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COMMISSION STAFF WORKING DOCUMENT

2025 Environmental Implementation Review
Country Report - LUXEMBOURG

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

2025 Environmental Implementation Review for prosperity and security

{COM(2025) 420 final} - {SWD(2025) 300 final} - {SWD(2025) 301 final} - {SWD(2025) 302 final} - {SWD(2025) 303 final} - {SWD(2025) 304 final} - {SWD(2025) 305 final} - {SWD(2025) 306 final} - {SWD(2025) 307 final} - {SWD(2025) 308 final} - {SWD(2025) 309 final} - {SWD(2025) 310 final} - {SWD(2025) 311 final} - {SWD(2025) 312 final} - {SWD(2025) 313 final} - {SWD(2025) 314 final} - {SWD(2025) 315 final} - {SWD(2025) 316 final} - {SWD(2025) 318 final} - {SWD(2025) 319 final} - {SWD(2025) 320 final} - {SWD(2025) 321 final} - {SWD(2025) 322 final} - {SWD(2025) 323 final} - {SWD(2025) 324 final} - {SWD(2025) 325 final} - {SWD(2025) 326 final}

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Executive summary

In May 2016, the Commission launched the Environmental Implementation Review (EIR), a regular reporting tool based on analysis, dialogue and collaboration with EU Member States to improve the implementation of existing EU environmental policy and legislation ([1]). Following previous cycles in 2017, 2019 and 2022, this report assesses the progress made while describing the main outstanding challenges and opportunities regarding environmental legal implementation in Luxembourg. The purpose of this report is to provide information on the implementation performance and highlight the most effective ways to address the implementation gaps that impact human health and the environment and hamper the economic development and competitiveness of the country. The report relies on detailed sectoral implementation reports collected or issued by the Commission under specific environmental legislation.

The main challenges set out below have been selected from Part I of this report, 'Thematic areas', considering factors such as the gravity of the environmental implementation issue in light of the impact on the quality of life of citizens, the distance to target and financial implications. In Luxembourg, these challenges have lingered since the first environmental implementation review in 2017 and require urgent action.

Luxembourg is among the good performers regarding **circular economy and waste management**. However, its performance in specific sectors are declining. For instance, the circular material use rate has dropped below the EU average and more efforts should be made to accelerate the transition to a circular economy. More importantly, Luxembourg is one of the Member States generating the most waste. While the country is not at risk of missing both the municipal waste reuse and recycling target and the packaging waste recycling target, it still relies more than the average Member State on incineration. Actions should be taken to reduce waste, targeting higher levels of the waste hierarchy.

Biodiversity and nature are deteriorating in Luxembourg and urgent measures are needed to protect and restore habitats and species. Ecosystems suffer from several pressures, notably agricultural practices and soil artificialisation. Luxembourg should take action to achieve the transition to sustainable agriculture.

Despite some progress, Luxembourg does not predict that it will fulfil its emission reduction commitments for several **air pollutants**. Concerns remain regarding the **quality of waterbodies**, as all surface waterbodies and a major part of groundwater bodies fail to achieve good chemical and ecological status. Further efforts are needed to reduce nitrate pollution where agricultural pressure is significant. Urban developments and constructions are also a frequent cause of modifications of water bodies.

The overall **environmental investment needed** to enable Luxembourg to meet its objectives in the main environmental areas is EUR 1.7 billion per year, broken down as follows: circular economy (EUR 913 million), pollution prevention and control (EUR 217 million), water (EUR 464 million), and biodiversity and ecosystems (EUR 70 million). To meet these environmental objectives, going beyond climate change, the additional investment over the current level – **the investment gap** – reaches an estimated EUR 403 million per year in Luxembourg. This value is around 0.52% of the national gross domestic product and is lower than the EU average (0.77 %).

Globally, Luxembourg performs well in the area of **environmental governance**; however, it needs to increase its administrative capacity to support the green transition.

On a positive note, Luxembourg's resource productivity is well above the EU average, illustrating the capacity of its economy to use resources more efficiently to produce goods and services. Luxembourg has demonstrated good levels of collection and treatment of urban waste water. The country continues to properly implement the Infrastructure for Spatial Information in the European Community Directive ([2]), thus providing relevant environmental spatial information for good governance.

([1]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Delivering the benefits of EU environmental policies through a regular environmental implementation review, COM(2016) 316 final of 27 May 2016, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2016%3A316%3AFIN.

([2]) Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007, establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), (OJ L, 108, 25.4.2007), https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0002.

Part I: Thematic areas

1. Circular economy and waste management

Transitioning to a circular economy

Advancing the transition to a circular economy in the EU will reduce the environmental and climate impact of our industrial systems by reducing input materials, keeping products and materials in the loop for longer and reducing waste generation, thus decoupling economic growth from resource consumption. A circular economy has considerable potential to increase competitiveness and job creation and will also promote innovation and provide access to new markets. With the 2020 circular economy action plan (CEAP) ([3]) measures either in place or legislatively advanced, EU Member States will now have to focus on a swift and effective implementation.

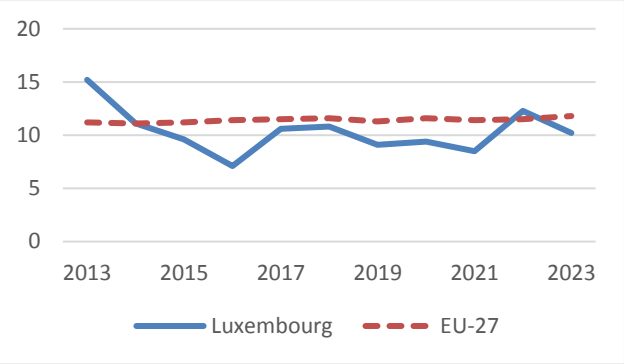
The 2020 CEAP launched the legislative process for a set of initiatives that will now have to be implemented by national governments across the EU. These initiatives were all introduced following a holistic life-cycle approach, with measures addressing the different stages of a product's life cycle, from design through use to end of life.

In the CEAP, the EU sets as its overarching objective the doubling of its circular material use rate (CMUR) by 2030.

The CMUR is a measure of one aspect of circularity: the share of the total amount of material used in the economy that is accounted for by recycled waste. A higher CMUR value means that more secondary materials were used as a substitute for raw materials, thus reducing the environmental impacts of extracting primary material.

Luxembourg's CMUR has declined overall, with some increases between 2016 and 2018 and between 2021 and 2022. In 2023, it stood at 10.2 %, below the EU average of 11.8 % (Figure 1).

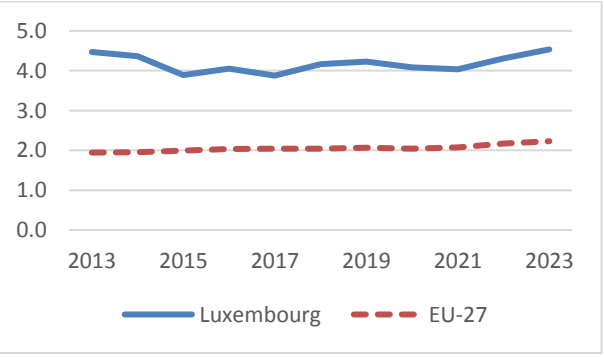
Figure 1: CMUR (%), 2013–2023



Source: Eurostat, 'Circular material use rate', env_ac_cur, last updated 13 November 2024, accessed 10 December 2024, https://ec.europa.eu/eurostat/databrowser/product/view/env_ac_cur.

Resource productivity measures the total amount of materials directly used by an economy in relation to gross domestic product (GDP). 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 4.53 generated per kg of material consumed, resource productivity in Luxembourg was well above the EU average of EUR 2.23 per kg in 2023.

Figure 2: Resource productivity (EUR/kg), 2013–2023



([3]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A new circular economy action plan for a cleaner and more competitive Europe, COM(2020) 98 final of 11 March 2020, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A98%3AFIN.

NB: The unit of measure used is EUR/kg chain-linked volume (2015). Chain-linked volumes focus on changes on quantities and prices of commodities in previous years, taking account of inflation, and are indexed to the nearest appropriate year, in this case 2015.

Source: Eurostat, 'Resource productivity', env_ac_rp, last updated 7 August 2024, accessed 9 December 2024, https://ec.europa.eu/eurostat/databrowser/view/env_ac_rp/default/table?lang=en.

Policies and measures

In parallel with European initiatives under the CEAP, Member States are encouraged to adopt and implement circular strategies at the national, regional and city levels. These should be tailored to each national and local reality, to harness the proximity economy's ([4]) potential, while following the principles of a holistic whole-value-chain approach.

Since the launch of the online European Circular Economy Stakeholder Platform in 2017 ([5]) national, regional and local authorities have used the platform to share their strategies, roadmaps and good practices, for example alternative business models and innovative technologies.

In February 2021, Luxembourg adopted a comprehensive circular economy strategy ([6]), which includes targets along products' entire life cycle. Roadmaps will be developed for public authorities' different domains of competence – namely regulations and standards, financial aspects, knowledge creation and management – to ensure tangible impacts.

A review of the strategy was carried out in 2023, and its recommendations are being analysed for further implementation. Recommendations include putting in place a structure dedicated to the circular economy at the national level; taking a strategic approach to action; introducing measurable indicators; including, and mobilising, citizens and businesses in the transition; scaling up education efforts; and increasing support for pilot projects.

Luxembourg is set to establish a consumption-based approach to calculating its carbon footprint, including indirect emissions. A carbon footprint calculator will be established to raise awareness of the potential to reduce greenhouse gas (GHG) emissions resulting from consumption; this measure is linked to the circular economy because of its potential to enable the adoption of alternative business models and consumption patterns.

Green public procurement

Public procurement accounts for a large proportion of European consumption, with public authorities' purchasing power representing around 14 % of EU GDP. Public procurement using green or circular criteria (life-cycle analysis, PaaS (platform as a service), second hand) can help drive the demand for sustainable products that meet reparability and recyclability standards. A national action plan or strategy for green public procurement is currently not in place in Luxembourg. Nevertheless, Luxembourg's public procurement law formally encourages contracting authorities to use tender procedures to promote sustainable development. The country does not have any targets, specific measures or mandatory criteria in place to promote green public procurement. Some guidance on criteria that can be imposed is provided in the form of references and links to the EU's green public procurement website and toolkit.

No further measures have been brought to the Commission's attention since the 2022 environmental implementation review.

The EU Ecolabel and the eco-management and audit scheme

The number of EU Ecolabel product groups and the number of eco-management and audit scheme (EMAS)-licensed organisations in each country provide 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. The EU Ecolabel is awarded to products with best-in-class environmental performance. EMAS is a voluntary environment management scheme aimed at reducing the environmental impacts of organisations.

In September 2021, Luxembourg had 9 out of 98 977 products and 9 out of 2 983 licences registered under the EU Ecolabel scheme ([7]). These are further decreases on the already low levels in 2022. As regards EMAS, in October 2024, Luxembourg ([8]) had eight registered organisations, one more than in October 2021.

([4]) European Commission, 'Proximity and social economy ecosystem', European Commission website, https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy_en.

([5]) Circular Economy Stakeholder Platform (https://circulareconomy.europa.eu/platform/en/strategies).

([6]) Schosseler, P., Tock, C. and Rasqué, P., *Circular Economy Strategy Luxembourg*, Ministry of Energy and Spatial Planning, Ministry of the Environment, Climate and Biodiversity, and Ministry of the Economy, Luxembourg, 2021, https://economie-circulaire.public.lu/en/publications/circular-strategy.html.

([7]) European Commission, 'EU Ecolabel facts and figures', European Commission website, http://ec.europa.eu/environment/ecolabel/facts-and-figures.html.

([8]) European Commission, 'Eco-management and audit scheme (EMAS)', European Commission website, November 2021, (https://webgate.ec.europa.eu/emas2/public/registration/list).

Luxembourg has been slow to implement the priority actions suggested in previous reports, and the 2022 actions all focused on waste-related measures.

2025 priority actions

- Adopt measures to increase the circular material use rate.
- Speed up the transition to a circular economy by implementing an updated national strategy and the EU framework and recommendations, in particular to complement it with upstream circularity measures.

Waste management

Turning waste into a resource is supported by:
— addressing the full life cycle of products, from conception to end of life, by setting requirements on the design of products to ensure that they are more sustainable;
— fully implementing EU waste legislation, which includes the waste hierarchy, the obligation to ensure separate collection of waste, landfill diversion targets, etc.;
— reducing waste generation per capita and in absolute terms;
— increasing the recycling rates of waste containing critical raw materials (CRMs), with a view to reducing dependencies and building resilient value chains, and stimulating demand for recycled content in all products;
— limiting energy recovery to non-recyclable materials;
— and phasing out landfilling of recyclable or recoverable waste.

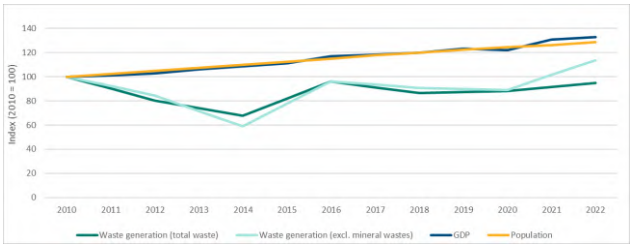
One of the main objectives of the EU Waste Law is to decouple economic growth from its environmental impacts.

The EU's approach to waste management is based on the waste hierarchy: prevention, preparing for reuse, recycling, recovery and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery).

All legislative proposals in the field of waste management put forward by the Commission since 2021 are intended to encourage Member States to promote better product design, to require producers to cover the costs of managing the waste resulting from their products and to ensure that waste is managed at the higher levels of the waste hierarchy.

The total amount of waste generated in Luxembourg follows a small overall decrease over the period considered (Figure 3). Excluding the major mineral waste categories alters this overall trend, revealing a moderate increase. This rise is mainly attributable to a significant increase in the generation of combustion waste from 2020 onward. Data reported for 2010–2014 are less reliable, and data collection has considerably improved since 2014. Due to strong variations in waste generation, there are no clear signs of decoupling between waste generation and economic growth.

Figure 3: Generation of waste (total and excluding major mineral waste), population and GDP, 2010–2022



Sources: Eurostat, 'GDP and main components (output, expenditure and income)', nama_10_gdp, accessed 15 October 2024, https://ec.europa.eu/eurostat/databrowser/view/nama_10_gdp__custom_9301905/default/table; Eurostat, 'Generation of waste by waste category, hazardousness and NACE Rev. 2 activity', env_wasgen, last updated 30 September 2024, accessed 22 October 2024, https://ec.europa.eu/eurostat/databrowser/view/env_wasgen/default/table?lang=en; Eurostat, 'Population change – Demographic balance and crude rates at national level', demo_grind, accessed 15 October 2024, https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en&category=demo.demo_ind.

Critical raw materials

Luxembourg's circular economy strategy emphasises the efficient use of CRMs across all stages of the product life cycle: by encouraging durable, repairable, and recyclable design, it reduces the need for virgin CRMs. The strategy also strengthens infrastructure for recycling CRMs from several waste streams, including electronic waste and construction and demolition waste, and promotes the reuse of CRM-rich products to extend their life cycle and reduce the extraction of new CRMs.

In parallel, Luxembourg's zero-waste strategy focuses on reducing waste generation at the source, particularly CRM-rich waste, and encourages zero-waste practices in industries that use significant amounts of CRMs (e.g.

electronics and construction). It promotes selective demolition practices in the construction sector to facilitate the recovery of CRMs from construction and demolition waste, ensuring that valuable CRM-rich materials are separated and recycled rather than sent to landfills.

Construction and demolition waste

Construction and demolition waste accounts for almost 40 % of all waste generated in the EU. A recent study ([9]) by the Joint Research Centre shows that preparing for reuse and recycling operations is preferred over incineration and landfilling from an environmental perspective for most of the individual fractions of construction and demolition waste. However, the economics often do not favour preparing for reuse and recycling over incineration and landfilling. If available technology were to be applied, it is estimated that the increase in preparing for reuse and recycling would lead to an additional 33 Mt of GHG emission savings annually (more than, for example, the combined annual GHG emissions from Estonia, Latvia and Luxembourg).

The rate of preparing for reuse and recycling of mineral construction and demolition waste in Luxembourg in 2022 was 94.4 %, compared with the EU average of 79.8 %. Measures to further increase that rate include facilitating separate collection at source, for instance through digitalised pre-demolition audits ([10]). Other economic instruments, for example extended producer responsibility (EPR), and upstream measures such as increasing the recycled content of construction products and the circular design ([11]) of construction works, also help.

Boosting implementation – the 2023 *Waste Early Warning Report*

This section focuses on the management of municipal waste, for which EU law sets mandatory recycling targets ([12]). In June 2023, the Commission published the *Waste Early Warning Report* ([13]) identifying the general trends in waste management. Luxembourg is not at risk of missing the municipal wastereuse and recycling target or the packaging waste recycling target.

Figure 4: Member States' prospects of meeting the preparing for reuse and recycling targets for municipal waste and packaging waste

([9]) European Commission: Joint Research Centre, *Techno-economic and environmental assessment of construction and demolition waste management in the European Union*, Publications Office of the European Union, Luxembourg, 2024, https://publications.jrc.ec.europa.eu/repository/handle/JRC135470.

([10]) European Commission: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, *EU Construction & Demolition Waste Management Protocol including guidelines for pre-demolition and pre-renovation audits of construction works – Updated edition 2024*, Publications Office of the European Union, Luxembourg, 2024, https://op.europa.eu/en/publication-detail/-/publication/d63d5a8f-64e8-11ef-a8ba-01aa75ed71a1/language-en.

([11]) European Commission, *Circular Economy – Principles for buildings design*, Brussels, 2020, https://ec.europa.eu/docsroom/documents/39984.

([12]) Municipal waste consists of (i) mixed waste and separately collected waste from households, including paper and cardboard, glass, metals, plastics, biowaste, wood, textiles, packaging, waste electrical and electronic equipment, waste batteries and accumulators, and bulky waste, including mattresses and furniture; and (ii) mixed waste and separately collected waste from other sources, where such waste is similar in nature and composition to waste from households (Directive 2008/98/EC, Article 3.2b).

([13]) European Commission, Early Warning Report, 8 June 2023, https://environment.ec.europa.eu/publications/waste-early-warning-report_en.

- Member States not at risk of missing the 55 % preparing for reuse and recycling target for municipal waste and the 65 % recycling target for packaging waste
- Member States at risk of missing the preparing for reuse and recycling target for municipal waste but not at risk of missing the recycling target for all packaging waste
- Member States at risk of missing both targets
- Outside coverage

Source: European Environment Agency (EEA), 'Many EU Member States not on track to meet recycling targets for municipal waste and packaging waste', briefing No 28/2022, Copenhagen, 2023. Reference data © ESRI.

Under certain conditions, EU waste legislation enables some Member States to postpone the deadlines for reaching certain waste management targets for municipal and packaging waste. Member States that want to use this possibility have to notify the Commission 24 months in advance of the deadline and submit an implementation plan laying down the steps they envisage to reach the postponed targets within a new time frame. Regarding the 2025 targets, 11 Member States, including Luxembourg, have used this prerogative.

On 22 December 2023, Luxembourg notified the Commission of its intention to postpone the attainment of the plastic packaging waste recycling target established for 2025 by the Packaging and Packaging Waste Directive. Attached to this notification, Luxembourg submitted an implementation plan setting out the measures necessary to attain the target within a postponed time frame (i.e. 2030 instead of 2025). At the request of the Commission ([14]), Luxembourg submitted a revised implementation plan on 21 June 2024. According to the implementation plan, the main measures Luxembourg will put in place include new packaging waste legislation, an EPR scheme for non-household packaging, and a deposit return system for plastic bottles. The Commission found that the plan submitted complies with the requirements set out in the relevant waste legislation.

In the *Waste Early Warning Report*, the Commission recommended that Member States accelerate their efforts to improve their recycling performance. The Commission is, on one hand, working together with the national authorities and stakeholders to speed up the implementation of measures necessary to meet the targets, including through dedicated financing. On the other hand, the Commission is pursuing enforcement actions against those Member States that, based on data submitted to the Commission, do not achieve the targets of the Waste Framework Directive ([15]), the Packaging and Packaging Waste Directive ([16]), and the Directive on Waste Electrical and Electronic Equipment ([17]).

In Luxembourg, the national waste and resource management plan (PNGDR) has included the notion of resources since 2018. The plan aims to strengthen prevention and reuse. It includes the principles of the circular economy in establishing measures. In 2022, the Chamber of Deputies passed five laws known as the circular economy package, the main aims of which are to prevent and reduce waste. This package lays the foundations for the transition from waste management to resource management. The overall objective is to reinforce the principles of the circular economy, following the principles of responsible consumption of natural resources and optimising the life cycle of materials by reusing them, preparing them for reuse or, failing that, recycling them. Most aspects of the package are covered by specific national laws and regulations.

([14]) COMMISSION DECISION on the implementation plan submitted by Luxembourg in accordance with Article 6(1a) of Directive 94/62/EC accompanying the notification to postpone the attainment of certain recycling targets set out in Article 6(1), point (g) and (i), of that Directive, C(2024) 1969, 20 March 2024. http://www.cc.cec/sg/vista/home?documentDetails&DocRef=C/2024/1969&ComCat=SPINE.

([15]) Directive 2008/98/EC on waste and repealing certain Directives, OJ L 312 22.11.2008, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705.

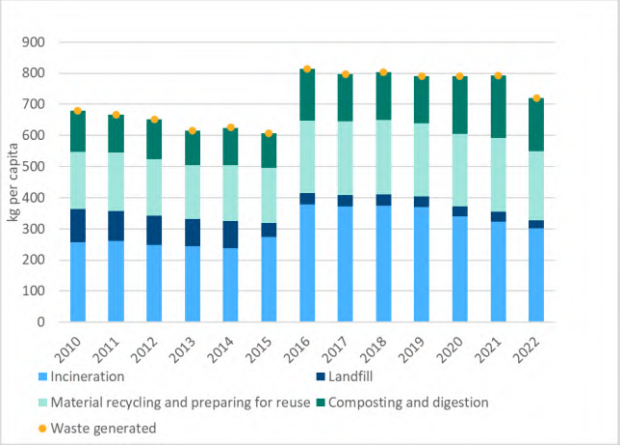
([16]) Directive 94/62/EC on packaging and packaging waste, OJ L 365 31.12.1994, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01994L0062-20180704.

([17]) Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), OJ L 197, 24.7.2012, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0019.

Municipal waste

Municipal waste generation in Luxembourg significantly increased between 2010 and 2021 (Figure 5). However, the increase in 2016 is attributable to the broadening of the scope of municipal waste in the reporting methodology. Since 2016, municipal waste generation has stagnated, with a decrease in 2022. In 2022, the country generated 721 kg per capita of municipal waste, which is significantly above the (estimated) EU-27 average of 515 kg per capita. This high amount could be partly due to the significant number of cross-border commuters and to the inclusion of municipal waste from sources other than households, which account for around 30 % of municipal waste generated ([18]).

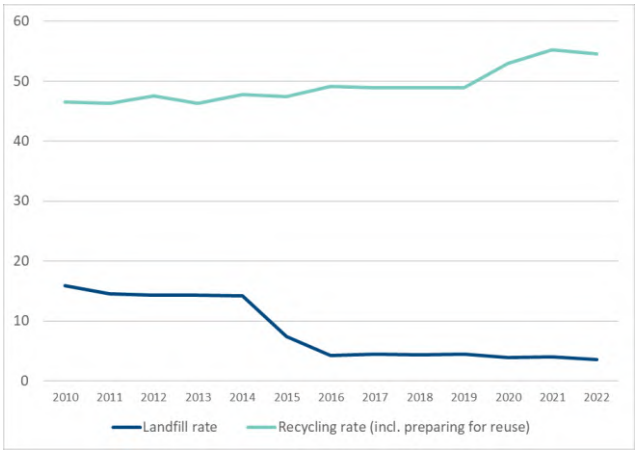
Figure 5: Municipal waste management and recycling (including preparation for reuse), 2010–2022



NB: There is a break in the series in 2016, when the definition of municipal waste was broadened. As of 2020, new reporting rules applied for calculating recycled municipal waste pursuant to the targets set out in Article 11.2(c–e) of Directive 2008/98/EC. Luxembourg has been applying the new reporting rules since 2015, but improvements were made in 2020 and again in 2022 with respect to the accuracy of the average loss rates ([19]).

Source: Eurostat, 'Municipal waste by waste operations', env_wasmun, accessed 22 October 2024, https://ec.europa.eu/eurostat/databrowser/view/ENV_WASMUN/default/table.

Figure 6: Recycling (including preparation for reuse) and landfill rates (%), 2010–2022



Source: Eurostat, 'Municipal waste by waste operations', env_wasmun, accessed 22 October 2024, https://ec.europa.eu/eurostat/databrowser/view/ENV_WASMUN/default/table.

