230] provides an

[224] Swedish National Council for Crime Prevention (Brottsförebyggande rådet), Environemntal crime (Miljöbrott)
[225] Startsida - Miljösamverkan Sverige
[226] County Administrative Board of Stockholm: Kartor över förorenade områden
[227] SEPAs guideline, Metodik för inventering av förorenade områden ().

[228] Environmental Performance Index.
[229] European Commission, Digital Economy and Society Index (DESI) 2021 - Sweden
[230] 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.

opportunity to streamline the regulatory framework on environmental assessments. Despite a delay in full transposition by the deadline (May 2017), Sweden has now transposed the revised Directive. The quality of the transposition is currently under assessment through conformity checks by the Commission.

The Commission encourages the streamlining of the environmental assessments, to reduce duplication and avoid overlaps in environmental assessments applicable to projects. Moreover, streamlining helps to reduce unnecessary administrative burden and accelerates decision-making, provided it is done without compromising the quality of the environmental assessment procedure[231]. Sweden had already introduced the streamlining of environmental assessments under EIA and Habitats Directives before the revision of the EIA Directive. Coordinated procedures have been established for the EIA, Water Framework and Industrial Emissions Directives.

Reforms through the Commission's Technical Support Instrument (TSI)

The Commission supports environmental implementation and the green transition, not only through the EU financing programs, but also by granting technical assistance, such as under the Technical Support Instrument (TSI).

Sweden was not actively seeking the support of the TSI for environmental reforms until 2022 when it submitted a request for technical support in implementation capacity of sustainable green development in European Artic Northern Sparsely Populated Areas. The Commission encourages Sweden to use this tool more often in the coming years.

TAIEX EIR peer to peer Projects

The TAIEX EIR Peer-to-Peer tool[232] was launched in 2017 by the Commission to facilitate mutual learning between environmental authorities.

During the reporting period, Sweden participated in a workshop on circular and non-toxic reuse of phosphorus from sewage sludge (2019). Sweden has also participated in two multi-country workshops on life cycle approach and circularity in policy and procurement planning (2019) and ammonia-reducing technology and measures (2021).

[231] The Commission issued a guidance document in 2016 on how to sett 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.

[232] TAIEX - Environmental Implementation Review - PEER 2 PEER - Environment - European Commission (europa.eu).