Packaging waste

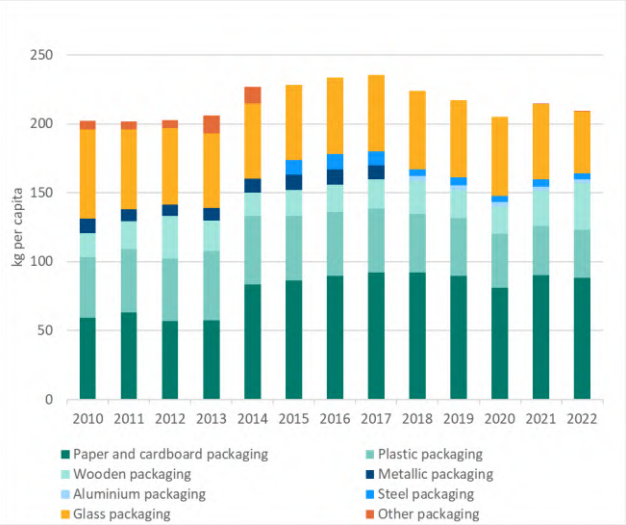
Packaging waste generation in Luxembourg has stagnated since 2010 (Figure 7). The country generated 209 kg per

([18]) EC, 2022, *Environmental Implementation Review 2022 Country Report - LUXEMBOURG*, COMMISSION STAFF WORKING DOCUMENT No SWD(2022) 268 final, Directorate-General for Environment, 8 September 2022, https://environment.ec.europa.eu/law-and-governance/environmental-implementation-review_en.

([19]) MECB, 2024, Information provided during the Eionet review of the draft EEA country profile on waste management for Luxembourg, Ministry of the Environment, Climate and Biodiversity, Gouvernement du Grand-Duché de Luxembourg.

capita in 2022, which is significantly above the estimated EU average of 186 kg per capita in the same year ([20]).

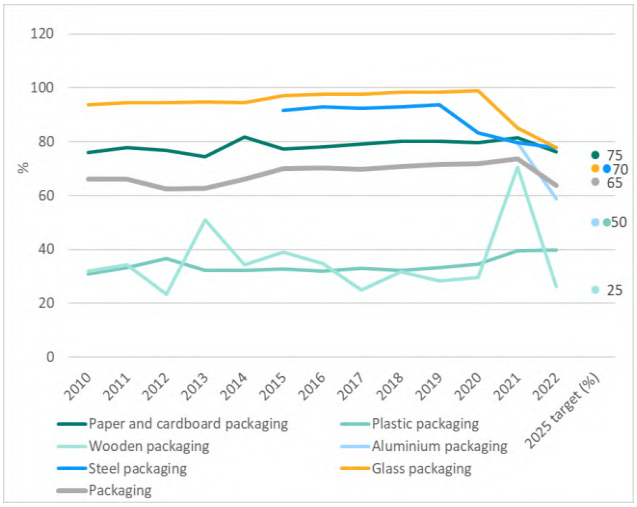
Figure 7: Packaging waste generation, 2010–2022



NB: As of reference year 2020, the rules for calculating recycled packaging waste had changed, pursuant to Article 6a of Directive 94/62/EC. Luxembourg has been applying the new reporting rules since 2015 but improvements were made in 2020 and again in 2022 with respect to the accuracy of the average loss rates ([21]).

Source: Eurostat, 'Packaging waste by waste management operations', env_waspac, last updated 23 October 2024, accessed 28 October 2024, https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_842634/default/table?lang=en.

Figure 8: Packaging waste recycling rates (%), 2010–2022



NB: As of reference year 2020 the rules for calculating recycled packaging waste have changed, pursuant to Article 6a of Directive 94/62/EC. Luxembourg has been applying the new reporting rules already since 2015 but improvements were made in 2020 and again in 2022 with respect to the accuracy of the average loss rates ([22]).

Source: Eurostat, 'Packaging waste by waste management operations', env_waspac, last updated 23 October 2024, accessed 28 October 2024, https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC__custom_842634/default/table?lang=en.

For 2022, the reported recycling rates are above the 2025 targets except for plastics packaging and total packaging. However, all recycling rates dropped in 2022 compared to 2021. For plastic packaging recycling, Luxembourg has to speed up its progress to reach the 2025 recycling target.

Policies to encourage waste prevention

Waste management plans and waste prevention programmes are instrumental to the full implementation of EU waste legislation. They set out key provisions and investments to ensure compliance with existing and new legal requirements (e.g. on waste prevention, on separate collection for certain waste streams, on recycling and on landfill targets).

Luxembourg's national waste prevention programme underwent a review in 2018 ([23]). At the time of writing, a new PNGDR was being developed, based on an evaluation in 2023. No budget is specified for the implementation of the national waste prevention programme ([24]).

([20]) The EU average might have been influenced by not all Member States fully applying the reporting rules for packaging waste set out in Commission Implementing Decision (EU) 2019/665.

([21]) MECB, 2024, Information provided during the Eionet review of the draft EEA country profile on waste management for Luxembourg, Ministry of the Environment, Climate and Biodiversity, Gouvernement du Grand-Duché de Luxembourg.

([22]) MECB, 2024, Information provided during the Eionet review of the draft EEA country profile on waste management for Luxembourg, Ministry of the Environment, Climate and Biodiversity, Gouvernement du Grand-Duché de Luxembourg.

([23]) Gouvernement du Grand-Duché de Luxembourg, *Plan National de Gestion des Déchets et des Ressources*, Ministère du Développement durable et des Infrastructures, 2018, https://environnement.public.lu/dam-assets/documents/offall_a_ressourcen/pngd/plan/PNGD.pdf.

([24]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022,

Priority waste streams for prevention in the 2016–2022 PNGDR were food and organic waste, construction and demolition waste, hazardous waste, household and municipal waste, packaging waste, waste electrical and electronic equipment, manufacturing waste, and other types of waste, like bulky waste, littering waste, waste from sewage treatment, used tires and end-of-life vehicles ([25]).

No indicators have been adopted, but the 2016–2022 PNGDR included quantitative targets for each priority waste stream, for example ([26]) reducing bulky waste by 20 %, achieving zero littering, reducing the consumption of lightweight plastic bags without increasing the production of packaging overall, and halving food waste by 2022.

To achieve the reduction target for bulky waste, Luxembourg aims to develop recovery and restoration systems for consumer goods deposited in recycling centres ([27]).

Luxembourg has created a special website dedicated to repair and sharing ([28]). Reuse is integrated in resource centres (formerly called recycling centres) by an ongoing project ([29]). The focus is on accelerating the implementation of repair systems, as current options lack financial investment. Initiatives such as 'repair cafes' will also be promoted, and repair services will be linked to job creation ([30]).

The implementation of prevention measures is highlighted across various areas, including sustainable production and consumption, reuse, food waste reduction, littering reduction and awareness-raising campaigns. To promote sustainable consumption, the Ministry of the Environment, Climate and Sustainable Development has launched the project 'Clever Iessen'. It aims to encourage the use of local and seasonal products and the reduction of food waste, and address the production and distribution of food through, for example, implementing a deposit system for reusing containers. It also raises awareness among stakeholders at all levels ([31]).

Policies to encourage separate collection and recycling

In Luxembourg, residual waste is primarily collected door to door and to some extent at civic amenity sites. The same applies to glass and paper and cardboard, whose collection methods are complemented by 'bring points'. For biowaste, a large part of the population is covered by door-to-door collection. Glass collection mainly targets glass packaging, but systems for collecting other glass are in place at civic amenity sites. Plastics, metals and composite packaging are collected door to door by producer responsibility organisation Valorlux, which has collected, since 2021, all plastic packaging, increasing collection rates and reducing incineration. Certain plastics and non-packaging metals are separately collected at civic amenity sites. Municipalities must ensure public access to separate collection facilities for paper, metal, glass, plastic, biowaste and packaging waste. Furthermore, Luxembourg mandates the separate collection of packaging waste from non-household sources ([32]).

In Luxembourg, around 60 % of citizens are incentivised to sort at source through a pay-as-you-throw system for collecting municipal waste, which is based on either weight or the volume and/or frequency of waste collection ([33]). There is still potential to expand the pay-as-you-throw system for residual waste to improve sorting at source and enhance recycling.

Voluntary deposit return systems are in place, but only for specific types of reusable packaging ([34]). A mandatory

https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([25]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([26]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([27]) Environnement Public, *Plan National de Gestion des Déchets et des Ressources*, Ministère du Développement durable et des Infrastructures, Gouvernement du Grand-Duché de Luxembourg, 2018, https://environnement.public.lu/dam-assets/documents/offall_a_ressourcen/pngd/plan/PNGD.pdf.

([28]) https://repairandshare.lu/.

([29]) Gouvernement du Grand-Duché de Luxembourg, 'Projet de règlement grand-ducal relatif à l'aménagement et à la gestion des centres de ressources et des autres infrastructures communales de collecte séparée', 2024, https://legilux.public.lu/eli/dl/pr/2023/220.

([30]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([31]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([32]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view.

([33]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/luxembourg/view; Environnement Public, *Plan National de Gestion des Déchets et des Ressources*, Le Gouvernement du Grand-Duché de Luxembourg, Ministère du Développement durable et des Infrastructures, 2018, https://environnement.public.lu/dam-assets/documents/offall_a_ressourcen/pngd/plan/PNGD.pdf .

([34]) Information provided by the Ministry of the Environment, Climate and Biodiversity of the Luxembourg Government during the 2024

deposit return scheme for packaging could boost reuse and further increase the capture of recyclable waste ([35]).

Luxembourg has no advanced fee modulation – that is, fee modulation beyond the broad categories of materials, such as higher fees for difficult-to-recycle types of plastic or combinations of materials. In addition, no packaging tax is applied ([36]).

Policies to discourage landfilling or incineration

The country's landfill rate is low (see Figure 6). Luxembourg has no landfill tax in place, but a relatively high gate fee, of EUR 200/ton, for non-hazardous municipal waste and a ban on landfilling untreated municipal waste and organic waste with a total organic carbon content above 5 % ([37]).

Luxembourg strongly relies on incineration for the disposal of mixed municipal waste (see Figure 5). Luxembourg could benefit from introducing a tax and phasing out subsidies for incineration ([38]).

In 2024, the Commission opened a new infringement procedure as Luxembourg did not meet the agreed target for the collection recycling of waste electronic and electric equipment ([39]) in 2021.

Luxembourg has fulfilled its requirement to update its waste management plan ([40]). It has made substantial progress in setting up new policies to further implement the waste hierarchy. This, together with the implementation of policies that were already in place, has contributed to the progress made in reducing the landfill rate, as well as slightly increasing the recycling rates of municipal waste and packaging waste. Luxembourg ratified the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships but not the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention). Luxembourg has made no progress on introducing a tax on incineration or phasing out subsidies for incineration.

2025 priority actions

- Further shift reusable and recyclable waste away from incineration, including through economic instruments.
- Increase the collection and recycling rate of waste electronic and electric equipment (WEEE).
- Introduce the deposit and return system(-s) (DRS), as mandated by the new Packaging and Packaging Waste Regulation, to capture more recyclable materials and improve the quality of recyclates.
- Invest in waste prevention measures to reduce the total amount of waste generated.
- Develop EPR schemes for problematic waste and introduce fee modulation.

Eionet review of the draft EEA country profile on waste management for Luxembourg.

([35]) EEA, *Early warning assessment related to the 2025 targets for municipal waste and packaging waste*, 2022, https://www.eea.europa.eu/publications/many-eu-member-states/early-warning-assessment-related-to; European Commission: Directorate-General for Environment, *Luxembourg – 2025 EU waste recycling targets: State of play*, Publications Office of the European Union, Luxembourg, 2023 https://op.europa.eu/en/publication-detail/-/publication/8dd40227-0351-11ee-87ec-01aa75ed71a1/language-en.

([36]) Ibid.

([37]) Environnement Public, Plan National de Gestion des Déchets et des Ressources, Ministère du Développement durable et des Infrastructures, Gouvernement du Grand-Duché de Luxembourg, 2018, https://environnement.public.lu/dam-assets/documents/offall_a_ressourcen/pngd/plan/PNGD.pdf.

([38]) Commission Staff Working Document – Environmental implementation review 2022, SWD(2022) 268 final of 8 September 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=comnat%3ASWD_2022_0267_FIN.

([39]) European Commission infringement decision INFR(2024)2124, Infringement decisions, 'The Commission calls on all Member States to meet waste collection and recycling targets', Juillet 25, 2024, Brussels, https://ec.europa.eu/commission/presscorner/detail/en/inf_24_3228.

([40]) Environnement Public, *Plan National de Gestion des Déchets et des Ressources*, Ministère du Développement durable et des Infrastructures, Gouvernement du Grand-Duché de Luxembourg, 2018, https://environnement.public.lu/dam-assets/documents/offall_a_ressourcen/pngd/plan/PNGD.pdf.

2. Biodiversity and natural capital

Global and EU biodiversity frameworks

Biological diversity and healthy ecosystems are critical for our societies, underpin our economies and well-being and are essential for climate change adaptation and mitigation. The Kunming–Montreal global biodiversity framework (GBF), adopted in December 2022, sets comprehensive and measurable targets to tackle biodiversity loss by 2030. To implement this global framework and integrate biodiversity considerations into national decision-making, the EU – as well as all Member States – had to submit national biodiversity strategies and action plans, or to communicate national targets aligned with the global targets, by the end of 2024.

The EU biodiversity strategy for 2030 (BDS) aims to put EU biodiversity on a path to recovery by 2030. It sets quantified targets intended to protect and restore nature and manage ecosystems in a sustainable manner, as well as measures to enable implementation and commitments to support global biodiversity. A BDS actions tracker ([41]) and a dashboard of indicators ([42]) provide information on implementation progress.

The recently adopted EU Nature Restoration Regulation ([43]) is the first EU-wide, comprehensive law of its kind and a key instrument for the EU to deliver on the global biodiversity targets for 2030. It lays down an overarching objective at the EU level to put in place effective restoration measures on 20 % of EU land and sea by 2030 and for all ecosystems in need of restoration by 2050. To achieve this, it sets binding targets for Member States to restore and maintain ecosystems, as well as an effective implementation framework based on national restoration plans.

The BDS is the main instrument used by the EU to deliver on its obligation under the GBF. The Commission has submitted to the Convention on Biological Diversity its report on GBF-aligned EU targets that stem from the BDS and from other policy instruments under the European Green Deal.

Member States' national biodiversity strategy and action plans need to provide coherent frameworks for national delivery on the global and EU 2030 biodiversity targets. In line with the global obligations, NBSAPs should also include a biodiversity financing plan and a capacity-building plan, based on needs assessments, as well as an overview of the national indicators used to measure progress.

Luxembourg's third national nature protection plan ([44]) was adopted by a governmental Council decision in January 2023. It sets 18 targets for 2030 and 118 measurable actions with a timeline towards 2026 and 2030, under four pillars: protection, restoration, transformative change and international engagement. The plan aims to align Luxembourg's national framework with the EU and global biodiversity targets. In July 2024, Luxembourg also uploaded to the Convention on Biological Diversity Online Reporting Tool ([45]) a mapping of national targets in relation to the global biodiversity targets.

The EU aimed to allocate to biodiversity objectives at least 7.5 % of annual spending under the EU budget in 2024, rising to 10 % in 2026 and 2027. For more details on biodiversity financing and investments for Luxembourg, see Chapter 5.

Nature protection and restoration – Natura 2000

Natura 2000 ([46]), the largest coordinated network of protected areas in the world, is key to the achievement of the objectives set out in the Birds and Habitats Directives. 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 Birds and Habitats Directives are (i) the setting up of a complete and coherent Natura 2000 network; (ii) the designation of sites of community importance (SCIs) as special areas of

([41]) EU Biodiversity Strategy Actions Tracker, https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker.

([42]) EU Biodiversity Strategy Dashboard, https://dopa.jrc.ec.europa.eu/kcbd/EUBDS2030-dashboard/?version=1.

([43]) Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 (OJ L, 2024/1991, 29.7.2024), http://data.europa.eu/eli/reg/2024/1991/oj; see also the Commission web page on the law, https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en.

([44]) Gouvernement du Grand-Duché de Luxembourg, Plan national concernant la protection de la nature, Portail de l'environnement (emwelt.lu), https://environnement.public.lu/content/dam/environnement/documents/natur/biodiversite/pnpn/pnpn-version-3.pdf.

([45]) https://ort.cbd.int/national-targets?countries=lu.

([46]) 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. Numbers of protected areas in Figure 9 do not add up to the total of SCIs plus SPAs, because some SCIs and SPAs overlap. An SAC is an SCI designated by a Member State.

conservation (SACs) ([47]); and (iii) effective management of all Natura 2000 sites through the setting of site-specific conservation objectives and measures.

Setting up a complete and coherent network of Natura 2000 sites

The setting up of a complete and coherent network of Natura 2000 sites is a cornerstone of the EU's international commitments, under the BDS and GBF, to legally protect a minimum of 30 % of its land area and 30 % of its sea area.

Meeting these commitments requires the full implementation of Article 3 of the Habitats Directive. The Natura 2000 network should represent a complete and coherent ecological network composed of sites hosting natural habitat types and species of community interest. The Natura 2000 network enables the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored to a favourable conservation status in their natural range.

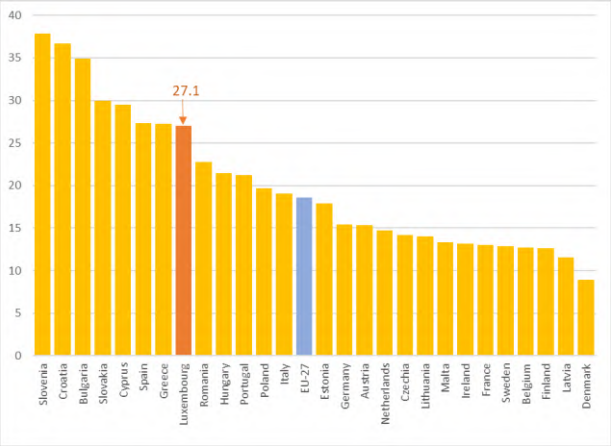
Luxembourg hosts 28 habitat types ([48]) and 60 species ([49]) covered by the Habitats Directive. The country also hosts populations of 44 bird taxa listed in Annex I to the Birds Directive ([50]).

In 2023, 27.1 % of Luxembourg's territory was covered by Natura 2000 sites (EU average: 18.6 %). Special protection areas classified under the Birds Directive covered 16.1 % (EU average: 12.8 %) and SCIs under the Habitats Directive covered 16.0 % (EU average: 14.3 %) of the Member State's territory.

The latest assessment of the SCIs of the Natura 2000 network was carried out in 2016, on the basis of the 2014 database. At that time, the only insufficiency was related to the southern damselfly (*Coenagrion mercuriale*). Luxembourg has designated a site for this species (LU0001013). A final evaluation of the situation in the country will be sufficient to conclude this procedure.

Considering both Natura 2000 sites and other nationally designated protected areas, Luxembourg legally protected 37.9% of its terrestrial areas in 2022 (EU average: 26 %) ([51]), showing a significant decreased since the last EIR (as protected areas represented 55.8% in 2021). One reason for this decrease is that some areas previously reported as "designated protected areas" have been excluded from the reporting as their actual protection effect does not qualify for a nationally designated area.

Figure 9: Natura 2000 terrestrial protected area coverage per Member State (%), 2023



Source: European Environment Agency (EEA), 'Natura 2000 Barometer', 2023 data, accessed March 2025, https://www.eea.europa.eu/data-and-maps/dashboards/natura-2000-barometer.

([47]) SCIs are designated pursuant to the Habitats Directive, whereas SPAs are designated pursuant to the Birds Directive. Figures of coverage do not add up because some SCIs and SPAs overlap.

([48]) EEA, 'Number of habitats and species per Member State', Article 17 dashboard, Annex I total, 19 December 2019, https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/general-information-on-habitats-and-species.

([49]) EEA, 'Number of habitats and species per Member State', Article 17 dashboard, Annex II, Annex IV excluding those in Annex II, and Annex V excluding those in Annex II, 19 December 2019, https://www.eea.europa.eu/en/analysis/maps-and-charts/general-information-on-habitats-and-species-article-17-national-summary-dashboards-archived. This counting only takes into account species and habitats for which an assessment of conservation status was requested.

([50]) EEA, 'Number of bird species/populations per Member State', Article 12 dashboard, Annex I total, last updated 11 May 2023, https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-12-national-summary-dashboards/general-information-on-bird-species-populations.

([51]) Eurostat dataset env_bio4, terrestrial protected area percentage for 2022, accessed March 2025, https://ec.europa.eu/eurostat/databrowser/view/env_bio4/default/table?lang=en.

Designating special areas of conservation and setting site-specific conservation objectives and measures

In order to ensure that SCIs contribute to the objectives of the Habitats Directive, Member States must designate them as SACs, setting site-specific conservation objectives based on the ecological needs of the species and habitats present on the sites. The site-specific conservation objectives must be defined in terms of attributes and targets that cover the properties of the feature of interest that are necessary to describe its condition as either favourable or unfavourable. These objectives must address the key pressures and threats present on the site. Article 6 of the Habitats Directive requires Member States to establish and implement conservation measures for the realisation of the objectives of the site.

In 2022, Luxembourg was assigned a priority action to complete the Natura 2000 site designation process, including addressing the SACs, and defining the conservation objectives and measures required to achieve favourable conservation status for protected habitats and species in the framework of site management plans or equivalent instruments. Since then, Luxembourg has designated all its 48 SACs within the six-year deadline. For each SAC, conservation measures are set out in a comprehensive management plan (some management plans are shared by several SACs) ([52]) or in the national plan for the protection of nature (PNPN). All conservation objectives are set by Grand-Ducal decrees. However, some conservation objectives of management plans should be improved to provide quantifiable objectives.

2025 priority action

- Ensure the effective implementation of Natura 2000 management plans and sufficient administrative capacity and financing both for Natura 2000 and the implementation of the Nature Restoration Regulation. Ensure implementation of Prioritised Actions Framework 2021-2027 (PAFs).

Recovery of species

One objective set by the BDS is that, by 2030, there should be no further deterioration in conservation trends or the status of any protected species. The BDS also states that Member States should ensure that at least 30 % of species not currently in favourable conservation status achieve that status or show progress towards doing so (e.g. by exhibiting positive population dynamics or stable or increasing range and habitat size), by 2030. According to the European Environment Agency (EEA), based on reporting required under Article 17 of the Habitats Directive, a quarter of species in the EU were of good conservation status as of 2018 ([53]).

One of the primary objectives of the Habitats Directive is the maintenance of or restoration to favourable conservation status of all species of community interest. Moreover, the Birds Directive also aims to ensure that all wild birds in the EU enjoy a secure status. In order to achieve these objectives, it will be necessary to address key pressures and threats. The Birds Directive and the Habitats Directive lay down a framework of species protection rules and rules on the conservation of habitats and species in order to combat these threats.

Under Article 17 of the Habitats Directive, Member States are required to report on the conservation status of habitats and species every six years. Reports for the current reporting cycle, covering 2019–2024, are due for submission in July 2025. Figures 10 and 11 show the latest available conservation status data.

According to Luxembourg's report on the conservation status of habitats and species covered by Article 17 of the Habitats Directive for 2013–2018, the share of habitats with a good conservation status was 32.14 % in 2018 (9 good assessments). The share of protected species with a good conservation status was 15 % in 2018 (11 assessments). 42.86 % of the forest area protected under the Birds and Habitats Directives has a favourable conservation status ([54]) (86.0 % has a good conservation status). For birds, 65 % of breeding species showed short-term increasing (15 %) or stable (50 %) population trends. For wintering species, 50 % of species showed a short-term increase.

The main pressures, as reported under Article 17 of the Habitats Directive and Article 12 of the Birds Directive, are (i) agriculture; (ii) development, construction and use of residential, commercial, industrial and recreational infrastructure and areas; and (iii) natural processes and changes in land use.

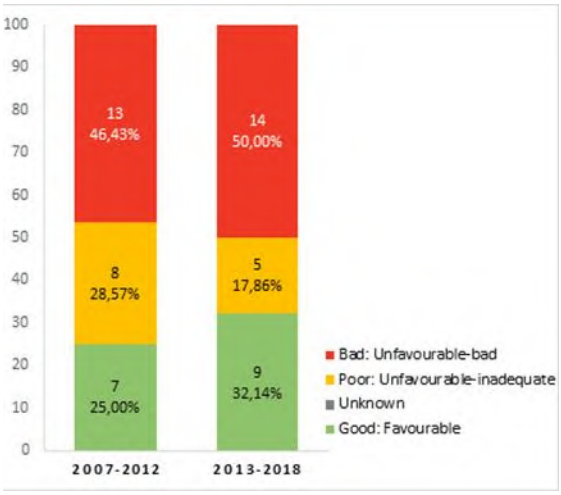
Figure 10: Assessments of

([52]) Management plans are available at www.emwelt.lu.

([53]) EEA, *State of Nature in the EU: Results from reporting under the Nature Directives 2013–2018*, Publications Office of the European Union, Luxembourg, 2020, https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020.

([54]) EEA, *State of Nature in the EU: Results from reporting under the Nature Directives 2013–2018*, Publications Office of the European Union, Luxembourg, 2020, https://op.europa.eu/en/publication-detail/-/publication/e733191f-5c65-11eb-b487-01aa75ed71a1.

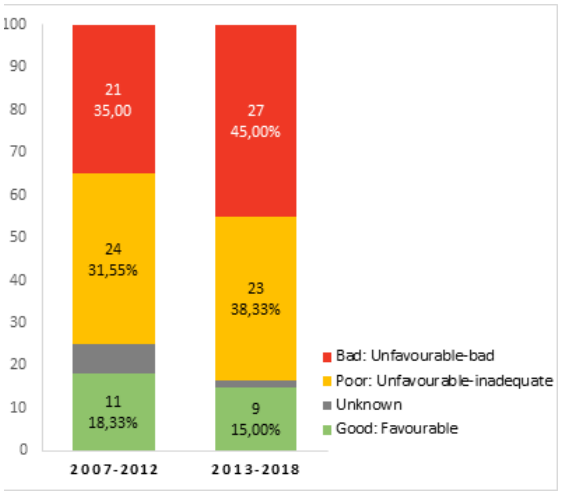
conservation status of habitats for the 2007–2012 and 2013–2018 reporting periods



NB: The values shown for 2007–2012 and 2013–2018 are not necessarily directly comparable because changes in area conservation status in a Member State may result from changes to methods or use of better data, rather than reflecting genuine changes.

Source: EEA, 'Conservation status and trends of habitats and species', EEA website, 19 December 2019, accessed December 2021, https://www.eea.europa.eu/en/analysis/maps-and-charts/conservation-status-and-trends-article-17-national-summary-dashboards-archived.

Figure 11: Assessments of conservation status of species for the 2007–2012 and 2013–2018 reporting periods



Source: European Commission: Directorate-General for Environment, *The State of Nature in the EU – Conservation status and trends of species and habitats protected by the EU Nature Directives 2013–2018*, Publications Office of the European Union, Luxembourg, 2021, https://op.europa.eu/en/publication-detail/-/publication/e733191f-5c65-11eb-b487-01aa75ed71a1.

With regard to habitats, the threats and risks induced by natural processes are on par with those induced by agriculture.

The country is under high pressure due to its high level of urbanisation and agriculture activities. The prioritised action framework proposed by Luxembourg (in the 3rd edition of the PNPN) ([55]) aims to improve the current situation, in particular by creating eight steering committees to improve site management and communication among stakeholders. Luxembourg is also investing in improving biodiversity monitoring, in particular setting up species monitoring. Luxembourg is also planning to invest in maintaining or restoring the favourable status of grasslands and humid areas, with specific measures for each habitat (see the third edition of the PNPN).

In 2022, Luxembourg was given priority actions to, among others, (i) continue to integrate biodiversity concerns into other policies (in particular on agriculture, but also on fisheries, urban and infrastructure planning, and sustainable tourism) and promote communication between players; and (ii) where relevant, avoid further habitat fragmentation and take measures to restore connectivity. No progress was reported in these actions.

([55]) Gouvernement du Grand-Duché de Luxembourg, Plan national concernant la protection de la nature, Portail de l'environnement (emwelt.lu), https://environnement.public.lu/content/dam/environnement/documents/natur/biodiversite/pnpn/pnpn-version-3.pdf.

2025 priority actions

- Reinforce action for habitats and species with unfavourable conservation status through, for example, restoration measures, increased connectivity, better policy coordination and integration, and increased funding.
- Strengthen the integration of biodiversity actions into other policies, e.g. energy, agriculture, fisheries, forestry, urban and infrastructure planning and sustainable tourism, and promote communication between stakeholders.

Recovery of ecosystems

Agricultural ecosystems

The BDS works alongside the common agricultural policy (CAP) to support the transition to sustainable agriculture. The strategy has set five common agriculture-related targets for 2030, namely to:

— reduce by 50 % the overall use of – and risk from – chemical pesticides;
— reduce by 50 % the use of more hazardous pesticides;
— reduce by 50 % losses of nutrients from fertilisers (which will result in a 20 % reduction in the use of fertilisers) while ensuring that there is no deterioration of soil fertility;
— restore at least 10 % of agricultural area to have high-diversity landscape features;
— and increase the area under organic farming to at least 25 %.

The "Vision for agriculture and food" ([56]), adopted by the European Commission in February 2025, sets a roadmap to an agri-food system that is attractive, competitive, sustainable and fair for current and future generations. To ensure a sustainable future for EU agriculture, it is crucial that these four priority areas are pursued together, and that public and private support are adequately targeted toward this objective.

The CAP and national CAP strategic plans are key instruments to facilitate and strengthen the efforts of European farmers to protect biodiversity and the environment at large. The Commission approved Member States' CAP strategic plans in 2022 for the programming period 2023-2027. The CAP is the largest source of funding dedicated to supporting biodiversity and plays a significant role in implementing EU environmental policy. Strategic plans should continue to support the protection of soil, water, air quality and biodiversity.

While certain CAP result indicators focus on the national measures favouring sustainable agriculture practices that regenerate ecosystems, the impact of these measures is difficult to assess, as uptake of the eco-schemes is voluntary for farmers.

The utilised agricultural area in Luxembourg increased from 130 651 hectares (ha) in 2016 to 132 980 ha in 2023 ([57]) or, representing more than 50% of Luxembourg's territory.

Landscape features are small fragments of non-productive and typically – but not exclusively – semi-natural vegetation present in or adjacent to agricultural land. They provide ecosystem services and support for biodiversity. The indicator 'share of agricultural land covered with landscape features' is the ratio between the area covered by landscape features and the area covered by agricultural land. Based on the Land Use/Cover Area Frame Survey landscape features estimates, the share of agricultural land covered by non-productive landscape features in Luxembourg is 4 %, below the EU average.

In 2024, the CAP basic regulations were amended ([58]) regarding, inter alia, the standards for good agricultural and environmental condition of land. These changes removed the obligation for farmers benefiting from CAP area-related support to have a minimum share of 3–4 % of non-productive area or landscape features in their farms. The amended regulations set out, however, an obligation for Member States to establish and provide support for eco-schemes covering practices for the maintenance of non-productive areas, such as land lying fallow, and for the establishment of new landscape features on arable land.

The recently adopted Nature Restoration Regulation ([59]) focuses on the restoration of agricultural ecosystems and requires Member States to put in place measures that

([56]) https://agriculture.ec.europa.eu/overview-vision-agriculture-food/vision-agriculture-and-food_en.

([57]) Eurostat, 'Utilised agricultural area by categories', tag00025, accessed 21 January 2025. These figures partially include lands used by Luxembourg's farmers in neighbouring countries https://ec.europa.eu/eurostat/databrowser/view/tag00025/default/table?lang=en.

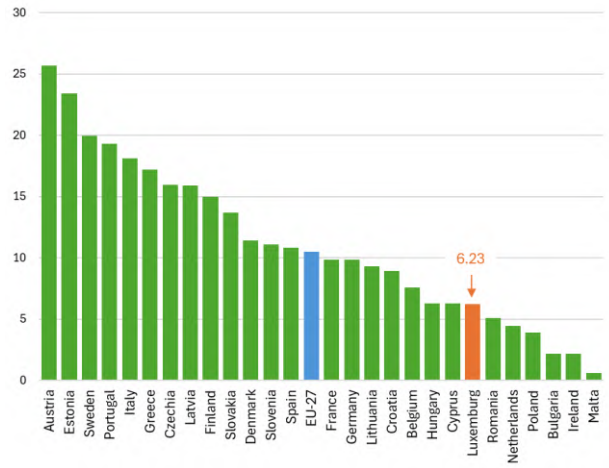
([58]) Regulation (EU) 2024/1468 of the European Parliament and of the Council of 14 May 2024 amending Regulations (EU) 2021/2115 and (EU) 2021/2116 as regards good agricultural and environmental condition standards, schemes for climate, environment and animal welfare, amendment of the CAP strategic plans, review of the CAP strategic plans and exemptions from controls and penalties (OJ L, 2024/1468, 24.5.2024), http://data.europa.eu/eli/reg/2024/1468/oj.

([59]) Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 (OJ L, 2024/1991, 29.7.2024), http://data.europa.eu/eli/reg/2024/1991/oj.

aim to achieve an increasing trend at the national level in at least two out of three indicators for agricultural ecosystems ([60]). One of these indicators is the 'share of agricultural land with high-diversity landscape features'.

Organic farming practices are highly beneficial to biodiversity. As shown in Figure 12, it is estimated that 6.23 % of Luxembourg's utilised agricultural land area is used for organic farming. This is lower than the EU average of 10.50 % ([61]). Luxembourg is making a below-average contribution to achieving the target of 25 % of the EU's agricultural land being used for organic farming by 2030.

Figure 12: Share of total utilised agricultural area occupied by organic farming per Member State (%), 2022



Source: Eurostat, 'Area under organic farming', sdg_02_40, accessed 5 December 2024, https://ec.europa.eu/eurostat/databrowser/view/sdg_02_40/default/table?lang=en.

In 2022, Luxembourg was asked to step up its action on implementing the recommendations set out in its CAP SP, especially in improving rural areas. The Commission approved Luxembourg's CAP SP in September 2022, and its amendment in December 2023. Its implementation is now ongoing.

2025 priority actions

- Step-up efforts to further reduce nitrogen deposition, in particular in Natura 2000 sites with nitrogen-sensitive species and habitats.
- Implement eco-schemes and agri-environmental measures and practices to address the environmental needs of Luxembourg.
- Implement and scale up the uptake of organic farming practices.
- Promote the active management of grasslands through extensive grazing to maintain the condition of these semi-natural habitats.

Soil ecosystems

Soil is an essential, finite, and extremely fragile resource. Its increasing degradation poses a threat to EU food security and climate resilience, adaptation, and mitigation.
The EU soil strategy, adopted in November 2021, aims to support soil protection, sustainable soil management and the restoration of degraded soils to achieve the Green Deal objectives as well as land degradation neutrality by 2030.
This entails:
— preventing further soil degradation;
— making sustainable soil management the new normal;
— taking action for ecosystem restoration.

The proposed directive on soil monitoring and resilience ([62]) aims to introduce the first comprehensive legislation on the protection of all soils in the EU. Should the Directive be adopted, Member States will have to transpose it into national legislation and implement it, starting with putting in place the governance systems and a sound monitoring framework building on existing

([60]) The three indicators are 'grassland butterfly index', 'stock of organic carbon in cropland mineral soils' and 'share of agricultural land with high-diversity landscape features'.
([61]) This is based on the latest available information from Eurostat, which is currently under review; European Commission, *Agriculture biologique au sein de l'union européenne*, factsheet, Brussels, 2024, https://agriculture.ec.europa.eu/document/download/c67458ed-ec50-4762-ae68-341763ab93c2_fr?filename=factsheet-organic-farning_fr.pdf&prefLang=en.
([62]) Proposal for a directive of the European Parliament and of the Council on soil monitoring and resilience (Soil Monitoring Law), COM(2023) 416 final of 5 July 2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A0416%3AFIN.

national soil monitoring frameworks. The objective of the proposed directive is to provide better and more comparable soil health data with the view of attaining healthy soils by 2050.

Degradation of soil ecosystems encompasses several aspects. The proposed Directive requires Member States to assess soil health according to a set of common indicators and to define the necessary regeneration measures. The area of soil that is sealed is an important factor in monitoring land-use change and represents an important pressure on nature and biodiversity. Other soil issues related to land degradation are soil erosion, soil compaction, loss of soil organic carbon, soil contamination, soil salinisation and the presence in soil of nitrogen and phosphorus in excess. The impact assessment accompanying the proposal, which builds on the data available in the EU Soil Observatory, points to the following soil degradation issues in Luxembourg ([63]).

The greatest contributor to Luxembourg's unhealthy soils is nutrient excess, with 31 % of soils containing nitrogen concentrations above 50 kg/ha, or 86 % of total agricultural land area. 12 % of the national territory experiences unsustainable soil erosion by water, wind, tillage and harvest, representing 87 % of cropland.

In 2022, Luxembourg was assigned a priority action to reduce the excessive area of sealed and artificialised soil and remediate degraded soils and, to this end, consider formally committing to land degradation neutrality targets under the United Nations Convention to Combat Desertification (UNCCD). According to Luxembourg's national report to the UNCCD, Luxembourg has not set an LDN target yet ([64]). Therefore, the priority action is repeated.

2025 priority action

- Reduce the excessive area of sealed and artificialised soil and remediate degraded areas of soil. If appropriate, consider formally committing to targets for land-degradation neutrality under the relevant United Nations Convention to Combat Desertification agreement.

Grasslands

Grasslands are among the most diverse ecosystems in the EU; they can contain as many as 80 different plant species per square metre and are home to a large variety of animals, ranging from small insects, birds, and rodents to large herbivores. Grasslands are essential for agriculture and livestock herding. Natural grasslands also play an important role in storing carbon. However, changes in agricultural practices and land uses have caused grasslands to disappear at an alarming rate, making them one of Europe's most threatened ecosystems.

Luxembourg hosts six types of protected grasslands, whose conservation status is degraded: the habitat types 6110 and 6430 have an unfavourable (inadequate) conservation status, while the habitat types 6210, 6230, 6410 and 6510 (83.33 % of protected grasslands) have an unfavourable status. Five of these habitat types have a degrading conservation status. The loss and deterioration of these types of habitats are mainly caused by harmful agricultural practices.

A pilot study on the degradation of protected grasslands in Luxembourg is currently ongoing, mainly targeting habitat type 6510, which is the most important type of grassland in terms of coverage. Luxembourg authorities proposed some practical measures to be taken to combat degradation, which will be discussed in a bilateral meeting by the end of 2024.

In 2021, the Commission received a complaint against Luxembourg related to the Habitats and Birds Directives. The complaint concerned the conservation status of (i) the grey partridge (*Perdix perdix*) and other farmland birds, and (ii) semi-natural grasslands ([65]). Despite supporting measures taken by Luxembourg, only four couples of partridges remain in the country and the conservation status of semi-natural grasslands is worsening. In response, the authorities announced they would take a variety of actions to step up their efforts to preserve these species and habitats, in particular to protect and restore semi-natural grasslands. These actions will be monitored.

In 2022, Luxembourg was given priority actions to urgently adopt binding and regulatory measures to address root causes and ensure the effective enforcement of measures to protect and restore the habitats of the grey partridge and other farmland birds. Some measures have been implemented and Luxembourg should pursue its efforts to restore grassland habitats and protect endangered species.

([63]) Commission staff working document – Impact assessment report: Annexes – Accompanying the proposal for a directive of the European Parliament and of the Council on soil monitoring and resilience (Soil Monitoring Law), SWD(2023) 417 final of 5 July 2023, https://environment.ec.europa.eu/system/files/2023-07/IMPACT%20ASSESSMENT%20REPORT_ANNEXES_SWD_2023_417_part4.pdf.

([64]) UNCCD, Voluntary LDN targets, accessed on 4 March 2025, https://www.unccd.int/our-work/country-profiles/voluntary-ldn-targets.

([65]) Habitat codes 6510, 6210, 6230, 6410 and 6430.

Wetlands/peatlands

Wetlands act as water sources and purifiers; they are the planet's greatest natural carbon stores, and they are crucial to agriculture and fisheries. Peatlands are a special type of wetlands dominated by peat-forming plants such as *Sphagnum* mosses. Nearly all peatlands in the EU are habitat types listed in Annex I to the Habitats Directive. Drained peatlands under intensive agricultural use constitute only 3 % of the EU's utilised agricultural area. At the same time, they are responsible for 25 % of the GHG emissions from the EU's agricultural sector. Restoring peatlands brings multiple benefits, as peatlands improve water retention and quality, store carbon, reduce GHG emissions and increase biodiversity.

Luxembourg hosts priority habitat type 7220, 'petrifying springs with tufa formation (cratoneurion)', protected in 9 Natura 2000 sites, and habitat type 7140, 'transition mires and quaking bogs', protected in 14 Natura 2000 sites. The area covered by these habitat types is rather small (about 1 ha for 7140 and 2 ha for 7220).

The latest reporting on Article 17 (2013–2018) shows wetlands have degraded: half of them are classified as degraded, with a stable trend, while the rest are degraded with a worsening conservation status.

These habitats are facing pressures and threats from agriculture and human-induced changes in the water regime. Other sources of pressures and threats relate to the development of operation of transport systems.

Luxembourg indicated in its pledges for the BDS target on status improvements for species and habitats that 10 projects were launched in 2022 to limit or reverse the negative impacts of water overexploitation and contribute to climate change adaptation. These actions were not found for habitat type 7140.

Forest ecosystems

Forests are important carbon sinks and conserving them is vital if the EU is to achieve climate neutrality by 2050. The EU forest strategy for 2030, adopted in July 2021, is a plan of actions to promote the many services that forests provide. Its key objective is to ensure healthy, diverse, and resilient EU forests that contribute significantly to the achievement of the EU's biodiversity and climate ambitions. About 27 % of the forest area in the EU is covered by habitat types listed in Annex I to the Habitats Directive. Moreover, forests host several species protected under the Birds and Habitats Directives, including those for which there is a requirement to designate Natura 2000 sites and to protect breeding sites and resting places.

Several guidelines on forestry management were published in 2023. They covered biodiversity-friendly afforestation, reforestation, and tree planting; closer-to-nature forest management; and defining, mapping, monitoring and strictly protecting primary and old-growth forests. Further guidance on payment schemes for ecosystems services has also been published.

In 2023, the Commission proposed a new forest monitoring law ([66]) that aims to create a comprehensive forest knowledge base, address information gaps, and enable a better response to growing pressures on forests.

Assessments show that, of the 27 % of EU forest area protected under the Habitats Directive, less than 15 % is of favourable conservation status ([67]). The share of forested areas in the EU with a bad conservation status increased from 27 % in 2015 to 31 % in 2018.

In Luxembourg, forests covered 36.5 % ([68]) of the territory ([69]) in 2020, and more than 50 % of assessments show these areas have a poor or bad conservation status. Luxembourg's forest health is concerning, with only 14.5% of trees in good health and 12.3% of dying or dead trees in 2023, partly due to pollution and eutrophication, and the situation is degrading[70].

Figure 13: Conservation status

([66]) Proposal for a Regulation of the European Parliament and of the Council on a monitoring framework for resilient European forests, COM(2023)728, 22 November 2023, https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2023)728&lang=en

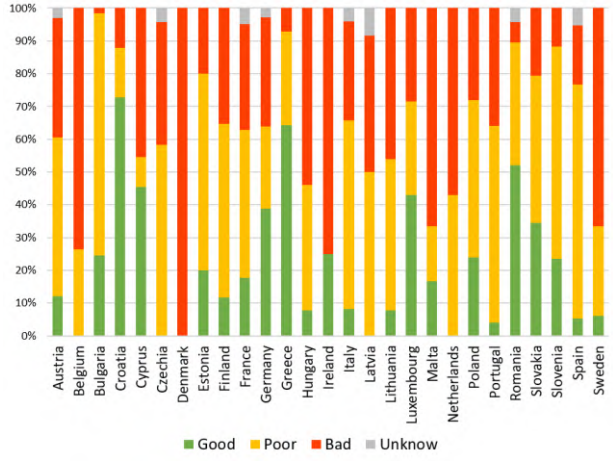
([67]) EEA, *State of Nature in the EU: Results from reporting under the Nature Directives 2013–2018*, Publications Office of the European Union, Luxembourg, 2020, https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020.

([68]) EEA, forest information system for Europe, 'Countries – FISE country factsheets', forest information system for Europe website, https://forest.eea.europa.eu/countries.

([69]) Commission staff working document – Stakeholder consultation and evidence base: 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 – New EU forest strategy for 2030, SWD(2021) 652 final of 16 July 2021, https://eur-lex.europa.eu/legal-content/NL/TXT/?uri=CELEX:52021SC0652.

([70]) Administration de la Nature et des forêts, Ministère de l'environnement du Luxembourg, Résultats de l'inventaire photosanytaire des forêts du Luxembourg, 2023.

# of forests protected under the Habitats Directive per Member State (% of assessments), 2013–2018



Source: EEA, 'Conservation status and trends of habitats and species', EEA website, 19 December 2019, accessed January 2022, https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/conservation-status-and-trends.

Among forest disturbances contributing to loss of forest integrity and related biodiversity loss, wildfires constitute a particular reason for concern. In 2022, the EU saw a record number (2 700) of wildfires affecting more than 30 ha, which led to the destruction of 785 605 ha of forest, the second highest annual figure recorded. Recent years have also seen the occurrence of widespread uncontrollable fires (so-called megafires), which are associated with loss of life and an enormous cost in terms of damage to the environment, businesses and society (over EUR 2 billion annually) and carbon dioxide (CO_2) emissions. Megafires are practically beyond suppression capacity and can be prevented only by an integrated risk management approach. Wildfire prevention is also essential to preserve resources for the bioeconomy.

The EU Timber Regulation (EUTR) ([71]) prohibits the placing on the EU market of illegally harvested timber.

On 29 June 2023, the Regulation on Deforestation-free Products (EUDR) ([72]) entered into force ([73]). The regulation seeks to guarantee that products in the EU that are produced using any of a list of seven commodities have no links to deforestation. The EUDR repeals the EUTR.

2025 priority action

- Bring levels of nitrogen deposition under the critical threshold to allow forest habitat types protected under the Habitats Directive to recover.

Prevention and management of invasive alien species

Invasive alien species (IAS) are a major cause of biodiversity loss in the EU. Besides inflicting direct and indirect damage on nature and the economy, some IAS also carry and spread infectious diseases, posing a threat to humans and wildlife. Regulation (EU) No 1143/2014 (the IAS Regulation) aims to prevent, minimise, and mitigate the adverse impacts of IAS on biodiversity. It focuses action on a list of IAS of EU concern (the 'Union list'), which is regularly updated ([74]).

The third update of the Union list ([75]) entered into force on 2 August 2022. The fourth update is in preparation.

([71]) Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market (OJ L 295, 12.11.2010, p. 23), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010R0995.

([72]) Regulation (EU) 2023/1115 of the European Parliament and of the Council of 31 May 2023 on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 (OJ L 150, 9.6.2023, p. 206), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1115&qid=1687867231461.

([73]) The law will apply to large and medium-sized companies starting on December 30, 2025, and to micro and small enterprises starting on June 30, 2026.

([74]) Commission Implementing Regulation (EU) 2016/1141 of 13 July 2016 adopting a list of invasive alien species of Union concern pursuant to Regulation (EU) No 1143/2014 of the European Parliament and of the Council (OJ L 189, 14.7.2016, p. 4), as amended by Commission Implementing Regulations (EU) 2017/1263, (EU) 2019/1262 and (EU) 2022/1203, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02016R1141-20220802&from=EN.

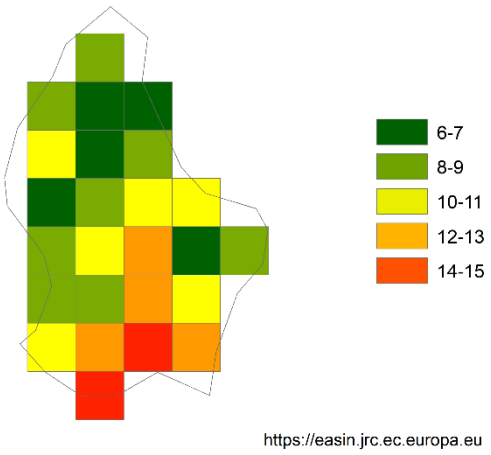
([75]) Commission Implementing Regulation (EU) 2022/1203 of 12 July 2022 amending Implementing Regulation (EU) 2016/1141 to update the list of invasive alien species of Union concern (OJ L 186, 13.7.2022, p. 10), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1203.

The IAS Regulation ([76]) currently lists 88 species subject to restrictions on keeping, importing, selling, breeding, growing, and releasing into the environment. Member States are required to take measures to (i) prevent the introduction of IAS; (ii) ensure early detection and rapid eradication of IAS; and (iii) manage species that are already widespread on their territory.

This aligns with target 6 of the GBF to reduce the introduction of IAS by at least 50 % by 2030 and minimise their impact. Preventing the introduction and spread of IAS, and managing them, including through eradication and control, can result in a substantial cost saving. Studies estimate that the total cost of IAS in Europe (damages and management) amounted to EUR 116.61 billion between 1960 and 2020 ([77]). More recent studies have put this cost at USD 28 billion per year in the EU, increasing to USD 148.2 billion by 2040 ([78]), and at USD 423 billion annually at the global level ([79]).

The total number of IAS of Union concern in the country is 22. This includes 14 species recorded in the previous EIR (2021) and 8 new additions. Of these 8 additions, 6 were already on the Union concern list in 2021, and 2 were added later under Commission Implementing Regulation (EU) 2022/1203.

Figure 14: Number of IAS of EU concern, based on available georeferenced information for Luxembourg, 2024



In 2022, Luxembourg was assigned priority actions on (i) stepping up the implementation of the IAS Regulation, and (ii) ensuring regional cooperation with neighbouring Member States to address predominant pressures. Luxembourg has taken the appropriate steps and complied with the first priority action but should continue its efforts regarding the second one.

2025 priority actions

- Step up implementation of the IAS Regulation, including with regard to enforcement and the capacity of inspection authorities.
- Ensure regional cooperation with neighbouring Member States to address predominant pressures.
- Ratify the International Convention for the Control and Management of Ships' Ballast Water and Sediments of 2004 (BWM Convention).

Ecosystem assessment and accounting

The BDS calls on Member States to better integrate biodiversity considerations into public and business decision-making at all levels and to develop natural capital accounting.
Similarly, target 14 of the GBF ([80]) aims to ensure the full integration of biodiversity and its multiple values into

([76]) 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 (OJ L 317, 4.11.2014, p. 35), https://eur-lex.europa.eu/eli/reg/2014/1143/oj/eng.

([77]) Haubrock, P. J., Turbelin, A. J., Cuthbert, R. N. et al., 'Economic costs of invasive alien species across Europe', *NeoBiota*, Vol. 63, 2021, pp. 153–190.

([78]) Henry, M., Leung, B., Cuthbert, R. N. et al., 'Unveiling the hidden economic toll of biological invasions in the European Union', *Environmental Sciences Europe*, Vol. 35, No 1, 2023, p. 43.

([79]) IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), *Summary for Policymakers – Invasive alien species assessment*, 2023 https://www.ipbes.net/document-library-catalogue/summary-policymakers-invasive-alien-species-assessment.

([80]) Decision 15/4 adopted by the Conference of the Parties to the Convention on Biological Diversity: Kunming–Montreal global biodiversity framework (https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf).

policy and planning and, as appropriate, national accounting. This requires effective and coherent biodiversity observation and reporting on ecosystem condition in the EU ([81]).
The amended Regulation (EU) No 691/2011 on European environmental economic accounts ([82]) introduces new requirements for Member States to report on the condition of ecosystems including urban ecosystems, croplands, grasslands, forest and woodlands, coastal beaches, dunes and wetlands. Data reported by the Member States will feed into the second European ecosystem assessment, due in 2027, and can also be used to support policy decisions.

An ecosystem assessment is an analysis of the condition of ecosystems and the pressures acting on them, as well as the benefits that they provide to people, either directly or indirectly through the economy.

An increasing number of platforms, networks and communities of practice involve businesses in protecting biodiversity, including the EU Business & Biodiversity Platform ([83]). These platforms and communities are key tools for promoting and facilitating natural capital assessments among businesses and financial services providers.

Natural capital assessments help private businesses to better understand both the negative and positive impacts that they have on nature, and to appreciate how nature contributes to their success. Such understanding contributes to the implementation of the EU's BDS.

In 2022, Luxembourg received the following 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 and the planning of management and restorative action.
- 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.

The first priority action could not be assessed due to a lack of data. Regarding the second priority action, there has been some progress, as there is one Luxembourg business sustainability network member of the EU Business & Biodiversity Platform.

([81]) European Commission: Joint Research Centre and EEA, *EU Ecosystem Assessment – Summary for policymakers*, Publications Office of the European Union, Luxembourg, 2021, https://op.europa.eu/en/publication-detail/-/publication/81ff1498-b91d-11eb-8aca-01aa75ed71a1/language-en.

([82]) Proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 691/2011 as regards introducing new environmental economic accounts modules, COM(2022) 329 final of 11 July 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:329:FIN.

([83]) The EU Business & Biodiversity Platform (https://green-business.ec.europa.eu/business-and-biodiversity_en) aims to promote the business case for biodiversity to businesses and financial institutions through workshops, seminars, reports and a cross-media communication strategy.

3. Zero pollution

Clean air

EU clean air policies and legislation have successfully reduced emissions of key air pollutants and significantly improved air quality, which is now moving towards the levels recommended by the World Health Organization (WHO). This has resulted in clear health benefits and reduced adverse impacts on ecosystems and biodiversity. However, to achieve the WHO-recommended levels, more efforts are needed, including full compliance with EU legislation. To guide these efforts, the EU zero pollution action plan sets targets for 2030 relative to 2005. These are to reduce the health impacts of air pollution by 55 % and to reduce the EU ecosystems threatened by air pollution by 25 %.

The EU has developed a comprehensive suite of air quality policies ([84]). These set health-based EU air quality standards ([85]) and stipulate Member States' national emission reduction commitments ([86]) for several air pollutants.

The air quality in Luxembourg is generally good, with some exceptions. The latest available annual estimates (for 2022) by the EEA ([87]) for Luxembourg attribute around 80 deaths each year (or 830 years of life lost (YLL)) to fine particulate matter ($PM_{2.5}$) ([88]), 30 deaths each year (or 360 YLL) to nitrogen dioxide (NO_2) ([89]) and 50 deaths each year (or 610 YLL) to ozone ([90]).

The emissions of several air pollutants have decreased significantly in Luxembourg since 2005, while GDP growth has continued (Figure 15). According to the inventories submitted under Article 10(2) of the National Emission Reduction Commitments Directive (NECD) ([91]) in 2024, Luxembourg met its emission reduction commitments for 2020–2029 for air pollutants nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), sulphur dioxide (SO_2), ammonia (NH_3) and $PM_{2.5}$. According to the projections submitted under Article 10(2) of the NECD in 2023, Luxembourg is projected to meet its emission reduction commitments for 2030 onwards for SO_2 and NH_3 ([92]), but not for NO_x, NMVOC and $PM_{2.5}$.

Luxembourg submitted an updated national air pollution control programme (NAPCP) to the Commission on 20 July 2023 and on 3 February 2025.

Figure 15: Emissions trends of main pollutants / GDP in Luxembourg (%), 2005–2022

([84]) European Commission, 'Air', European Commission website, https://environment.ec.europa.eu/topics/air_en.

([85]) European Commission, 'EU air quality standards', European Commission website, https://environment.ec.europa.eu/topics/air/air-quality/eu-air-quality-standards_en.

([86]) European Commission, 'Reducing emissions of air pollutants', European Commission website, https://environment.ec.europa.eu/topics/air/reducing-emissions-air-pollutants_en.

([87]) EEA, 'Harm to human health from air pollution in Europe: Burden of disease 2024', briefing No 21/2024, Copenhagen, 2024, https://www.eea.europa.eu/en/analysis/publications/harm-to-human-health-from-air-pollution-2024.

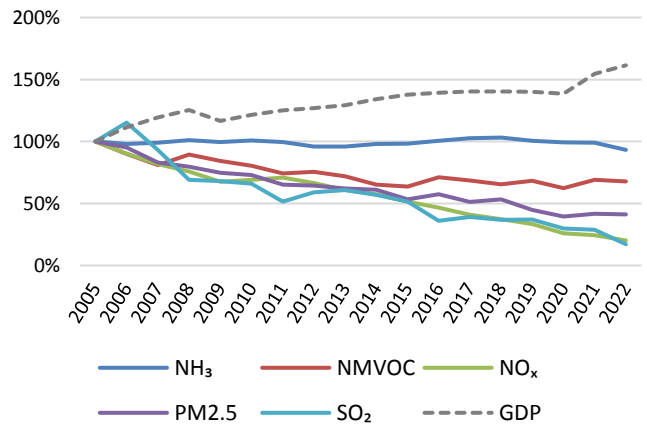
([88]) Particulate matter (PM) is a mixture of aerosol particles (solid and liquid) covering a wide range of sizes and chemical compositions. PM_{10} refers to particles with a diameter of 10 µm or less. $PM_{2.5}$ refers to particles with a diameter of 2.5 µm or less. PM is emitted from many human sources, including combustion.

([89]) Nitrogen dioxide (NO_2) pertains to a group of gases called NO_x, which also comprises nitrogen monoxide (NO). NO_x is emitted during fuel combustion – for example, from industrial facilities and the road transport sector.

([90]) Low-level ozone is produced by photochemical action on pollution. This year, for the first time, the impact of long-term exposure to ozone has also been taken into account. In previous analyses by the EEA, only the impact of short-term exposure was estimated.

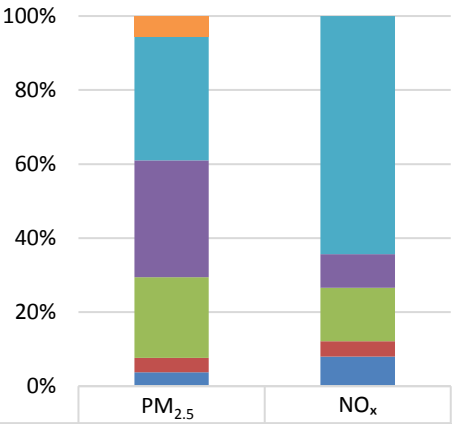
([91]) Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (OJ L 344, 17.12.2016, p. 1), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.344.01.0001.01.ENG.

([92]) In the 'with additional measures' scenario.



Source: EEA, 'National air pollutant emissions data viewer 2005–2022', 25 June 2024, https://www.eea.europa.eu/en/topics/in-depth/air-pollution/national-air-pollutant-emissions-data-viewer-2005-2022.

Figure 16: $PM_{2.5}$ and NO_x emissions by sector in Luxembourg (%), 2022



	$PM_{2.5}$	NO_x
Waste	5.44%	0.00%
Transport	33.52%	64.35%
Residential, commercial & institutional	31.59%	9.08%
Manufacturing and extractive industry	21.84%	14.40%
Energy supply	3.84%	4.17%
Agriculture	3.77%	8.00%

Source: EEA, 'National air pollutant emissions data viewer 2005–2022', 25 June 2024, https://www.eea.europa.eu/en/topics/in-depth/air-pollution/national-air-pollutant-emissions-data-viewer-2005-2022.

In 2023, no exceedances above the limit values established by the Ambient Air Quality Directive (AAQD) ([93]) were registered in Luxembourg ([94]).

Infringement procedures have been opened for Member States not meeting the emission reduction commitments for 2020–2029; this includes a procedure for Luxembourg for NH_3 and NMVOC.

In the 2022 EIR, Luxembourg received two priority actions. The first priority action was to further reduce emissions in the context of the NAPCP. Luxembourg has made some progress on this. While the latest data show compliance with the 2020–2029 emission reduction commitments, Luxembourg is still projected not to reach the emission reduction commitments for NO_x, NMVOC and $PM_{2.5}$ for 2030 onwards. The second priority action was to ensure full compliance with EU air quality standards and maintain downward emission trends. Based on the latest data, Luxembourg has made substantial progress in this regard. Full compliance has been ensured for all limit values and target values. Since 2019, downward emission trends have been reported for all main air pollutants except NMVOC, which requires further action.

2025 priority actions

- As part of the NAPCP, take action to reduce emissions of air pollutants.
- Ensure full compliance with the current AAQD standards, also in light of future stricter requirements under the revised AAQD.

Industrial emissions

The main objectives of EU policy on industrial emissions are to:

— protect air, water, and soil and to prevent harmful effects on human health and the environment;
— prevent and manage waste;
— improve energy and resource efficiency, including water;
— contribute to decarbonisation.

The cornerstone of the policy is the Industrial Emissions Directive (IED), which was revised in 2024 ([95]). The revision improves the directive's contribution to the zero pollution objective. It has a strong focus on innovation, and builds solid links between depollution, decarbonisation, and circularity, making it a key regulatory tool to accompany

([93]) Directive 2008/50/EU of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (OJ L 152, 11.6.2008, p. 1), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008L0050.

([94]) EEA, Eionet Central Data Repository (https://cdr.eionet.europa.eu/).

([95]) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial and livestock rearing emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17), as amended by Directive (EU) 2024/1785 of the European Parliament and of the Council of 24 April 2024, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0075-20240804&qid=1725983863299.

the green transformation of EU industry by 2050.

The overview of industrial activities regulated by the IED below is based on data reported to the EU Registry in 2022 ([96]).

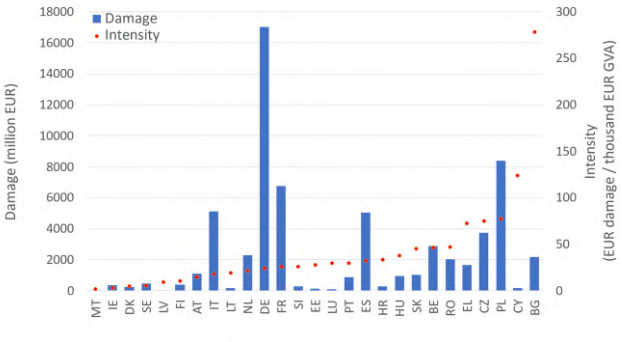
In Luxembourg, 48 industrial installations are required to have a permit under the IED. In 2022, the industrial sectors in Luxembourg with the most IED installations were the production and processing of metals (25 %) and the waste management (including landfills) (25 %), followed by intensive rearing of poultry and pigs (23 %), the mineral industries (6 %) and chemicals (6 %).

Figure 17 shows the damage to health and the environment due to the main industrial air pollutants. As this depends on, among other factors, the size of the industrial sector in each Member State, the figure also shows the ratio between the damage and the industrial activity (expressed in gross value added (GVA)), which gives an indication of the emissions 'intensity'.

In relation to air emissions, Luxembourg ranks 24th in terms of damage in the EU, and it comes 16th with regard to the emissions intensity, above the EU average of EUR 27.5 / EUR 1 000 GVA.

The main industrial contributors to emissions to air ([97]) in Luxembourg are the metals sector, followed by the waste and energy sector as regards dioxins, as well as the metals, energy, and mineral sectors for mercury.

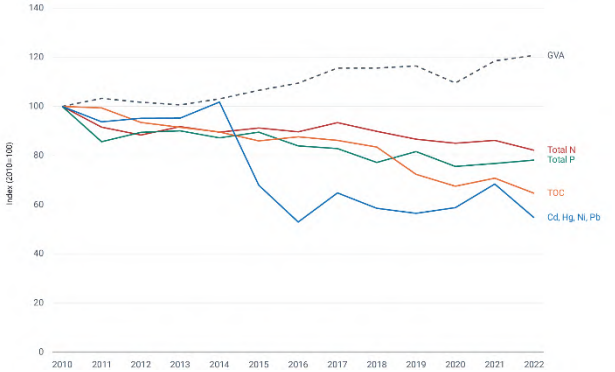
Figure 17: Industrial air pollution damage and intensity per Member State (%), 2021



Source: EEA, 'Industrial pollution intensity indicators – EU large industry air pollution damage costs intensity', European Industrial Emissions Portal, 2024, https://industry.eea.europa.eu/analyse/industrial-emissions-indicator.

Overall, the industrial emissions to water in the EU have decreased over time for all the main pollutants. On average in the EU, they appear to be decoupled from the industrial activity, which has increased over the same period (expressed in GVA), as shown in Figure 18.

Figure 18: Industrial releases of pollutants to water and industrial activity in the EU-27



NB: Cd, cadmium; Hg, mercury; Ni, nickel; Pb, lead; TOC, total organic carbon; total N, total nitrogen; total P, total phosphorous.

Source: EEA, 'Industrial pollutant releases to water in Europe', 30 May 2024, https://www.eea.europa.eu/en/analysis/indicators/industrial-pollutant-releases-to-water.

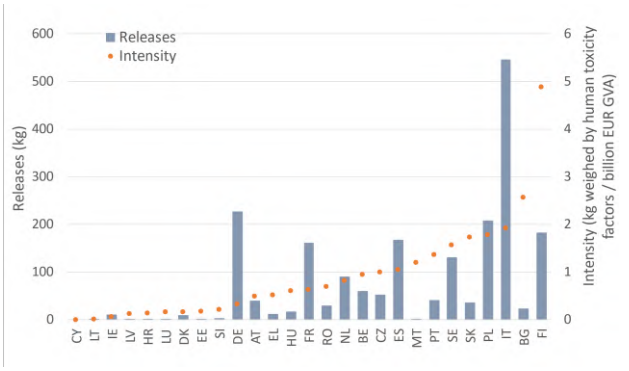
([96]) EEA, European Industrial Emissions Portal, (https://industry.eea.europa.eu/), 2022 being the baseline year for all reports.

([97]) European Environment Agency, LRTAP, Air pollutant emissions data viewer (Gothenburg Protocol, LRTAP Convention) 1990-2022, https://www.eea.europa.eu/en/topics/in-depth/air-pollution/air-pollutant-emissions-data-viewer-1990-2022.

In Luxembourg, the ferrous metal processing industry (particularly the processing of heavy metals) places the largest burden on the environment in terms of industrial emissions to water (based on European Pollutant Release and Transfer Register data).

Figure 19 shows the industrial emissions of heavy metals to water, taking into account the human toxicity of each metal, as well as the emissions intensity, based on the ratio with industrial activity (expressed in GVA). Luxembourg has the 23rd highest amount of emissions of heavy metals to water and is in 21st position in terms of emissions intensity (below the EU average intensity of 0.864 kg per billion EUR GVA).

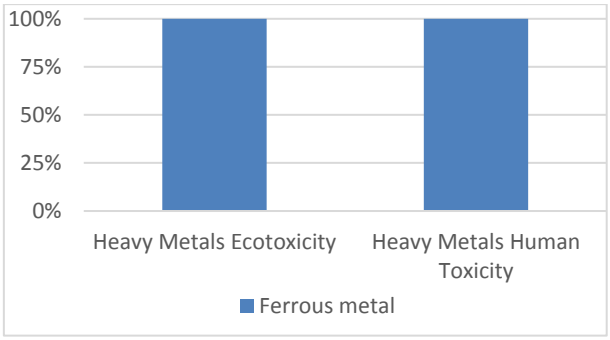
Figure 19: Industrial releases and intensity of heavy metals to water per Member State, 2022



Source: EEA, 'Industrial pollution intensity indicators – EU large industry water pollution intensity', European Industrial Emissions Portal, 2024, https://industry.eea.europa.eu/analyse/industrial-emissions-indicator.

As shown in Figure 20, the main industrial contributor to emissions to water in Luxembourg is the ferrous metal sector.

Figure 20: Relative releases to water from industry in Luxembourg (%), 2022



Source: EEA, 'Industrial reporting under the Industrial Emissions Directive 2010/75/EU and European Pollutant Release and Transfer Register Regulation (EC) No 166/2006 – ver. 12.0 Sep. 2024 (tabular data)', EEA Geospatial Data Catalogue, 13 September 2024, https://doi.org/10.2909/cf5e54c1-be99-4426-bcad-baa26c4f27a0.

IED provisions on public information and participation require Member States to adopt transposition legislation enabling members of the public to have access to relevant information and participate in the approval process for potentially polluting installations. Thus, the public and non-governmental organisations (NGOs), alongside competent authorities, play a role in ensuring compliance of these permits with EU legislation. The IED contains mandatory requirements on environmental inspections, requiring a site visit to take place at least every 1–3 years, using risk-based criteria. In addition, IED enforcement provisions require Member States to determine effective, proportionate, and dissuasive penalties applicable to infringements of IED-based national provisions. In the revised directive, the provisions set that worst infringements can be sanctioned by fines of at least 3% of the annual EU turnover of the legal person. The revised IED also introduces a right to compensation for people whose health has been harmed by such infringements.

The development of best available techniques (BATs), BAT reference documents and BAT conclusions ensures effective collaboration between stakeholders and enables better implementation of the IED.

Since the 2022 EIR, the Commission has adopted BAT conclusions on (i) ferrous metal processing, (ii) the textiles industry, (iii) common waste gas management and treatment systems in the chemical sector and (iv) smitheries and foundries.

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 2022, Luxembourg received priority actions to address the pollution from metal production and processing. Some progress was made on this action at the time of reporting.

2025 priority actions

- Reduce industrial air pollution damage and intensity.
- Engage with industry and environmental NGOs to ensure proper contribution to and implementation of BAT conclusions and ensure timely updates to permits following the publication of BAT conclusions.
- Ensure effective public participation and access to justice in relation to the IED.

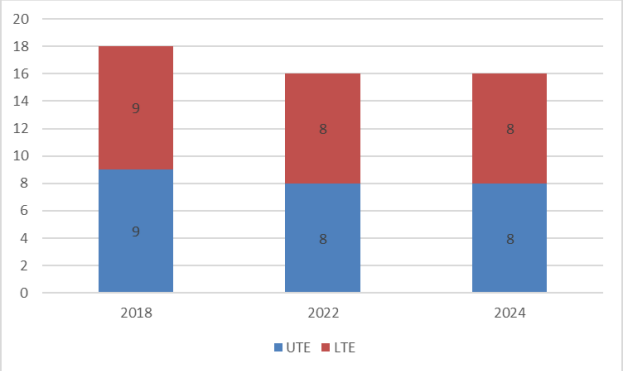
Major industrial accidents prevention – Seveso

The main objectives of EU policy on the prevention of major industrial accidents are to:
— control major-accident hazards involving dangerous substances, especially chemicals;
— limit the consequences of such accidents for human health and the environment;
— continuously improve the prevention of, preparedness for and response to major accidents.
The cornerstone of the policy is Directive 2012/18/EU (the Seveso III Directive) ([98]).

The overview below of industrial plants regulated by the Seveso III Directive ('Seveso establishments') is based on data reported on eSPIRS (e-Seveso Plants Information Retrieval System) for 2022–2024) ([99]) and the report by Luxembourg on the implementation of the Seveso III Directive for 2019–2022 ([100]).

In Luxembourg, in 2024, among the 16 Seveso establishments, 8 were categorised as lower-tier establishments and 8 as upper-tier establishments (UTEs), based on the quantity of hazardous substances likely to be present. UTEs are subject to more stringent requirements. The trend of the number of Seveso establishments is presented in Figure 21.

Figure 21: Number of Seveso establishments in Luxembourg, 2018, 2022 and 2024



NB: LTE, lower-tier establishment.

Sources: European Commission: Directorate-General for Environment, *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)*, Publications Office of the European Union, Luxembourg, 2022, https://op.europa.eu/en/publication-detail/-/publication/94d57d74-735b-11ec-9136-01aa75ed71a1/language-en/format-PDF/source-search; eSPIRS data, extractions from 2022 and 2024; *Analysis and summary of Member States' reports on implementation of Directive 2012/18/EU on the control of major accident hazards involving dangerous substances according to the format established by Commission Implementing Decision 2014/896/EU - Publications Office of the EU*, https://op.europa.eu/en/publication-detail/-/publication/9bd73087-e9b8-11ef-b5e9-01aa75ed71a1/language-en.

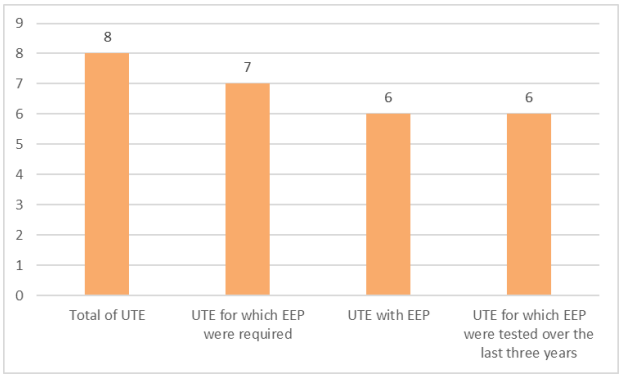
Member States are required to draw up external emergency plans (EEPs). These EEPs are essential to allow proper preparation and effective implementation of the actions necessary to protect the environment and the population should a major industrial accident occur. In Luxembourg, in 2022, an EEP was required for seven UTEs. That same year, six UTEs had an EEP, and each plan had been tested over the previous three years. A summary of the situation is shown in Figure 22.

Figure 22: Situation regarding EEPs in Luxembourg, 2022

([98]) Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (OJ L 197, 24.7.2012, p. 1), https://eur-lex.europa.eu/eli/dir/2012/18/oj.

([99]) https://espirs.jrc.ec.europa.eu/en/espirs/content; data extracted in September 2024.

([100]) As provided for by Article 21(2) of the Seveso III Directive.

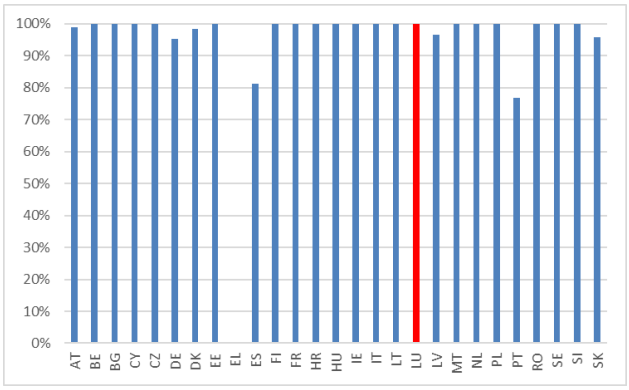


Sources: European Commission: Directorate-General for Environment, *Assessment and summary of Member States' implementation reports for Implementing Decision 2014/896/EU (implementing Directive 2012/18/EU on the control of major accident hazards involving dangerous substances)*, Publications Office of the European Union, Luxembourg, 2022, https://op.europa.eu/en/publication-detail/-/publication/94d57d74-735b-11ec-9136-01aa75ed71a1/language-en/format-PDF/source-search; eSPIRS data, extractions from 2022 and 2024; *Analysis and summary of Member States' reports on implementation of Directive 2012/18/EU on the control of major accident hazards involving dangerous substances according to the format established by Commission Implementing Decision 2014/896/EU - Publications Office of the EU*, https://op.europa.eu/en/publication-detail/-/publication/9bd73087-e9b8-11ef-b5e9-01aa75ed71a1/language-en.

The information for the public referred to in Annex V to the Seveso III Directive is permanently available for all UTE establishments in Luxembourg ([101]). This information mainly concerns (i) how the public concerned will be warned in the event of a major accident, (ii) the appropriate behaviour in the event of a major accident and (iii) the date of the most recent site visit.

The shares of UTEs for which information on safety measures and requisite behaviours was actively made available to the public in 2022 in all Member States are presented in Figure 23. This provision on knowledge is an important provision of the Seveso III Directive, as awareness by the public of this information may ameliorate the consequences of a major industrial accident.

Figure 23: Share of UTEs for which information on safety measures and requisite behaviours was actively made available to the public per Member State (%), 2022



NB: No data available for Greece.

Sources: European Commission: Directorate-General for Environment, *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)*, Publications Office of the European Union, Luxembourg, 2022, https://op.europa.eu/en/publication-detail/-/publication/94d57d74-735b-11ec-9136-01aa75ed71a1/language-en/format-PDF/source-search; eSPIRS data, extractions from 2022 and 2024; Analysis and summary of Member States' reports on implementation of Directive 2012/18/EU on the control of major accident hazards involving dangerous substances according to the format established by Commission Implementing Decision 2014/896/EU - Publications Office of the EU, https://op.europa.eu/en/publication-detail/-/publication/9bd73087-e9b8-11ef-b5e9-01aa75ed71a1/language-en.

Mercury Regulation

The Mercury Regulation establishes measures and conditions concerning the use and storage of and trade in mercury, mercury compounds and mixtures of mercury, the manufacture and use of and trade in mercury-added products and the management of mercury waste, in order to ensure a high level of protection of human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The revision of the Mercury Regulation adopted in 2024 sets out rules to address the last intentional uses of mercury in the EU by phasing out the use of dental amalgam by 1 January 2025 except when deemed strictly necessary by the dental practitioner based on the specific medical needs of the patient and prohibiting the manufacture and export of

([101]) https://seveso.public.lu/fr.html

additional mercury-containing lamps from 1 January 2026 or 1 January 2027 (depending on the lamp category).

In 2019, 21 % of dental treatments were still using dental amalgam, while more up-to-date information provided by the authorities reveals much lower use in more recent years. However, measures should have been put in place to ensure a socially and economically sound phase-out, including an adequate reimbursement of the alternatives to dental amalgam through the health insurance scheme and the training of dental practitioners. The Commission is monitoring whether the phase-out has taken place under the terms and conditions of the regulation. Luxembourg will also need to ensure that the manufacture and export of mercury-containing lamps are prohibited by the deadlines set out in the Mercury Regulation.

Noise

The Environmental Noise Directive ([102]) requires a common approach to avoid, prevent, and reduce the harmful effects of noise. The designated authorities are responsible for making and approving noise maps and action plans for agglomerations, major roads, major railways, and major airports. Member States decide on noise limits that are not set at the EU level. Nevertheless, the zero pollution action plan sets as a 2030 target a 30 % reduction compared with 2017 in the share of people chronically disturbed by transport noise.

Excessive noise from aircraft, railways and roads is one of the main causes of environmental health-related issues in the EU. It can cause ischaemic heart disease, stroke, interrupted sleep, cognitive impairment, and stress ([103]).

In Luxembourg, environmental noise is estimated to cause at least 50 cases of ischaemic heart disease annually ([104]) and some 25 000 people to suffer from disturbed sleep ([105]).

Based on the latest set of information analysed, Luxembourg has completed its noise mapping of agglomerations, roads, railways, and airports.

Action plans for noise management for agglomerations, roads, railways, and airports must be updated and submitted to the Commission every five years. The deadline for reporting noise action plans under the most recent reporting cycle was 18 January 2025; these plans have not been assessed as yet.

2025 priority action

- Complete and implement action plans on noise management.

Water quality and management

EU legislation and policy requires that the impact of pressures on transitional waters, coastal waters, and fresh water (including surface waters and groundwaters) be significantly reduced. Achieving, maintaining, or enhancing a good status of waterbodies as defined by the Water Framework Directive (WFD) 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 WFD ([106]) is the cornerstone of EU water policy in the 21st century ([107]). The WFD and other water-related directives ([108]) form the basis of sustainable and integrated water management in the EU. They aim to achieve a high

([102]) Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise – Declaration by the Commission in the Conciliation Committee on the directive relating to the assessment and management of environmental noise (OJ L 189, 18.7.2002, p. 12), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32002L0049.

([103]) WHO, *Environmental Noise Guidelines for the European Region*, Copenhagen, 2018, https://www.who.int/europe/publications/i/item/9789289053563.

([104]) These figures are an estimation by the EEA based on (i) the data reported by Member States on noise exposure covered by Directive 2002/49/EC for the round of noise mapping of 2022; (ii) European Topic Centre on Air Pollution, Transport, Noise and Industrial Pollution (ETC/ATNI), *Noise indicators under the Environmental Noise Directive 2021: Methodology for estimating missing data*, Eionet report ETC/ATNI No 2021/06, Kjeller, 2021; and (iii) the methodology for health impact calculations in European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), *Implications of environmental noise on health and wellbeing in Europe*, Eionet report ETC/ACM No 2018/10, Bilthoven, 2018, https://www.eionet.europa.eu/etcs/etc-atni/products/etc-atni-reports/eionet_rep_etcacm_2018_10_healthimplicationsnoise.

([105]) More information on the adverse health effects of noise pollution is available at: https://www.eea.europa.eu/themes/human/noise/noise-2

([106]) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060.

([107]) https://environment.ec.europa.eu/topics/water_en.

([108]) These include the Groundwater Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0118), the Environmental Quality Standards Directive (https://eur-lex.europa.eu/eli/dir/2008/105/oj), the Floods Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32007L0060), the Bathing Water Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0007), the Urban Wastewater Treatment Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31991L0271), the new Drinking Water Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020L2184), the Nitrates

level of protection of water resources, prevention of further deterioration and restoration to good status. These objectives are very important for the EU's competitiveness, strategic autonomy, and security, yet have become even more challenging in the face of climate change affecting our precious water resources.

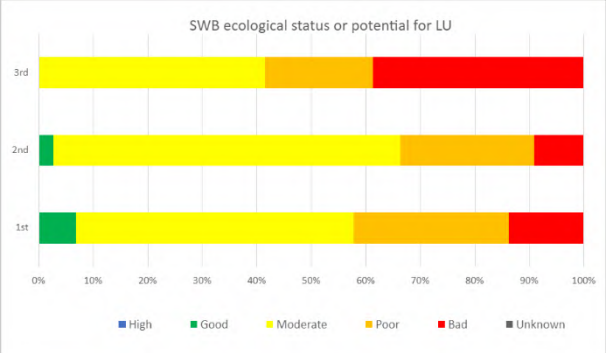
The WFD establishes a procedural framework for reaching good surface water ecological and chemical status and good groundwater quantitative and chemical status. This implies monitoring and classification of all waterbodies, assessment of pressures and impacts and identification of the most cost-effective measures to achieve the objectives of the directive. The directive dates from 2000 and set an initial deadline of 2015 for achieving its objectives, with the option to extend the deadline to the end of 2027. Every six years, Member States must report their river basin management plans (RBMPs) to the Commission. They should cover river basin districts in their countries, some of which may be shared with other countries. The Commission has assessed the third cycle of RBMPs, which were to be submitted by March 2022, and reported its findings to the European Parliament and to the Council on 4th February 2025 ([109]).

Luxembourg has 106 surface waterbodies and 6 groundwater bodies, divided over two river basin districts (Rhine and Meuse). Approximately 7 % of surface waters are designated as 'heavily modified' and none as 'artificial'. Heavily modified and artificial waterbodies must reach good ecological potential rather than good ecological status, which means that all measures must be taken to mitigate the adverse impact of the sustainable human development activities causing the waterbody to be heavily modified / artificial, while not significantly affecting these activities.

It follows from the assessment of the third RBMPs that there has been a deterioration in the ecological status/potential of surface waterbodies, and no improvement in their chemical status, compared with the status reported in the second RBMPs (covering period 2015–2021). There has been no deterioration in the quantitative status of groundwater bodies, which are all reported to have a good status, and there has been no improvement in their chemical status.

Figures 24–27 show the change in ecological status/potential and chemical status of surface waters, and the quantitative and chemical status of groundwater in 2010, 2015 and 2021.

Figure 24: Ecological status/potential of surface waterbodies in each RBMP cycle (%)



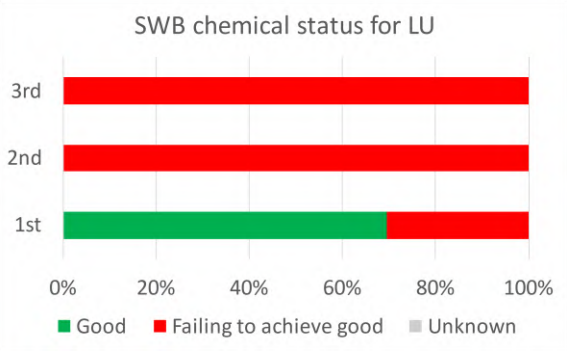
Since the second RBMPs, there has been a further deterioration in the ecological status/potential of surface waterbodies, as 0 % had a good (or better) status in the third RBMPs. The apparent deterioration can be mainly attributed to improved compliance with monitoring and assessment methodologies. No improvement is expected by 2027.

Diffuse pollution, point sources (from industry, urban waste water and historical contaminated sites) and historical anthropogenic pressures are reported as being equally responsible for the failures to achieve good ecological and/or chemical status. Diffuse pollution from agriculture is identified as placing significant pressure on nearly all waterbodies. Hydromorphological pressures affect nearly all surface waterbodies.

Directive (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A31991L0676), the Marine Strategy Framework Directive (https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32008L0056) and the IED (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010L0075).

([109]) Commission Staff Working Document – EU overview, Third river basin management plans, second flood hazard and risk maps and second flood risk management plans, Member State: Luxembourg, accompanying the document report from the Commission to the Council and the European Parliament on the implementation of the water framework directive (2000/60/ec) and the floods directive (2007/60/ec), SWD(2025) 13 final of 4 February 2025, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2025%3A35%3AFIN&qid=1738746144581.

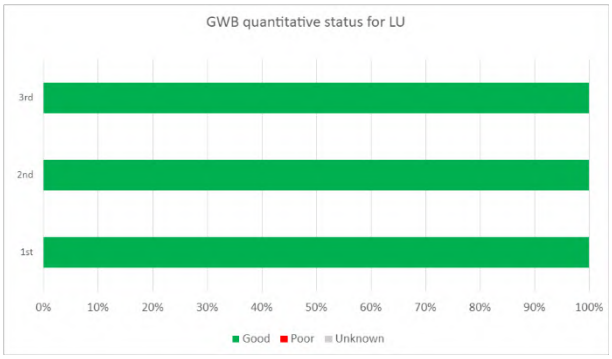
Figure 25: Chemical status of surface waterbodies in each RBMP cycle (%)



In the third RBMPs, the percentage of surface waterbodies failing to achieve a good chemical status continues to amount to 100 %. However, monitoring changed compared with previous cycles, as new priority substances were monitored, and stricter thresholds were set.

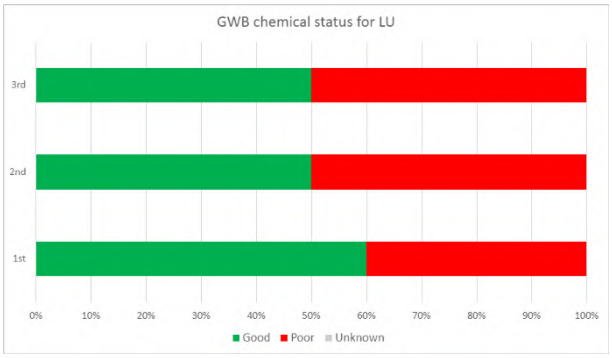
Failure to achieve a good chemical status is mostly due to ubiquitous persistent bio-accumulative and toxic substances, which are difficult to address and often have transboundary sources. In Luxembourg, these are mainly airborne polycyclic aromatic hydrocarbons and scrubber water discharges, and airborne mercury from combustion processes. Fluoranthene, cadmium and cypermethrin are the other main pollutants.

Figure 26: Quantitative status of groundwater bodies in each RBMP cycle (%)



100 % of groundwater bodies are reported to have a good status. However, groundwater-dependent terrestrial ecosystems and groundwater-associated aquatic ecosystems are not considered in the quantitative status assessment. Natura 2000 data show a mostly poor nature status, but the dependence of this status on associated groundwater is unclear. Water balances are not used to evaluate the quantitative status of groundwater bodies.

Figure 27: Chemical status of groundwater bodies in each RBMP cycle (%)



There was no change in the chemical status of groundwater bodies between the second and third RBMPs, and 50 % of groundwater bodies are reported to have a good chemical status.

Failure to achieve a good chemical status is mostly due to diffuse agricultural pollution of nutrients and pesticides. The main three pollutants are nitrates, and a herbicide and

its metabolites ([110]). Additionally, two groundwater bodies failed to pass the drinking water protected area test due to pesticides.

Until the end of 2027, Member States can still apply time-related exemptions, subject to providing evidence of compliance with the strict criteria set out in the WFD.

After 2027, the possibilities for applying exemptions will be much more limited.

The 2022 EIR identified the following priority actions.

- Assess new physical modifications of waterbodies in line with Article 4(7) of the WFD. In these assessments, consider alternative options and appropriate mitigation measures.
- Facilitate the implementation of measures to help achieve the WFD objectives and step up efforts to counteract pollution in waterbodies.

Some progress has been made in following up on these priority actions, but much remains to be done.

In this context, the third RBMPs describe involved a detailed process of measure selection based on knowledge of pressures. The RBMPs have added a focus on identifying significant pressures for morphological alterations and modifications of flow regimes through abstractions or regulations of the flow, including measures to mitigate or compensate these alterations. A particular example is the renaturalisation of the river Pétrusse, co-funded by the European Investment Bank (EIB), which will help in reducing the flood risk, increase biodiversity and help the city of Luxembourg's atmosphere adapt to climate change. Furthermore, Luxembourg's programme of measures ([111]) includes, in addition to the measures in the nitrate action plans, a list of voluntary agricultural measures (supported by the CAP) to reduce diffuse pollution that cover approximately 10 % of the area used for agriculture. Luxembourg has also included seven WFD-eco-schemes in its CAP SP.

2025 priority actions

Without prejudice to the list of recommended actions in the Commission report to the European Parliament and to the Council on the assessment of the third RBMPs, the following priority actions can be highlighted.

- Improve river continuity and ecological flows, boosting efforts on nature-based solutions to reduce hydromorphological pressures.
- Ensure periodic reviews of permits for discharges, abstractions and other water uses, including hydropower pressures.
- Reduce pollution from nutrients, chemicals, metals and saline discharges.
- Better justify exemptions to the achievement of good status.
- Improve the classification of water bodies and strengthen monitoring systems.
- Develop more robust programmes of measures, tackle obstacles identified in the implementation of measures and ensure adequate financing for implementation, including through better use of cost recovery and the polluter-pays principle.

Floods Directive

Every six years, following the same reporting cycle as the RBMPs, all Member States also report their flood risk management plans (FRMPs), based on the flood hazard and risk maps (FHRMs) and the preliminary flood risk assessments drawn up during the second cycle (2016–2021).

The Commission also assessed the FRMPs, and will report in the first quarter of 2025 on both the third RBMPs and the second FRMPs (first FRMP reporting was in 2016) to the European Parliament and to the Council.

The main progress resulting from the assessment of the third FRMPs is that the objectives of these plans are more specific, and there is a clear link between measures and objectives. For some objectives, the type of measures and number of actions are mentioned. Information is also provided on the prioritisation of measures. The responsibilities of authorities with respect to measures are now identified. Moreover, a damage potential study was commissioned based on the FHRMs, which identified the potential monetary damage. In addition, specific funding sources are included in the FRMPs. The FRMPs describe coordination with the 2018–2027 national climate change adaptation strategy and link measures between the two.

2025 priority actions

- FRMPs should provide details on how the FHRMs were used in the choice of measures and how to consider pluvial flooding.
- Consider future climate scenarios in the FRMPs.

([110]) For example, metolachlor ethanesulfonic acid and metazachlor ethanesulfonic acid. Under the Plant Protection Product Regulation (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32009R1107) and the guidance document on Regulation (EC) No 1107/2009 (https://food.ec.europa.eu/system/files/2021-10/pesticides_ppp_app-proc_guide_fate_metabolites-groundwtr-rev11.pdf), 'metabolite' means any reaction or breakdown product of an active substance of a plant protection product, formed either in organisms or in the environment.

([111]) As requested by Article 11 of the Water Framework Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060).

- Better explain the choice and implementation of flood prevention and protection measures (prioritisation, monitoring, costs of measures).
- Improve public consultation and stakeholder involvement.

Drinking Water Directive

The recast Drinking Water Directive is now applicable, and Member States were required to transpose its provisions into their national legal systems by 12 January 2023. Since the entry into force of the recast directive, the Commission has adopted several delegated and implementing acts establishing (i) a watch list of substances and compounds of concern for drinking water ([112]), (ii) a methodology for measuring microplastics in drinking water ([113]) and (iii) an EU system for testing and approving materials that will be allowed to be in contact with drinking water ([114]). Member States will have to take these various Commission acts into account when implementing the recast directive.

Finally, the Commission has now received data from Member States on the quality of drinking water in 2017–2019. The quality of drinking water (supplied by large water suppliers) in Luxembourg does not give rise to concern ([115]).

From January 2026, the European quality standards for PFAS in drinking water will apply, ensuring harmonised Member States' reporting of PFAS monitoring data in the future.

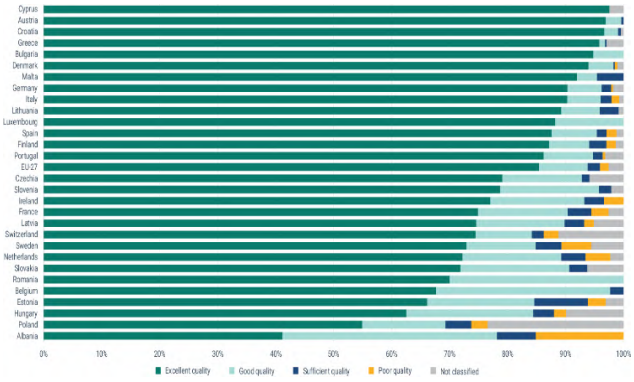
Bathing Water Directive

The Bathing Water Directive requires Member States to monitor and assess bathing water. It requires that, during the bathing season, Member States disseminate to the public information on bathing water quality actively and promptly. In particular, notices banning or advising against bathing should be rapidly and easily identifiable.

Figure 28 shows that in 2023, out of the 17 Luxembourg's bathing waters, 15 (88.2 %) were of excellent quality and 2 (11.8 %) were of good quality. No bathing waters were found to be of sufficient or poor quality.

According to national data ([116]), several bathing sites in Luxembourg have been repeatedly affected by cyanobacteria contamination, and subsequently closed to the public, in recent years.

Figure 28: Bathing water quality per Member State, Albania and Switzerland (%), 2023



Source: EEA, *European Bathing Water Quality in 2023*, briefing No 04/2024, Copenhagen, 2024, https://www.eea.europa.eu/publications/european-bathing-water-quality-in-2023/.

Nitrates Directive

The Nitrates Directive ([117]) aims to protect water quality across Europe by preventing nitrates from agricultural

([112]) https://environment.ec.europa.eu/publications/implementing-decision-drinking-water-directive-watch-list_en.

([113]) Commission Delegated Decision (EU) 2024/1441 of 11 March 2024 supplementing Directive (EU) 2020/2184 of the European Parliament and of the Council by laying down a methodology to measure microplastics in water intended for human consumption (notified under document C(2024) 1459) (OJ L, 2024/1441, 21.5.2024), http://data.europa.eu/eli/dec_del/2024/1441/oj.

([114]) OJ L, 2024/365, 23.4.2024, http://data.europa.eu/eli/dec_impl/2024/365/oj; OJ L, 2024/367, 23.4.2024, http://data.europa.eu/eli/dec_impl/2024/367/oj; OJ L, 2024/369, 23.4.2024, http://data.europa.eu/eli/reg_del/2024/369/oj; OJ L, 2024/368, 23.4.2024, http://data.europa.eu/eli/dec_impl/2024/368/oj; OJ L, 2024/370, 23.4.2024, http://data.europa.eu/eli/reg_del/2024/370/oj; OJ L, 2024/371, 23.4.2024, http://data.europa.eu/eli/reg_del/2024/371/oj; see the Commission web page on all six delegated acts for more information, (https://environment.ec.europa.eu/publications/delegated-acts-drinking-water-directive_en).

([115]) In summary, the compliance for all parameter groups in Luxembourg was at least 97.96 % in 2017, 97.83 % in 2018 and 98.19 % in 2019.

([116]) Luxembourg's website on cyanobacteria (https://www.cyanowatch.lu/home).

([117]) https://environment.ec.europa.eu/topics/water/nitrates_en.

sources that can pollute groundwater and surface waters and by promoting the use of good farming practices.

The latest Commission report on the implementation of the Nitrates Directive, dating to 2021, 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. Cleaning of waters by national authorities or farmers, where it has been undertaken, has had a positive impact on the drinking water supply and on biodiversity. It has also benefited the sectors – such as fisheries and tourism – that depend on biodiversity and on a good supply of drinking water. Nevertheless, excessive fertilisation remains a problem in many parts of the EU. The report on the implementation of the Nitrates Directive covering 2020–2023 will be available in 2025.

The analysis of Luxembourg's RBMPs has identified nutrients from agriculture as an important pressure on groundwater / surface water that is affecting these waters' good status and as one of the main factors in not meeting the WFD objectives.

In 2022, Luxembourg received a priority action on tackling nutrient pollution, especially from agriculture, through the implementation of the Nitrates Directive. Since the report on the implementation of the Nitrates Directive covering 2020–2023 will be available in 2025, the 2022 EIR priority action could not be assessed and is repeated.

2025 priority action

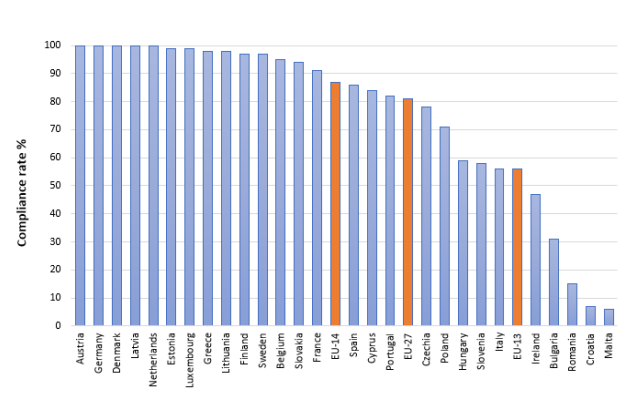
- Tackle nutrient pollution, especially nitrates from agriculture through the implementation of the Nitrates Directive.

Urban Wastewater Treatment Directive

The Urban Wastewater Treatment Directive (UWWTD) aims to protect human health and the environment from the effects of untreated urban waste water. It therefore requires Member States to collect and treat (secondary or biological treatment) waste water in all urban areas of more than 2 000 people, and to apply a more stringent treatment than secondary, with nitrogen and/or phosphorus removal, to the waste water generated in urban areas, also known as agglomerations, of more than 10 000 people, before they are discharged into waters and their catchments, when they are sensitive to nitrogen and/or phosphorus (i.e. eutrophic or tending to become eutrophic).

In Luxembourg, the compliance rate was nearly 100 % in 2020.

Figure 29: Proportion of urban waste water that fully complies with the UWWTD (%), 2020



Source: European Commission, 12th technical assessment of UWWTD implementation - Publications Office of the EU, 2024 https://op.europa.eu/en/publication-detail/-/publication/4c97f846-44b2-11ef-865a-01aa75ed71a1/language-en.

The directive has been revised. The revised directive builds on the current *acquis* and strengthens existing treatment standards and establishes an additional treatment of micropollutants in urban waste water. Other new requirements relate to moving towards the energy neutrality of the sector, establishing an EPR system to ensure sustainable financing of micropollutant treatment by the most-polluting industries, and ensuring access to sanitation, especially for vulnerable and marginalised groups. Luxembourg has until 31 July 2027 to incorporate the new directive into its national legal system.

In the 2019 EIR, Luxembourg received three priority actions. The first action, on the compliance of new projects with the WFD, has been fully implemented. The action to ensure the correct levels of collection and treatment of urban waste water has also been fully implemented. No information is available on the action on clarifying the method used by Luxembourg for the prioritisation of measures, including the assessment of costs and benefits in relation to FRMPs.

The priority actions from 2022 are considered to have been fully implemented.

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 ([118]), 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 ([119]) provides a baseline protection for human health and the environment. It also ensures stability and predictability for businesses operating in the internal market.

Since 2007, the Commission has gathered information on the enforcement of the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation and the Classification, Labelling and Packaging (CLP) Regulation. In December 2020, the Commission assessed the Member States' reports ([120]) on the implementation and enforcement of these regulations ([121]). It is apparent from the Commission's report that there are still many disparities in the implementation of the REACH and CLP Regulations, notably in the area of law enforcement. Recorded compliance levels in Member States, generally quite stable over time, appear to be getting slightly worse. This may be because: (i) enforcement authorities are becoming more effective in detecting non-compliant products/companies; and (ii) more non-compliant products are being placed on the EU market.

In August 2021, the Commission published a measurable assessment of the enforcement ([122]) of the two main EU regulations on chemicals using a set of indicators on different aspects of enforcement. Since 2021, the list of chemicals subject to restrictions has been expanded as new entries have been added to Annex XVII to the REACH Regulation ([123]).

In 2023, new hazard classes were added to the CLP Regulation, and the revision of the regulation was tabled (published on 20 November 2024) ([124]). The new hazard classes cover endocrine disruptors and persistence-related hazards while the revision of the regulation encompasses new rules on online sales to better tackle non-compliances observed over the years. Also in 2023, the Conference of the Parties of the Stockholm Convention (COP) decided to include, in its Annex A (which lists banned substances), three new chemicals ([125]). The Commission is working on the delegated acts to include these substances in Annex I to the Persistent Organic Pollutants Regulation by 2025 at the latest.

([118]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Chemicals strategy for sustainability: Towards a toxic-free environment, COM(2020) 667 final of 14 October 2020, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A667%3AFIN; Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (OJ L 353, 31.12.2008, p. 1), https://publications.europa.eu/resource/cellar/c6b6a31d-8359-11ee-99ba-01aa75ed71a1.0004.02/DOC_2.

([119]) Namely, Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the registration, evaluation, authorisation and restriction of chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30/12/2006, p. 1), https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32006R1907; and Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (OJ L 353, 31.12.2008, p. 1), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008R1272-20221217.

([120]) European Commission, *Technical assistance to review the existing Member States reporting questionnaire under Articles 117(1) of REACH and 46(2) of CLP – Final report*, Publications Office of the European Union, Luxembourg, 2020, https://circabc.europa.eu/ui/group/8ee3c69a-bccb-4f22-89ca-277e35de7c63/library/a4abce8c-8425-455f-b7e6-0ead917bde6b/details.

([121]) In line with Article 117(1) of the REACH Regulation and Article 46(2) of the CLP Regulation.

([122]) European Commission: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, *REACH and CLP Enforcement: EU level enforcement indicators*, Publications Office of the European Union, Luxembourg, 2021, https://op.europa.eu/en/publication-detail/-/publication/e5c3e461-0f85-11ec-9151-01aa75ed71a1/.

([123]) These are substances in tattoo inks and permanent make-up, *N*,*N*-dimethylformamide, formaldehyde (and formaldehyde releasers), lead in PVC (polyvinyl chloride), siloxanes (D4, D5, D6) and, finally, microplastics.

([124]) Regulation (EU) 2024/2865 of the European Parliament and of the Council of 23 October 2024 amending Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, OJ L, 2024/2865, 20.11.2024, p.1 (Regulation - EU - 2024/2865 - EN - EUR-Lex)

([125]) These are methoxychlor, dechlorane plus and UV-328. In the case of the pesticide methoxychlor, there are no exemptions from the ban. However, for the two plastic additives, dechlorane plus and UV-328, the COP decision lists some time-limited specific exemptions.

In Luxembourg, responsibility for checking compliance with the REACH and CLP Regulations rests with the following authorities ([126]):

- the customs and excise administration;
- the labour and mining inspectorate;
- the health directorate;
- the water management administration;
- the Luxembourg Institute of Standardisation, Accreditation, Safety and Quality of Products and Services;
- the environmental administration.

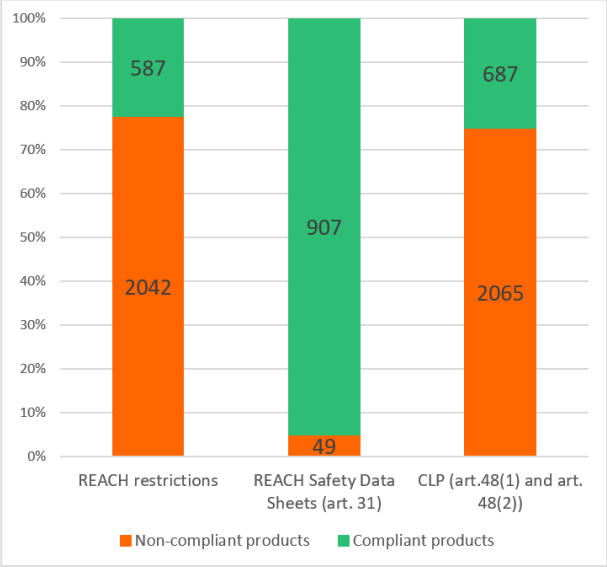
Luxembourg has devised and fully implemented enforcement strategies for both the REACH and CLP Regulations ([127]).

The Member States' reporting exercise set out in Article 117 of the REACH Regulation and Article 46 of the CLP Regulation is conducted every five years. The results of the coming one are expected in 2025, hence the absence of new country-specific data on enforcement since 2022.

In 2022, two full-time equivalents were allocated to REACH and CLP Regulation enforcement ([128]).

In 2020, Luxembourg participated in an EU-coordinated enforcement project on products sold online, called the REACH-EN-FORCE (REF-8) project ([129]). The report was adopted in November 2021, so it could not be taken into account in the previous EIR.

Figure 30: Compliances of imported products – results of the REF-8 project (%)



A risk approach was used for the targeting of controls in order to maximise the chances of identifying non-compliance. Therefore, the non-compliance rates presented above cannot be considered the average non-compliance rates of products in the EU. However, the proportion of non-compliance cases found in the REF-8 project are of concern.

Figure 31: Number of REF-8 checks performed per

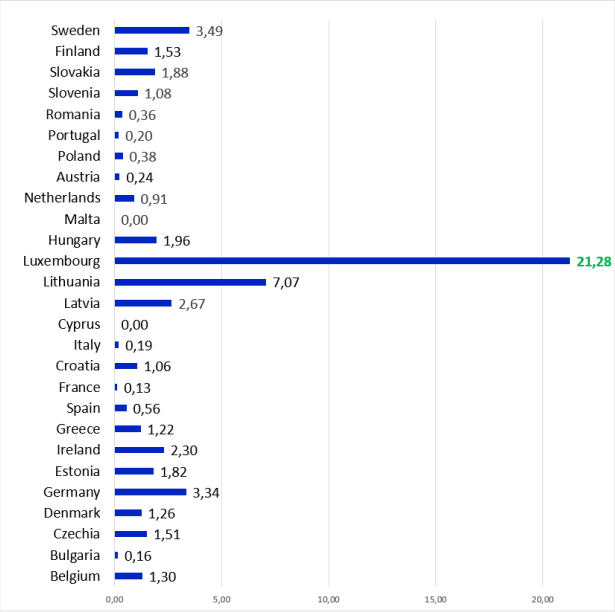
([126]) European Commission, *Technical assistance to review the existing Member States reporting questionnaire under Articles 117(1) of REACH and 46(2) of CLP – Final report*, Publications Office of the European Union, Luxembourg, 2020, p. 70, https://circabc.europa.eu/ui/group/8ee3c69a-bccb-4f22-89ca-277e35de7c63/library/a4abce8c-8425-455f-b7e6-0ead917bde6b/details.

([127]) European Commission, *Technical assistance to review the existing Member States reporting questionnaire under Articles 117(1) of REACH and 46(2) of CLP – Final report*, Publications Office of the European Union, Luxembourg, 2020, p. 76, https://circabc.europa.eu/ui/group/8ee3c69a-bccb-4f22-89ca-277e35de7c63/library/a4abce8c-8425-455f-b7e6-0ead917bde6b/details.

([128]) European Commission, *Technical assistance to review the existing Member States reporting questionnaire under Articles 117(1) of REACH and 46(2) of CLP – Final report*, Publications Office of the European Union, Luxembourg, p. 75, 2020, https://circabc.europa.eu/ui/group/8ee3c69a-bccb-4f22-89ca-277e35de7c63/library/a4abce8c-8425-455f-b7e6-0ead917bde6b/details.

([129]) European Chemicals Agency, *REF-8 project report on enforcement of CLP, REACH and BPR duties related to substances, mixtures and articles sold online*, Helsinki, 2021, p. 20, https://echa.europa.eu/documents/10162/17088/project_report_ref-8_en.pdf/ccf2c453-da0e-c185-908e-3a0343b25802?t=1638885422475.

100 000 inhabitants (EU average = 1.24)



Luxembourg's participation in the coordinated enforcement project (REF-8) was well above the EU average.

From this project and others conducted with the help of the European Chemicals Agency in recent years, online sales have been proven to correspond consistently to higher non-compliance rates in controls performed across the EU, in particular when related to imported products.

In 2022, Luxembourg received a priority action related to upgrading its administrative capacities in implementation and enforcement to move towards a policy of zero tolerance to instances of non-compliance. In the absence of reporting since 2022, no progress has been shown and this priority action remains valid in 2025.

2025 priority actions

- Upgrade the administrative capacities in implementation and enforcement to move towards a policy of zero tolerance for non-compliance.
- Increase customs checks and checks of products sold online with regard to compliance with chemicals legislation.

4. Climate action

The impacts of climate change have continued to increase in recent years, inflicting damage and suffering in the EU and around the world. Globally, 2023 was the hottest year on record, while Europe has been warming twice as quickly as the global average and is now the fastest-warming continent. The frequency and severity of extreme climate events are also increasing. Against this backdrop, the EU has demonstrated its determination to implement the European Green Deal and to become climate neutral and resilient by 2050, ensuring sustainable competitiveness and supporting EU industry in the net-zero transition. The European Climate Law is the EU's response to the need for action. It sets the objective of achieving climate neutrality by 2050 and a midterm target of a reduction in GHG emissions of at least 55 % by 2030 and outlines the adaptation efforts necessary to adjust to climate change's present and future impacts. Almost all the 'Fit for 55' proposals set out in the European Green Deal have been agreed in law, and the European Commission recommended a new intermediate climate target of a 90 % reduction in emissions by 2040. In 2024, the Member States submitted updated national energy and climate plans for 2021–2030, reflecting the increased ambition of the revised EU legislation. In 2024, the European Commission also released, jointly with the EEA, the first-ever European climate risk assessment.

Over the last three decades, since 1990, the EU has achieved steady decreases in its emissions, reaching a running total in 2022 of –32.5 % ([130]). However, the EU and its Member States need to step up their implementation efforts and accelerate emissions reduction to stay on track to reach their targets of a 55 % reduction in net GHG emissions by 2030 and climate neutrality by 2050. Between 1990 and 2022, net GHG emissions of Luxembourg decreased by 41 %, making it one of the countries with an above-average decrease.

The 'Fit for 55' legislative package reflects the need to speed up the green transition. It includes (i) strengthening and expanding the EU emissions trading system (ETS), with the creation of a new, second, ETS for transport and buildings together with a dedicated Social Climate Fund to help citizens during the transition; (ii) increasing targets under the Effort Sharing Regulation; and (iii) a revised Regulation for Land Use, Land Use Change and Forestry ([131]). The package has been fully adopted, and the Member States have been implementing the legislation.

The key strategic document at the country level is the National Energy and Climate Plan (NECP) ([132]). Luxembourg submitted its final plan in July 2024 after the deadline set by the Regulation on the Governance of the Energy Union and Climate Action ([133]). The European Commission assessed the final plan and the extent to which Luxembourg has followed the recommendations for the draft version. The findings from the assessment are:

- Emissions under the Effort Sharing Regulation will decrease by 56% in 2030 compared to 2005, and Luxembourg will meet its target of 50%.
- Luxembourg is in line with its Land Use, Land-Used Change and Forestry (LULUCF) target.
- Luxembourg is in line with its target for the share of renewable energy.
- There are still gaps in energy efficiency targets that must be closed.

To minimise the impacts of climate policies on vulnerable people and sectors, Luxembourg is using the Just Transition Fund and will use the Social Climate Fund from 2026 (for more information, see Chapter 5, on finance).

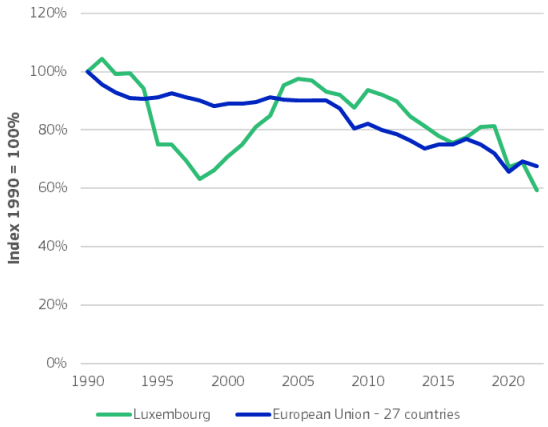
Figure 32: Total GHG emissions (excluding international aviation) (%), 1990–2022

([130]) EU net domestic emissions, including the land use, land-use change and forestry (LULUCF) sector and excluding international aviation.

([131]) A full overview of the Fit for 55 package is available at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en.

([132]) More information about NECP is on the dedicated website https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en.

([133]) Article 14 of Regulation 2018/1999 on the Governance of the Energy Union and Climate Action.



The EU emissions trading system

The EU ETS is the key tool for reducing GHG emissions cost-effectively across all Member States. It is the world's biggest carbon market, covering around 40 % of the EU's total GHG emissions from electricity and heat generation, the manufacturing industry, aviation within Europe ([134]) and, from 2024, maritime transport also.

The system sets a limit or cap on the total amount of GHGs that can be emitted at the EU level. Within this limit, companies buy emissions allowances (one allowance gives the right to emit 1 t of CO_2 equivalent (eq)), in auctions or through trading allowances with others. The cap is reduced annually to ensure that overall emissions in the sectors covered decrease over time.

The emissions under the ETS decreased by 61 % from 2005 to 2023.

In 2023, 43 % of the GHGs emitted by Luxembourg's ETS installations came from cement and lime production, 39 % came from the metals industry, and 12 % from other industries. Between 2013 and 2023, GHG emissions from the metals industry decreased by 22 %, while in 'other industries' (glass production), they declined by 62 %. With emissions broadly stable between 2013 and 2022, cement and lime production saw a steep decline in 2023, by 36 %. In 2023, power generation accounted for only 6 % of GHG emissions (EU average: 57 %), following big reductions in 2014–2016.

From 2027, a new emissions trading system, called ETS2, for buildings, road transport and additional sectors (mainly industry not covered by the current ETS) will become fully operational ([135]). Member States should have notified full transposition the provisions of the revised EU ETS Directive related to the new ETS2 into national law by 30 June 2024. Luxembourg did not communicate full transposition into national law by this deadline. The Commission therefore opened an infringement procedure ([136]) against Luxembourg on 25 July 2024 for failing to fully transpose the provisions into national law.

The Commission also opened infringement procedures ([137]) against Luxembourg on 25 January 2024 for failing to fully transpose previous revisions of ETS Directive ([138]) into national law. Luxembourg has since notified full transpositions of the abovementioned directives to the Commission and the case was closed in October 2024.

Effort sharing

The Effort Sharing Regulation (ESR) ([139]) covers GHG emissions from domestic transport (excluding CO_2 emissions from aviation), buildings, agriculture, small industry, and waste. Emissions from these sectors account for around 60 % of the EU's domestic emissions. The regulation sets the EU-wide target to reduce emissions from the effort sharing sectors by 40 % by 2030 compared to 2005 levels. This overall target for the EU translates to binding national emission reduction targets for each Member State. Luxembourg's target is – 50 %.

In addition to the 2030 targets, Member States have annual GHG emissions limits (annual emission allocations), reducing every year until 2030.

There is some flexibility to take account of annual fluctuations in emissions, by trading emissions and transfers from the ETS and LULUCF.

([134]) Flights between the Member States including departing flights to Norway, Iceland, Switzerland, and the United Kingdom.

([135]) Directive (EU) 2023/959 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system, OJ L 130, 16.5.2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.130.01.0134.01.ENG.

([136]) European Commission infringement decision INFR(2024)0194.

([137]) European Commission infringement decisions INFR(2024)0088 and INFR(2024)0087.

([138]) Directive (EU) 2023/959 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system, OJ L 130, 16.5.2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.130.01.0134.01.ENG; and Directive (EU) 2023/958 amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and the appropriate implementation of a global market-based measure, OJ L 130, 16.5.2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023L0958.

([139]) Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013, OJ L 156, 19.6.2018, https://eur-lex.europa.eu/eli/reg/2018/842.

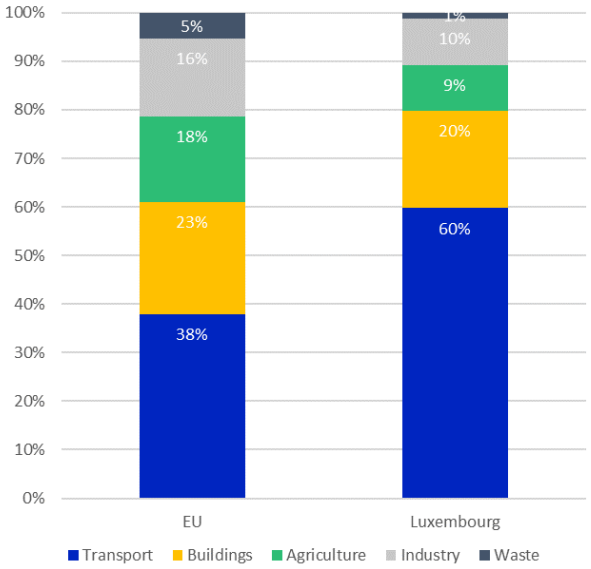
Based on historical emissions and the most updated projections Luxembourg is on track to achieve its 2030 ESR target.

Projected emission reduction is 5.6 percentage points above the 2030 target.

Transport is the dominant effort sharing sector and accounted for 60 % of all effort sharing emissions in 2022. Transport emissions have decreased by 42 % since 2005, but emissions per capita or per kilometre remain the highest in the EU. Luxembourg's transition to sustainable transport is taking off, and it must keep up the momentum. In 2023, 5.6 % of its car passenger fleet were battery electric vehicles, one of the highest shares in the EU (EU average is 1.2 %). In 2023, it had 2 120 publicly accessible charging points, providing one charging point for every 13 e-vehicles (EU average 1:10). 97 % of its rail network is electrified – the highest share in the EU – but only 4 % and 7 % of passenger and freight transport, respectively, is by rail. Roads are used for 86 % of passenger and freight transport.

The buildings sector accounted for 20 % of effort sharing emissions and it is a concern for Luxembourg. Although emissions have decreased by 15 % since 2005, the general trend is stagnating. From 2016 to 2021, emissions were higher than in 2015. Residential final energy consumption has remained stable since 2015, while the national Long Term Renovation Strategy envisages a reduction in building energy consumption of 36 % by 2030.

Figure 33: Effort sharing emissions by sector (%), 2022



Land use, land-use change and forestry

The LULUCF sector plays a significant role in achieving the EU's climate neutrality goal. In the EU, this sector absorbs more GHGs than it emits, removing significant volumes of carbon from the atmosphere. Thus, it is the only sector with negative emissions.

Luxembourg has seen a comparatively large increase in net LULUCF removals since 2018.

Luxembourg's target in 2030 is to enhance land removals by additional −27 kt (kiloton) of CO_2 equivalent compared to the yearly average of the period 2016–2018. The latest available projections show a surplus to target of −40 kt of CO_2 equivalent in 2030. Therefore, Luxembourg is on track to meet its 2030 target.

Adaptation to climate change

Halting all GHG emissions would still not prevent climate impacts that are already occurring. Therefore, adaptation to climate change is also a key component of climate policy in order to cope with inevitable impacts of climate change.

Luxembourg has no regions identified as a hotspots of climate risks most affected by climate change ([140]).

Climate change affects many sectors in Luxembourg, including agriculture, forestry, water management and health. Climate hazards may give rise to floods, droughts, and heatwaves, with adverse effects on health and changes in the vegetation period, impacting wheat crops, winegrowing, and other sectors. In the last few years

([140]) European Climate Risk Assessment (EUCRA). 2024. Available at https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/key-eu-actions/european-climate-risk-assessment.

droughts, heatwaves, and the spread of bark beetle, exacerbated by climate change, have caused the damage or destruction of about two thirds of forests in Luxembourg ([141]). Luxembourg's climate protection gap is low.

Luxembourg has relatively well-developed institutional arrangements for climate adaptation. Luxembourg adopted its national climate adaptation law in 2020 and has national adaptation strategy (for 2018–2023) and plan. A new national adaptation strategy is being drawn up in Luxembourg and will be submitted for public consultation and participation in early 2025. These documents cover all relevant climate risks and links its vulnerabilities and risks with actions. Luxembourg is currently updating the strategy and plan in line with its climate law, and sets binding requirements for planning, implementing and governing adaptation measures. Stakeholders are involved locally via the climate and nature pacts.

European Commission identified three priority actions regarding climate action in the 2022 edition of the review. There is no progress in traffic congestion, and it remains an issue. The share of public transport on total passenger transport has decreased by 0.2 percentage points compared to 2019 and there is no visible progress in recent years. But Luxembourg plans to invest EUR 1.7 billion in public transportation during the period 2024–2027 ([142]), which is promising for the future development. Luxembourg is making progress towards electrification of passenger car fleet and railway network.

2025 priority action

- Implementing all polices and measures that are needed to achieve targets laid down in the Effort Sharing Regulation (ESR) and the Land Use and Land-Use Change and Forestry (LULUCF) Regulation. More detailed priority actions are set out in the assessment of the final National Energy and Climate Plan (NECP) ([143]).

([141]) Gouvernement du Grand-Duché de Luxembourg (2023), The results of the 2023 phytosanitary inventory of forests - Nature and Forest Administration.

([142]) Les priorités « Mobilité et Travaux publics » d'ici 2027 | Chambre des députés du grand-duché de Luxembourg.

([143]) European Commission, National energy and climate plans. Available at https://commission.europa.eu/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en.

Part II: Enabling framework – implementation tools

5. Financing

The EU budget supports climate investment in Luxembourg with significant amounts in 2021–2027, with revenues from the ETS also feeding into the national budget. During 2020–2022, Luxembourg's revenues from auctioning reached EUR 56 million in total, with 73 % of that spent on climate and energy.

In addition, the annual investment needed to meet its environmental objectives in the areas of pollution prevention and control, the circular economy and waste, water protection and management, and biodiversity and ecosystems is estimated to be EUR 1.7 billion per year in Luxembourg.

These four environmental areas currently receive total funding of around EUR 1.3 billion per year; thus, there is a gap of around EUR 0.4 billion per year.

Of the annual environmental investment gap, EUR 200 million concerns pollution prevention and control, EUR 125 million water and circular economy (each).

Climate finance landmarks

EU funding for climate action

The EU budget supports climate action in the EU-27 with EUR 657.8 billion in the 2021–2027 budgetary period across the various programmes and funds, representing an overall 34.3 % contribution level. Of this, cohesion policy provides EUR 120 billion (over half of it through the European Regional Development Fund (ERDF)), the recovery and resilience facility (RRF) EUR 275.7 billion and CAP EUR 145.9 billion ([144]).

In Luxembourg, the EU cohesion policy (considering EU contribution amounts) provides EUR 17.8 million for climate action in 2021–2027 (with one-third via the ERDF) ([145]).

The recovery and resilience facility (RFF) contributes to climate finance in Luxembourg with EUR 0.06 billion up to 2026, representing 68.8 % of the RRP ([146]).

The EIB provided EUR 109.9 billion of financing across the EU-27 between 2021 and mid 2024 to support energy, transport and industry projects that are aligned with the EU's climate objectives. Of this amount, EUR 27.2 million was assigned to Luxembourg in the reference period ([147]).

National financing, including EU emissions trading system revenues

Revenues from the auctioning of emission allowances under the EU ETS, which feeds directly into national budgets, amounted to EUR 17 million in 2020, EUR 8.1 million in 2021 and EUR 31 million in 2022, in Luxembourg, totalling EUR 56 million in the three-year period. In Luxembourg, these revenues are not earmarked ([148]).

From the remaining part of the EU ETS revenues that feed into the Innovation Fund and the Modernisation Fund, further support is available to climate action at the EU level.

It should be noted that investment in climate action also supports the environment and, therefore, the environmental investments described in the following sections cannot be regarded as entirely additional to climate investment ([149]).

Environmental financing and investments

This section describes Luxembourg's investment needs, current financing, and gaps as they relate to the four environmental objectives beyond climate objectives, namely tackling pollution, the circular economy and waste, water protection and management, and biodiversity and ecosystems ([150]).

([144]) European Commission, *Statement of Estimates of the European Commission – For the financial year 2025*, Publications Office of the European Union, Luxembourg, 2024, pp. 94–96, https://commission.europa.eu/document/download/7a0420e1-599e-4246-9131-ccb7d505d6d9_en?filename=DB2025-Statement-of-Estimates_1.pdf.

([145]) See the Cohesion Open Data Platform (https://cohesiondata.ec.europa.eu/).

([146]) EU Commission datasets and the Recovery and Resilience Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/index.html).

([147]) A list of financed projects by the EIB (https://www.eib.org/en/projects/loans/index.htm).

([148]) European Commission: Directorate-General for Climate Action, *Progress Report 2023 – Climate action*, Publications Office of the European Union, Luxembourg, 2023, https://climate.ec.europa.eu/news-your-voice/news/climate-action-progress-report-2023-2023-10-24_en.

([149]) Indirect investments (from climate and other policies) in support of the environment are accounted for via the tracking.

([150]) Research, development and innovation is accounted for under each environmental objective. The financing needs, baselines and gaps estimates are based on the Directorate-General for Environment's internal analysis (of 2024). Throughout this chapter, specific references are provided to the most important data sources used.

The environment overall

Investment needs

The overall environmental investment needs to be sufficient to enable Luxembourg to meet its objectives in the areas of pollution prevention and control, the circular economy and waste, water protection and management, and biodiversity and ecosystems. The required investment is estimated to be EUR 1.7 billion per year (in 2022 prices).

A significant part of the estimated requirement, around EUR 0.9 billion per year, can be attributed to the need to support circular economy; the needs are around EUR 464 million for water, EUR 217 million for pollution prevention and control, and EUR 70 million for biodiversity and ecosystems (in 2022 prices).

Current investments

To implement the environmental investments needed, the available financing is estimated to currently reach an annual EUR 1.3 billion in Luxembourg from EU and national sources combined (in 2022 prices).

Total environmental funding from the multiannual financial framework (MFF) is estimated to reach around EUR 1 198.2 million for Luxembourg in total during 2021–2027 (or EUR 17 million per year).

Table 1: Key environmental allocations from EU funds to Luxembourg (million EUR), 2021–2027

Instrument	Allocations
Cohesion policy	**4.8** ([a])
ERDF	2.2
Just Transition Fund	2.7
CAP	**66.2** ([b])
European Agricultural Guarantee Fund	42.6
European Agricultural Fund for Rural Development	23.6
European Maritime, Fisheries and Aquaculture Fund	**0.0**
Other MFF	48.1 ([c])
RRF ([d]) (2021–2026)	**27.8**

([a]) European Commission, 2021-2027 cohesion policy (planned) allocations in *EU amount* excluding national co-financing, based on the tracking in the Common Provisions Regulation (CPR, 2021) Annex I. Please note potential data changes that may have arisen between the EIR preparation cut-off date (31 October 2024) and its publication date. Note that Luxembourg is not eligible for the Cohesion Fund. Source and further information: https://cohesiondata.ec.europa.eu/2021-2027-Categorisation/2021-2027-Planned-finances-detailed-categorisation/hgvj-gyin/about_data.

([b]) Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP strategic plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013 (OJ L 435 6.12.2021, p. 1), Annex XI, https://eur-lex.europa.eu/eli/reg/2021/2115.

Note that 2021-2027 combines factual data for 2021 and 2022 and expenditure under the relevant specific objectives (SOs) of the CAP strategic plans from 2023, using the EU biodiversity tracking methodology (https://commission.europa.eu/system/files/2023-06/Biodiversity%20tracking%20methodology%20for%20each%20programme%202023.pdf). Source: European Commission.

([c]) Space Fund, Horizon Europe, financial instrument for the environment and the Connecting Europe Facility.

([d]) Outside the MFF. Note that the RRF applies a similar environmental tracking scheme (set in the RRF Regulation, Annex VI) as the EU's cohesion policy. RRF dataset version used: July 2024, prior to 2025 revisions. Data source: European Commission.

Luxembourg, in addition to receiving EU funds earmarked specifically for it in 2021–2027, can also benefit from funding programmes that can be accessed at the EU level and which are open to all Member States. These include the financial instrument for the environment (LIFE) programme ([151]) (EUR 5.4 billion), Horizon Europe ([152]) (EUR 95.5 billion), the Connecting Europe Facility ([153]) (EUR 33.7 billion) and funds that can be mobilised through the InvestEU programme ([154]).

([151]) https://cinea.ec.europa.eu/programmes/life_en.

([152]) European Commission, Horizon Europe, (https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en).

([153]) The Connecting Europe Facility Transport part also includes EUR 11.3 billion transferred from the Cohesion Fund, of which 30 % 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.

([154]) The InvestEU Fund is set 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 EIB group and others.

Luxembourg's RRP supports climate objectives through funding of EUR 0.06 billion (68.8 % of total), with an additional EUR 3.6 million (4.4 % of total) for the environment.

The EIB provided around EUR 9 million in environment-related financial contributions to Luxembourg from 2021 to mid 2024, related to water projects.

The EU's total national expenditure on environmental protection (operating plus capital expenditure) was EUR 298 billion in 2020 and EUR 321 billion in 2021, representing around 2.2 % of EU-27 GDP. In Luxembourg, the total national environmental protection expenditure was EUR 609 million in 2020 and EUR 674 million in 2021, representing around 0.9 % of GDP.

Of the total environmental expenditure, the national capital expenditure (investment) on environmental protection amounted to EUR 54.5 billion in 2020 and EUR 59.9 billion in 2021 in the EU-27, representing around 0.4 % of the EU's GDP. In Luxembourg, the national environmental protection investment data were not available for 2020 and 2021.

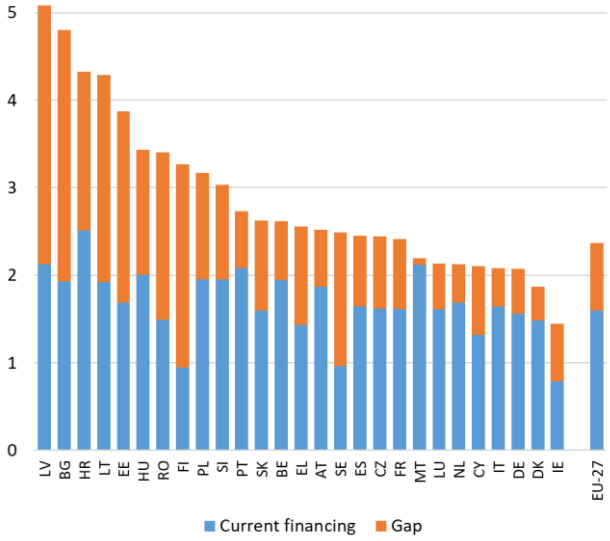
Splitting by institutional sector, 13 % of Luxembourg's national environmental protection investment (capital expenditure) comes from the general government budget, with 87 % coming from specialist private-sector producers (of environmental protection services, such as waste and water companies). Data for the business sector, whose environmental activities are usually ancillary to its main activities, was not available. At the EU level, 38 % of environmental protection investment comes from governments, 40 % from specialist private-sector producers and 22 % from the general business sector ([155]).

Luxembourg's total financing for environmental investment reaches an estimated EUR 1.3 billion per year (in 2022 prices), including EU funding and national public and national private expenditure. Of the total, the share of EU fund (including EIB funds) reaches 2 %, with around 98 % national financing. The total public financing (EU plus national public) represents 14 % of the total.

The gap

To meet its four environmental objectives beyond climate change, the additional investment need over the current levels (i.e. the gap) reaches an estimated EUR 403 million per year in Luxembourg, representing around 0.52% of the national GDP, being lower than the EU average (0.77 %).

Figure 34: Environmental financing, needs and gaps per Member State (% of GDP)



Source: Analysis of Directorate-General for Environment.

The following table provides the distributions of Luxembourg's environmental investment gap (expressed in various forms) by environmental objective.

Table 2: Summary of environmental investment gaps in Luxembourg per year, 2021–2027

([155]) Eurostat, 'Environmental protection expenditure accounts', env_ac_epea, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_protection_expenditure_accounts.

Environmental objective	Investment gap per year		
	Million EUR (2022 prices)	% of total	% of GDP
Pollution prevention and control	201	49.9	0.3
Circular economy and waste	125	30.9	0.2
Water management and water industries	125	31.0	0.2
Biodiversity and ecosystems	—	—	—
Total	**403**	**100.0**	**0.5**

NB: For biodiversity and ecosystems, no significant gap is observed, based on currently available data, with data consistency to be further assessed.

Source: Analysis of Directorate-General for Environment.

Pollution prevention and control

Investment needs

In pollution prevention and control, Luxembourg's investment needs are estimated to reach EUR 217 million per year (including baseline investments) in 2021–2027. Most of this, EUR 184 million, relates to air pollution control, to comply with the clean air requirements for the five main air pollutants under the NECD by 2030. The estimated needs to reduce environmental noise reach EUR 119 million per year, most of which is delivered by the (same) sustainable energy and transport investments that also benefit clean air ([156]). Industrial site remediation requires an estimated EUR 14 million per year. Microplastics pollution and the chemicals strategy require around EUR 8–10 million per year (each) ([157]).

Current investments

The current investment levels supporting pollution prevention and control reach an estimated EUR 16 million per year in Luxembourg in 2021–2027. Most of the financing concerns clean air (EUR 11 million per year). Protection from environmental noise receives around EUR 2 million per year, and chemicals 5 million per year.

In Luxembourg, the EU MFF provides an estimated 31 % of clean air financing (mostly via cohesion policy), with a further 18 % from the RRF, adding up to 49 % of the total. National sources provide 51 % ([158]).

The gap

To meet its environmental objectives concerning pollution prevention and control (towards zero pollution), Luxembourg needs to provide an additional EUR 201 million per year (0.26 % of GDP), mostly related to clean air and noise. The adequate implementation of the NECP with the investments included for sustainable energy and transport would largely deliver this, while in many Member States additional measures and investments may be required to comply with the ammonia reduction requirements.

According to the latest NAPCP review report ([159]) and Luxembourg's 2024 emission inventory, Luxembourg did not comply with ammonia reduction requirements in 2020 but complied in 2021 and 2022. Luxembourg will need additional measures to meet the NECD'S 2030 emission reduction commitments for ammonia, based on the policies and measures in its NAPCP that take into account climate, energy and CAP plans and financing baselines.

Circular economy and waste

Investment needs

Luxembourg's investment needs in circular economy and waste reach an EUR 913 million per year (including baseline investments). Most of this, around EUR 855 million per year, relates to circular economy measures in the mobility, food and built environment systems, with a further EUR 59 million necessary for waste management (municipal and packaging waste), covering waste collection, biowaste treatment, recycling reprocessors, waste-sorting facilities and digitalisation of the waste registry. The amount for waste excludes the

([156]) 2021 Phenomena project assessment (https://op.europa.eu/en/publication-detail/-/publication/f4cd7465-a95d-11eb-9585-01aa75ed71a1) and the Commission's 2023 Environmental Noise Directive implementation report (https://environment.ec.europa.eu/system/files/2023-03/COM_2023_139_1_EN_ACT_part1_v3.pdf).

([157]) European Commission, *Third Clean Air Outlook*, Brussels, 2022, https://environment.ec.europa.eu/topics/air/clean-air-outlook_en. See also the impact assessment for the revision of the AAQD, available from the Commission web page on the proposed revision.

([158]) Through the tracking of EU funds, EIB projects and national expenditure (EPEA accounts, Eurostat). Note that the bulk of clean air financing is provided as a contribution from climate (energy and transport) measures, as per the tracking schemes in the Common Provisions Regulation Annex I and the RRF Regulation Annex VI. Further information on clean air tracking: https://commission.europa.eu/document/download/0a80484e-2409-4749-94c6-3b23bc6bae8f_en?filename=Clean%20air%20methodology_0.pdf

([159]) European Commission, 'National air pollution control programmes and projections', European Commission website, https://environment.ec.europa.eu/topics/air/reducing-emissions-air-pollutants/national-air-pollution-control-programmes-and-projections_en.

investments needed for the uptake of circularity and waste prevention across the economy ([160]).

Current investments

Circular economy investments across the economy reach around EUR 739 million per year in Luxembourg in 2021-2027, with a further EUR 50 million provided for waste management that does not constitute circular economy.

Around 0.1 % of this combined financing for circularity and waste comes from the EU MFF, with no further contribution from the RRF. The share of national sources is absolutely overwhelming, reaching 99.9 % of the total financing ([161]).

The gap

To meet its environmental objectives concerning the circular economy and waste, Luxembourg needs to increase circular economy investments by an estimated EUR 116 million per year, with an additional EUR 8 million concerning waste management action, not belonging to circular economy. Combined, this amounts to EUR 125 million per year, representing 0.16 % of Luxembourg's GDP.

Of the circular economy gap, EUR 30 million relates to recent initiatives, such as the eco-design for sustainable products, packaging and packaging waste, labelling and digital tools, CRM recycling, and measures proposed under the amendment of the Waste Framework Directive, and EUR 86 million constitutes further investment need to unlock Luxembourg's circular economy potential.

Water protection and management

Investment needs

The annual water investment needs reach an estimated EUR 464 million (in 2022 prices) in Luxembourg. This comprises investment needs both for the water industry and for the protection and the management of water. Of the total annual need, EUR 246 million, relates to the management of waste water (also including additional costs associated with the revised UWWTD). A further EUR 122 million is necessary for drinking-water-related investments and around EUR 94 million for the protection and management of water ([162]).

Current investments

Water investments in Luxembourg are estimated to be around EUR 339 million per year (in 2022 prices) in 2021–2027. Of this, EUR 234 million supports waste water management, EUR 105 million drinking water and around EUR 1 million the other aspects of the WFD (water management and protection).

Of the total financing, 0.2 % is provided by the EU MFF (mostly through cohesion policy), with no further support from the RRF. EIB financing is around 0.4 % of the total, while the bulk of financing comes from national sources (99.4 %) ([163]).

The gap

To meet the various environmental targets under the WFD and the Floods Directive, Luxembourg's water investment gap reaches EUR 125 million per year (0.16 % of GDP), with EUR 13 million linked to wastewater measures. Drinking water measures require an additional 18 million per year and the other aspects of the WFD around 94 million per year over the existing levels of financing.

Biodiversity and ecosystems

Investment needs

The investment needs for biodiversity and ecosystems are estimated to be EUR 70 million per year (in 2022 prices) in Luxembourg in 2021–2027. This includes the following financing needs:

- Luxembourg's prioritised action framework ([164]), concerning the Natura 2000 areas: EUR 59 million per year, mostly running costs;
- additional BDS ([165]) costs: there may be additional costs, while the annual costs of the strategy are lower

([160]) See Systemiq and Ellen MacArthur Foundation, *Achieving 'Growth Within'*, 2017; and European Commission: Directorate-General for Environment, *Study on investment needs in the waste sector and on the financing of municipal waste management in Member States*, Publications Office of the European Union, Luxembourg, 2019, https://op.europa.eu/en/publication-detail/-/publication/4d5f8355-bcad-11e9-9d01-01aa75ed71a1.

([161]) Waste management and circular economy expenditure tracking in the EU funds, EIB projects and in the national expenditure (Eurostat). Datasets: EPEA accounts (env_epi) and circular economy private investments (cei_cie012).

([162]) See European Commission, 'Estimating investment needs and financing capacities for water-related investment in EU Member States', 28 May 2020, https://commission.europa.eu/news/estimating-investment-needs-and-financing-capacities-water-related-investment-eu-member-states-2020-05-28_en; and OECD, *Financing Water Supply, Sanitation and flood Protection: Challenges in EU Member States and policy options*, OECD Publishing, Paris, 2020, https://www.oecd-ilibrary.org/environment/financing-water-supply-sanitation-and-flood-protection_6893cdac-en.

([163]) Water investment levels are estimated through tracking EU funds, EIB projects and national expenditure (EPEA accounts, Eurostat).

([164]) European Commission, 'Financing Natura 2000 – Prioritised action frameworks', European Commission website, https://environment.ec.europa.eu/topics/nature-and-biodiversity/natura-2000/financing-natura-2000_en.

([165]) European Commission: Directorate-General for Environment, *Biodiversity Financing and Tracking – Final report*, Publications Office of the European Union, Luxembourg, 2022, https://op.europa.eu/en/publication-detail/-/publication/793eb6ec-dbd6-11ec-a534-01aa75ed71a1/language-en.

than those associated with the prioritised action framework;
- sustainable soil management ([166]) costs: EUR 10.7 million per year.

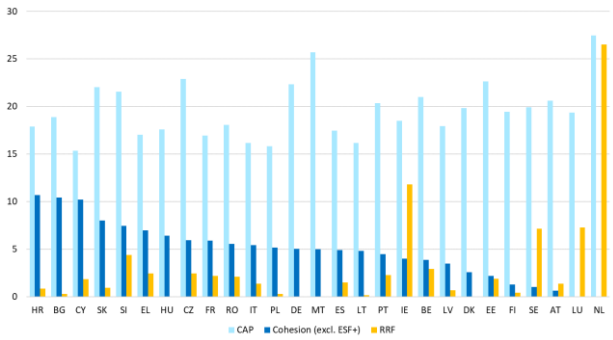
Current investments

The current level of biodiversity financing is estimated to be EUR 118 million per year (in 2022 prices) in 2021–2027. 97 % of this is considered direct financing to biodiversity and ecosystems, with a 100 % coefficient in the tracking schemes.

Out of the total biodiversity financing, no financing is estimated to come from EU cohesion policy, 2.7 % from CAP, 0.5 % from Horizon Europe and around 0.2 % from LIFE. The EU MFF altogether accounts for 8.2 % of the financing and the RRF for 0.7 %, adding up to a total of 8.9 % from the EU budget. The rest, 91 %, comes from national sources ([167]).

Luxembourg is the Member State with the third-highest share of biodiversity financing programmed under the RRF: 7.3 %. Luxembourg has also envisaged 19.4 % of CAP funds in 2021–2027 period to support biodiversity (above the EU average of 18.6 %). However, no cohesion policy funds have been programmed for investments in biodiversity in Luxembourg (while the EU average is 5.9 %).

Figure 35: 2021–2027 contributions to biodiversity from the main EU instruments per Member State (% of policy total)



NB: ESF+, European Social Fund Plus.

The gap

To meet the environmental objectives concerning the protection and restoration of biodiversity and ecosystems and other relevant cross-cutting measures, based on the available data, no significant investment gap can be observed in the case of Luxembourg.

Public financial management

Green budgeting practices

Green budgeting refers to the use of budgetary tools to achieve climate and environmental goals. Some Member States, including Luxembourg, already use green budgeting tools for identifying and tracking green expenditures and/or revenues ([168]). Green budgeting practices provide increased transparency on the environmental implications of budgetary policies.

The Commission has developed a non-mandatory green budgeting reference framework that brings together methodologies for assessing the impacts of budgets on climate and environmental goals ([169]).

To help Member States to develop national green budgeting and thereby improve policy coherence and

([166]) Proposal for a directive of the European Parliament and of the Council on soil monitoring and resilience (Soil Monitoring Law) COM(2023) 416 final of 5 July 2023, https://environment.ec.europa.eu/publications/proposal-directive-soil-monitoring-and-resilience_en.

([167]) Based on biodiversity tracking in the EU budget (https://circabc.europa.eu/ui/group/3f466d71-92a7-49eb-9c63-6cb0fadf29dc/library/8e44293a-d97f-496d-8769-50365780acde), and national expenditure into biodiversity from the Classification of the Functions of Government accounts.

([168]) European Commission, *Green Budgeting in the EU. Key Insights from the 2023 European Commission Survey of Green Budgeting Practices*, 2023, https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/national-fiscal-frameworks-eu-member-states/green-budgeting-eu_en#:~:text=European%20Commission%20Green%20Budgeting%20Survey%C2%A0.

([169]) European Commission, 'European Union green budgeting reference framework', 2022, https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/green-budgeting-eu_en.

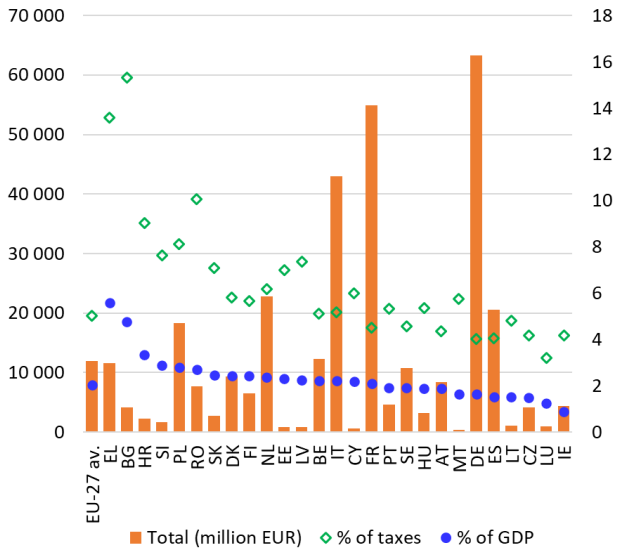
support the green transition, the Commission launched a technical support instrument (TSI) project on green budgeting in 2021 ([170]), in which Luxembourg participated and identified possible improvements to its tagging methodology.

Beyond green budgeting, to improve policy outcomes, the Commission has also drawn up climate-proofing and sustainability-proofing guidance ([171]) as tools to assess project eligibility and compliance with environmental legislation and criteria.

Green taxation and tax reform

Total environmental taxes amounted to EUR 1.02 billion in Luxembourg in 2023, representing 1.28 % of its GDP (EU average: 2.03 %). Energy taxes formed the largest component of environmental taxes, accounting for 1.18 % of GDP, which is lower than the EU average of 1.58 %. Transport taxes, at 0.09 % of GDP, were under the EU average (0.36 %), as were taxes on pollution and resources, at 0.01 % (EU average: 0.08 %). In 2022, environmental taxes in Luxembourg accounted for 3.2 % of total revenues from taxes and social security contributions (under the EU average of 5.0 %) ([172]).

Figure 36: Environmental taxes per Member State, 2022



The European Green Deal emphasises the role of well-designed tax reforms (e.g. shifts from taxing labour to taxing pollution) to boost economic growth and resilience, and to foster a fairer society and a just transition through the right price signals. The Green Deal promotes the 'polluter-pays principle', which makes polluters bear the costs to prevent, control and remedy pollution.

According to a 2024 study ([173]), Luxembourg applies a hunting and fishing tax, and a volumetric charge on water abstraction and water disposal.

Green bonds and sustainable bonds

In 2023, the total value of green bonds issued by the Member States was USD 245 billion (EUR 227 billion), up from USD 234 billion (EUR 198 billion) in 2021.

During 2021–2023 combined, Luxembourg issued green bonds worth USD 11.5 billion (EUR 9.8 billion). Of this, the issuance in 2023 amounted to USD 0.8 billion (EUR 0.7 billion) ([174]).

During 2014–2023, 83 % of the green bonds issued by European countries (excluding supranational entities) served objectives in energy, buildings or transport, while 5 % supported objectives in water, 5.1 % related to land use (with links to nature and ecosystems) and 3.8 % applied to waste management. By 2023, the combined

([170]) https://reform-support.ec.europa.eu/what-we-do/revenue-administration-and-public-financial-management/supporting-implementation-green-budgeting-practices-eu_en.

([171]) Commission notice – Technical guidance on the climate proofing of infrastructure in the period 2021–2027 (OJ C 373, 16.09.2021, p. 1), https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en.

([172]) Eurostat, 'Environmental taxes statistics – detailed analysis', Eurostat website, September 2024, https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=651046.

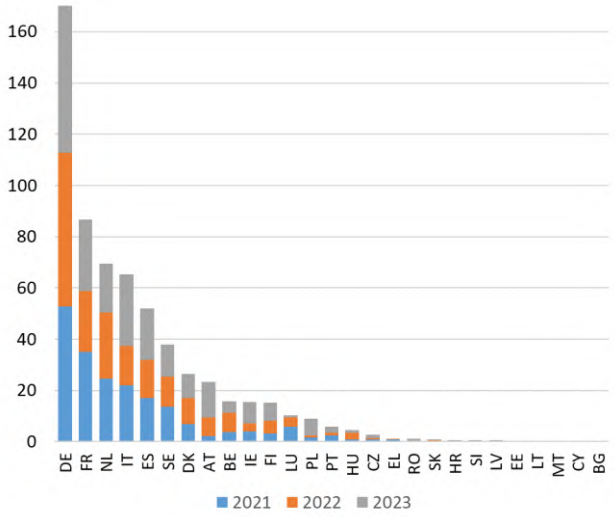
([173]) European Commission: Directorate-General for Environment, *Candidates for Taxing Environmental Bads at National Level*, Publications Office of the European Union, Luxembourg, 2024, Annexes 1 and 2, https://op.europa.eu/en/publication-detail/-/publication/35c1bbdf-2931-11ef-9290-01aa75ed71a1/language-en.

([174]) Climate bonds initiative (https://www.climatebonds.net/). *NB*. Additionally (and not included in this), national sources indicated EUR 544.8 million issuance for Croatia, in 2022-2023, and a slightly higher amount for Slovenia (+0.27 billion) during 2021-2023 in total.

share of energy, buildings and transport had decreased to 73 %, the share of waste management and land use had increased (to 5.9 % and 8.4 %, respectively) and the share of water had remained around 5 %.

In 2021–2023, 31.7 % of European green bonds (excluding supranational issuances) were issued by financial corporates, 29.1 % by sovereign governments and 23.1 % by non-financial corporates. 8.3 % of the issuances were linked to government-backed entities, 6.4 % to development banks and 1.4 % to local governments.

Figure 37: Value of green bonds issued per Member State (billion EUR), 2021, 2022 and 2023



Source: Climatebonds.net, with some additional data from national sources (e.g. Croatia, Slovenia).

Environmentally harmful subsidies

Addressing and phasing out environmentally harmful subsidies (EHSs), in particular fossil fuel subsidies (FFS), is a further step towards achieving the eighth environmental action programme objectives and the enabling conditions ([175]). FFS are costly for public budgets and make it difficult to achieve European Green Deal objectives.

The overall downward trend of FFS mentioned in past EIRs was disrupted from 2022, due to the European response to the 2021 energy crisis and subsequent increase in energy prices.

As a direct consequence, annual FFS in the EU have increased to EUR 103 billion in 2023 from EUR 57 billion in 2020. From 2021 to 2023, there was a marked increase in annual FFS of 72 % in the EU ([176]).

For the majority of the Member States (16), the year 2022 saw a peak in the amount of overall FFS. A decline was then observed in 2023 ([177]). In particular, FFS for coal and lignite, natural gas and oil increased in 2022, and a strong increase was observed for natural gas subsidies.

In Luxembourg, the energy subsidies were stable between 2015 and 2021, with FFS amounting to EUR 0.1–0.2 billion per year. In 2022 and 2023, energy subsidies increased significantly overall, and so did FFS, reaching EUR 0.3 billion in 2022 and EUR 0.5 billion in 2023.

As a share of GDP, FFS in 2022 ranged from 1.8 % in Croatia to less than 0.1 % in Denmark and Sweden. Luxembourg's value reached 0.4 %, under the EU average (0.8 %) ([178]).

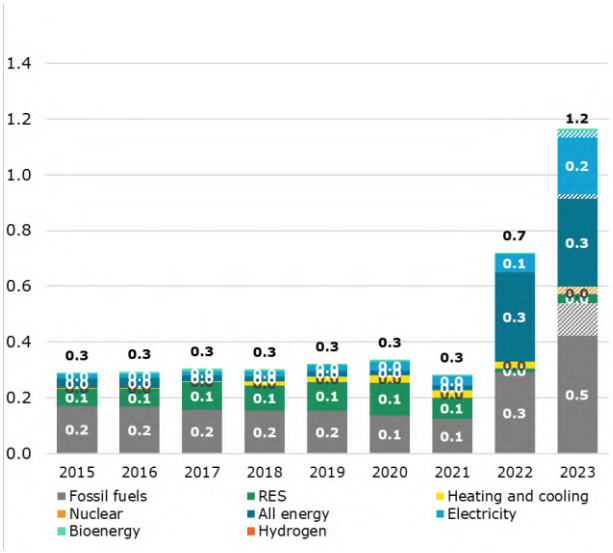
Figure 38: Energy subsidies by energy carrier (billion EUR), 2015–2023

([175]) Article 3(h) and 3(v) of the eighth environmental action plan.

([176]) European Commission, 2025, "2024 Report on Energy Subsidies in the European Union", COM(2025), .

([177]) 16 Member States: BE, EE, IE, EL, ES, FR, HR, IT, CY, LT, HU, NL, AT, PT, RO and SE.

([178]) European Commission, 2025, "2024 Report on Energy Subsidies in the European Union", COM(2025), https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2025)17&lang=en.



NB: RES, renewable energy source.

Source: analysis of the Directorate-General for Energy.

In the 2022 EIR, Luxembourg received the following recommendations.

- Draw up an environmental financing strategy to maximise opportunities for closing environmental implementation gaps, including by increasing environmental taxes.
- Tackle the main environmental challenges affecting the country through appropriate funding, including through the mobilisation of investments and the use of EU funds.

Overall, Luxembourg has a similar environmental investment gap to that in 2022 (around 0.5 % of GDP), which is lower than the EU average, and is to a significant extent related to pollution prevention and control. In light of an existing investment gap overall, which requires further actions, the second recommendation from 2022 has been reformulated below.

2025 priority action

- Use more national funding (for instance by increasing taxes in favour of the environment and reducing environmentally harmful subsidies), EU funding and private funding to help close the investment gap.

6. Environmental governance

Information, public participation and access to justice

Citizens can more effectively protect the environment if they rely on the three 'pillars' of the Aarhus Convention: (i) access to information, (ii) public participation in decision-making and (iii) access to justice in environmental matters. It is of crucial importance to public authorities, the public and businesses that environmental information is shared efficiently and effectively ([179]). 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, safeguard the rights of citizens and ensure accountability of authorities ([180]). It includes the right to bring legal challenges ('legal standing') ([181]).

Environmental information

This section focuses on the implementation of the Infrastructure for Spatial Information in the European Community (Inspire) Directive. The Inspire Directive aims to set up a European spatial-data infrastructure for sharing environmental spatial information between public authorities across Europe. It is expected that this will help policymaking across boundaries and facilitate public access to this information. Geographic information is needed for good governance at all levels and should be readily and transparently available.

Luxembourg's performance in implementing the Inspire Directive is substantial and has been reviewed based on its 2023 country fiche ([182]) (see Table 3).

Table 3: Luxembourg dashboard on implementation of the Inspire Directive, 2016–2023

([179]) The Aarhus Convention (https://unece.org/environment-policy/public-participation/aarhus-convention/text), the Access to Environmental Information Directive (Directive 2003/4/EC) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0004) and the Inspire Directive (Directive 2007/2/EC) (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0002) together create a legal foundation for the sharing of environmental information between public authorities and with the public.

([180]) These guarantees are explained in the European Commission's 2017 notice on access to justice in environmental matters (https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52017XC0818(02)) and a related 2018 citizen's guide (https://op.europa.eu/en/publication-detail/-/publication/2b362f0a-bfe4-11e8-99ee-01aa75ed71a1/language-en/format-PDF).

([181]) This EIR focuses on the means used by Member States to guarantee rights of access to justice and legal standing and to overcome other major barriers to bringing cases on environmental protection.

([182]) European Commission, 'Luxembourg', Inspire Knowledge Base, (https://knowledge-base.inspire.ec.europa.eu/luxembourg_en).

	2016	2023	Legend
Effective coordination and data sharing			■ Implementation of this provision is well advanced or (nearly) completed. Outstanding issues are minor and can be addressed easily. Percentage > 89 % ■ Implementation of this provision has started and made some or substantial progress but is still not close to being completed. Percentage = 31–89 % ■ Implementation of this provision is falling significantly behind. Serious efforts are necessary to close the implementation gap. Percentage < 31 %
Ensure effective coordination	■	■	
Data sharing without obstacle	■	■	
Inspire performance indicators			
(i) Conformity of metadata	■	■	
(ii) Conformity of spatial datasets	■	■	
(iii) Accessibility of spatial datasets through view and download services	■	■	
(iv) Conformity of network services	■	■	

Source: European Commission, 'Luxembourg', Inspire Knowledge Base, https://knowledge-base.inspire.ec.europa.eu/luxembourg_en.

Public participation

Public involvement at both the planning and the project phase maximises transparency and social acceptance of programmes and projects. Consultation with the public (including NGOs) and environmental, local, and regional authorities is a key feature of an effective impact assessment procedure. Such consultation also provides an opportunity for public authorities and project promoters to engage with the public actively and meaningfully by making information on the likely significant effects widely available. If carried out with due diligence and taking into consideration useful public input, this process leads to better-informed decision-making and can promote public acceptance. Making information available increases stakeholder involvement, thus lessening resistance, and preventing (or minimising) litigation. On the other hand, it is paramount that the procedure is effective.

This section examines how public involvement and transparency are ensured under two instruments, namely the Environmental Impact Assessment (EIA) Directive ([183]) and the Strategic Environmental Assessment (SEA) Directive ([184]).

EU law provides for a flexible framework concerning EIAs. The aim of this framework is to ensure the application of the necessary environmental safeguards, while enabling speedy approval of projects. The Commission has contributed to simplifying and accelerating permitting for renewable energy projects and continues to support the Member States in this regard ([185]). Luxembourg is yet to take steps aiming to accelerate permitting-issuing procedures taking advantages of the broad flexibilities offered by the EU legal framework, such as the establishment of one stop shop and accelerated short deadlines for issuing permits for renewable energy projects.

The average speed in the EU for issuing permits involving an EIA procedure is 20.6 months, with a minimum duration of 11.4 months and a maximum duration of 75.7 months ([186]). The duration of each step in an EIA process (screening, scoping, EIA report, public consultation, reasoned conclusion, development consent) varies considerably between Member States and projects. The available data for Luxembourg shows that the average duration for some steps (screening, scoping, EIA report, public consultation, reasoned conclusion) of the EIA process in the country is faster than the EU average ([187]). Effective use of EU procedures can positively influence the timely approval of activities underpinning the decarbonisation of the economy on the way to net zero by 2050.

A new report is not yet available on the application and effectiveness of the SEA Directive in the EU. Nevertheless, a support study has been published with information by Member State ([188]).

([183]) Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ L 26, 28.1.2012, p. 1), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0092.

([184]) Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (OJ L 197, 21.7.2001, p. 30), https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32001L0042.

([185]) Commission Staff Working Document (SWD/2022/0149 final), 18 May 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022SC0149&qid=1653034229953.

([186]) European Commission: Directorate-General for Environment, *Collection of information and data on the implementation of the revised Environmental Impact Assessment (EIA) Directive (2011/92/EU) as amended by 2014/52/EU)*, Publications Office of the European Union, Luxembourg, 2024, Tables 5 and 6, https://op.europa.eu/en/publication-detail/-/publication/8349a857-2936-11ef-9290-01aa75ed71a1/.

([187]) Details are not available regarding the average duration for all steps of the procedure. Therefore, we could not assess the average duration of the entire EIA procedure.

([188]) European Commission: Directorate-General for Environment, Lundberg, P., McNeill, A., McGuinn, J., Cantarelli, A. et al., *Study supporting the preparation of the report on the application and effectiveness of the SEA Directive (Directive 2001/42/EC) – Final*

Access to justice

Access to justice, guaranteed by Article 19(1) of the Treaty on European Union and Article 47 of the EU Charter of Fundamental Rights, is a fundamental right and part of the democratic process. It is vital to ensure the full application of EU law in all Member States and the legal protection of the rights of individuals, including in environmental matters. Access to justice is essential to enable judicial review of the decisions of public authorities and to allow the correction of any wrongdoing committed by these authorities.

This section provides a snapshot of the state of play of access to courts by the public, particularly when it comes to challenging plans, or the non-adoption of plans, under EU law, in the areas of water, waste, air quality and noise, irrespective of the form of the legal act (i.e. regulatory act or administrative decision).

As outlined in the 2022 EIR, both individuals with a legal legitimate interest and recognised environmental NGOs have standing to challenge environmental administrative decisions.

Information on access to justice in environmental matters is accessible via government sites ([189]).

In the 2022 EIR, Luxembourg received priority actions to ensure that standing is not conditional on prior participation in environmental cases. It appears that standing is no longer conditional on prior participation; therefore, the priority action is not repeated.

Compliance assurance

Environmental compliance assurance covers all work undertaken by public authorities to ensure that industries, farmers, and others fulfil their obligations to protect water, air, and nature, to manage waste ([190]) and to remedy any environmental damage. It includes measures such as (i) compliance promotion; (ii) compliance monitoring (i.e. inspections and other checks); (iii) enforcement, that is, steps taken to stop breaches, and impose sanctions; and (iv) ensuring damage prevention and remediation in line with the polluter-pays principle.

Compliance promotion, monitoring and enforcement

Non-compliance with environmental obligations may occur for different reasons, including poor understanding or lack of acceptance of the rules, opportunism or even criminality. Compliance promotion activities help duty-holders to comply by providing information, guidance and other support. This is particularly important in areas where new and complex legislation is put in place.

When inspections and other control activities identify problems, a range of responses may be appropriate, including the use of administrative and criminal enforcement tools.

As mentioned in the 2022 EIR, no centralised database or statistics on environmental crimes and their outcomes are available. Luxembourg police continue to report limited statistics specifically targeting environmental crimes, but they are not broken down by specific environmental crime types. The 2023 activity report from Luxembourg's police website ([191]) still does not isolate environmental crimes, though it does provide general crime statistics across various categories, such as property, violent crime and other infractions. Nonetheless, Luxembourg's police continue to allocate specialised teams to investigate these offences, particularly within departments addressing economic and financial crimes, which include some environmental violations.

The 2022 EIR recommended that Luxembourg (i) better inform the public about compliance promotion, monitoring and enforcement; (ii) provide more information on how professionals dealing with environmental crime work together; and (iii) publish information on the outcomes of enforcement actions and on the follow-up of detected cross-compliance breaches on nitrates and nature. However, such actions concerning compliance promotion, monitoring, and criminal and administrative enforcement are not assessed in this report due to the lack of systematic information.

The new EU Environmental Crime Directive

The EU has recently strengthened its legal framework on tackling the most serious breaches of environmental obligations, notably by the adoption of the new Environmental Crime Directive (ECD) (Directive (EU)

study, Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2779/1615072

([189]) Portals providing information on the environment (www.emwelt.lu) and sustainable development (www.developpement-durable-infrastructures.public.lu/fr/index.html).

([190]) The concept is explained in detail in the European Commission's 2018 communication on EU actions to improve environmental compliance and governance (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0010) and the related Commission staff working document (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0010).

([191]) https://police.public.lu/en/publications/2024/rapport-activites.html.

2024/1203) ([192]) and new sectoral legislation with stronger provisions on compliance monitoring, enforcement and penalties. Issues important for the transposition and the implementation of the relevant new instruments are highlighted below; a detailed assessment of these topics will be included in the next EIR once more implementation measures are put in place and more systematic information is available.

The new ECD replaced the 2008 ECD and introduced several new offence categories, such as unlawful ship recycling, unlawful water abstraction, and serious breaches of EU legislation on chemicals, mercury, fluorinated GHG and IAS of EU concern. It also covered the establishment of qualified offences, subject to more severe penalties where one of the offences defined in the directive leads to serious widespread and substantial damage or destruction of the environment. Concrete provisions on the types and levels of penalties for natural and legal persons who commit an offence were also introduced. Other provisions will help considerably to improve the effectiveness in combating environmental crime of all actors along the enforcement chain. These include obligations to ensure adequate resources and investigative tools, specialised regular training and the establishment of cooperation mechanisms within and between Member States as well as national strategies on combating environmental crime.

Member States are required to transpose the new ECD into national law by 21 May 2026 and to take additional measures to combat environmental crime more effectively, in particular through training, coordination, cooperation and strategic approaches. The Commission will provide support, including by facilitating the identification and sharing of good practices. Member States are expected to ensure the necessary resources and specialised skills required and they are invited to encourage their authorities to support and cooperate with the recognised EU-level networks of environmental enforcement practitioners, such as the EU Network for the Implementation and Enforcement of Environmental Law ([193]), EnviCrimeNet ([194]), the European Network of Prosecutors for the Environment ([195]) and the EU Forum of Judges of the Environment ([196]). The European Union Agency for Law Enforcement Cooperation and European Union Agency for Criminal Justice Cooperation mechanisms for cooperation on cross-border cases should be used more systematically for environmental offences.

Environmental Liability Directive

The Environmental Liability Directive (ELD) ([197]) aims to ensure that environmental damage is remediated in kind at the expense of those who have caused it, in line with the polluter-pays principle. It helps to halt the net loss in biodiversity, as well as reducing the number of contaminated sites and protecting the environmental quality of groundwater and surface waters. The ELD is a cross-cutting tool and a key enabler for better implementation of EU environmental law.

The ELD addresses cases of significant environmental damage to protected species and natural habitats, and, when caused by operators carrying out certain potentially hazardous activities, also damages to water and to soil. The Commission has the legal obligation to periodically evaluate the ELD. The ELD has undergone the second evaluation ([198]), which will be finalised in 2025, and which was supported by an external study ([199]), containing, among other things, evidence, views, reports, and other relevant information gathered from different stakeholder groups, including Member States.

One of the most relevant indicators in assessing implementation and enforcement of the ELD is the number of environmental damage cases handled under the ELD, especially when this number is compared with the previous reporting period. Fewer ELD cases have been reported in the second reporting period (2013–2022) than in the first one (2007–2013). However, the downward tendency in the number of ELD occurrences and their overall low number do not necessarily mean that the ELD has achieved its objectives, as it needs to be compared with the overall number of environmental damage cases, some of which may have been handled under the other liability instruments.

([192]) Directive 2024/1203/EU on the protection of the environment through criminal law, https://eur-lex.europa.eu/eli/dir/2024/1203/oj/eng.
([193]) https://www.impel.eu/en.
([194]) LIFE+SATEC project (https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE20-PRE-ES-000001/fight-against-environmental-crime-at-a-strategic-level-through-the-strengthening-of-envicrimenet-network-of-experts-in-environmental-criminal-investigations).
([195]) https://www.environmentalprosecutors.eu/.
([196]) https://www.eufje.org/index.php?lang=en.
([197]) Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02004L0035-20190626).
([198]) Commission staff working document - Evaluation of the Environmental Liability Directive, forthcoming 2025.
([199]) European Commission: Directorate-General for Environment and Fogleman, V., *Study in support of the evaluation of the Environmental Liability Directive and its implementation – Final report*, Publications Office of the European Union, Luxembourg, 2024, https://op.europa.eu/en/publication-detail/-/publication/006d90e5-980a-11ef-a130-01aa75ed71a1/language-en.

The ELD has not always been effective in ensuring that the polluter pays, because the liable operators often lack financial capacity to carry out remediation measures. While the ELD does not provide for a mandatory financial security system, it explicitly calls for Member States to encourage the development of financial security instruments and markets, with the aim of enabling operators to use financial guarantees to cover their responsibilities under this directive.

From 1 May 2013 to 31 December 2021, Luxembourg reported two occurrences of environmental damage under the ELD (water damage), whereas in the previous reporting period no environmental damage occurrences were reported under the ELD.

Luxembourg has not introduced mandatory financial security for ELD liabilities. Environmental insurance policies that provide cover for all on-site and off-site ELD liabilities including other environmental damage as well as pollution are widely available in a form of the environmental extensions to general liability policies. Such extensions generally only provide cover for ELD liabilities if such liabilities overlap with requirements under other national environmental legislation to remediate off-site land/soil pollution from a sudden and accidental incident on the insured's site. The extensions rarely provide cover for remediating biodiversity damage under the ELD.

The 2022 EIR recommended that Luxembourg improve financial security for environmental liabilities, and improve ELD guidance and/or the collection and/or publication of information on environmental damage. Luxembourg has made some progress in improving financial security; however, no information is available about its progress on other priority actions. Efforts to implement the 2022 priority actions should continue along with those for the 2025 priority actions.

2025 priority action

- Encourage the use of training programmes provided by the Commission (or developed at the national level) covering the ELD and its interaction with the other national liability-related instruments, to ensure more efficient ELD implementation, improve the expertise of the competent authorities and raise awareness among all stakeholder groups.

EU-supported environmental capacity building

The Commission's 2023 Compact ([200]) initiative to enhance the administrative space identifies the capacity to lead the green transition as one of three key pillars, along with the public administration skills agenda and the capacity for Europe's Digital Decade. Compact also recognises the role of the EIR reporting tool in improving environmental governance. The two main capacity-building opportunities for the environment provided by the European Commission are the TSI ([201]) and TAIEX-EIR PEER 2 PEER tool ([202]). The technical assistance available through the cohesion policy is subject to shared management and is not dealt with in this subsection.

The Commission's technical support instrument

The TSI provides Member States with tailor-made technical expertise on the design and implementation of reforms. The support is demand driven and does not require national co-financing.

The Commission's TSI had annual calls in 2021, 2022, 2023, 2024 and 2025, with projects implemented the following year. In 2024, Luxembourg participated for the first time in a multi-country TSI project related to the environment, which focused on identifying financial solutions to mobilise resources for the implementation of the GBF, through the preparation of national biodiversity finance plans, the beneficiary was the Ministry of the Environment, Climate and Sustainable Development.

The Commission's TAIEX-EIR PEER 2 PEER tool

The Commission launched the TAIEX-EIR PEER 2 PEER tool in 2017. It aims to facilitate peer-to-peer learning among Member States' environmental authorities through workshops (single or multi-country), expert missions (where a delegation of experts travels to the requesting institution) and study visits (where a delegation from the requesting institution travels to a host country). Flagship multi-country workshops are those requested by the European Commission to present new and upcoming environmental legislation and policy in all Member States ([203]).

([200]) See the European Commission web page on Compact (https://reform-support.ec.europa.eu/public-administration-and-governance-coordination/enhancing-european-administrative-space-compact_en).

([201]) See the European Commission web page on the TSI (https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/technical-support-instrument/technical-support-instrument-tsi_en).

([202]) See the European Commission web page on the TAIEX-EIR PEER 2 PEER tool (https://environment.ec.europa.eu/law-and-governance/environmental-implementation-review/peer-2-peer_en). TAIEX: Technical Assistance and Information Exchange.

([203]) Flagship multi-country workshops in the reporting period are Recast Drinking Water Directive (3 April 2025); Environmental compliance and governance (18 March 2025); Planning of Renewable Energy Projects (20 February 2025); Air Quality:

Workshops involving Luxembourg are as follows:

- Online platforms: EU Batteries, Packaging and Packaging Waste Regulation (28-29 October 2024);
- Delivery of advisory services for businesses to go circular (13 April 2023);
- Future challenges in the air protection in Europe (24 November 2022) with the Czechia EU presidency;
- Eco-management and audit scheme (EMAS) (28–30 September 2022), hosted by Luxembourg.

In 2022, Luxembourg received a priority action to continue to improve environmental governance, in particular administrative capacity and coordination at the national level. There are no available data showing progress in this regard; therefore, the priority action is repeated.

2025 priority action

- Improve overall national environmental governance, in particular administrative capacity to support the green transition and coordination at the local level.

Implementation of the revised Air Quality Directive (16 January 2025); Industrial safety awareness raising of emerging risks linked with climate change and decarbonation (12 December 2024); Air quality: implementation of the NEC Directive to further mainstream air and broader pollution reduction in agricultural policy (25 September 2024); Industrial emissions transposition and implementation of the revised directive (12 September 2024); Noise: progress towards meeting Member States' noise limit values and EU reduction targets (5 June 2024); Best practice use of environmental footprint methods on the EU market (30 May 2024); Sustainable finance (9 November 2023); Textile waste separate collection, treatment and markets (3 October 2023); EU environmental funding and support (13 June 2023); Advisory service for businesses to go circular (24 April 2023); Digital product passport implementation (6 December 2022); Public involvement in planning and approval of renewable energy projects (17 November 2022); Environmental compliance and governance (14 November 2022); Biowaste management (19-20 September 2022); and Renewable energy projects: permitting granting processes (13 June 2022). NB: The first flagship workshop on zero pollution for air, water and soil took place on 9 February 2022.

Annex

2025 priority actions

Circular economy

- Adopt measures to increase the circular material use rate.
- Speed up the transition to a circular economy by implementing an updated national strategy and the EU framework and recommendations, in particular to complement it with upstream circularity measures.

Waste management

- Further shift reusable and recyclable waste away from incineration, including through economic instruments.
- Increase the collection and recycling rate of waste electronic and electric equipment (WEEE).
- Introduce the deposit and return system(-s) (DRS), as mandated by the new Packaging and Packaging Waste Regulation, to capture more recyclable materials and improve the quality of recyclates.
- Invest in waste prevention measures to reduce the total amount of waste generated.
- Develop EPR schemes for problematic waste and introduce fee modulation.

Biodiversity and natural capital

Nature protection and restoration – Natura 2000

- Ensure the effective implementation of Natura 2000 management plans and sufficient administrative capacity and financing both for Natura 2000 and the implementation of the Nature Restoration Regulation. Ensure implementation of Prioritised Actions Framework 2021-2027 (PAFs).

Recovery of species

- Reinforce action for habitats and species with unfavourable conservation status through, for example, restoration measures, increased connectivity, better policy coordination and integration, and increased funding.
- Strengthen the integration of biodiversity actions into other policies, e.g. energy, agriculture, fisheries, forestry, urban and infrastructure planning and sustainable tourism, and promote communication between stakeholders.

Recovery of ecosystems

- Step-up efforts to further reduce nitrogen deposition, in particular in Natura 2000 sites with nitrogen-sensitive species and habitats.
- Implement eco-schemes and agri-environmental measures and practices to address the environmental needs of Luxembourg.
- Implement and scale up the uptake of organic farming practices.
- Promote the active management of grasslands through extensive grazing to maintain the condition of these semi-natural habitats.
- Reduce the excessive area of sealed and artificialised soil and remediate degraded areas of soil. If appropriate, consider formally committing to targets for land-degradation neutrality under the relevant United Nations Convention to Combat Desertification agreement.
- Bring levels of nitrogen deposition under the critical threshold to allow forest habitat types protected under the Habitats Directive to recover.

Prevention and management of invasive alien species

- Step up implementation of the IAS Regulation, including with regard to enforcement and the capacity of inspection authorities.
- Ensure regional cooperation with neighbouring Member States to address predominant pressures.
- Ratify the International Convention for the Control and Management of Ships' Ballast Water and Sediments of 2004 (BWM Convention).

Zero pollution

Clean air

- As part of the NAPCP, take action to reduce emissions of air pollutants.
- Ensure full compliance with the current AAQD standards, also in light of future stricter requirements under the revised AAQD.

Industrial emissions

- Reduce industrial air pollution damage and intensity.
- Engage with industry and environmental NGOs to ensure proper contribution to and implementation of BAT conclusions and ensure timely updates to permits following the publication of BAT conclusions.
- Ensure effective public participation and access to justice in relation to the IED.

Noise

- Complete and implement action plans on noise management.

Water quality and management

- Improve river continuity and ecological flows, boosting efforts on nature-based solutions to reduce hydromorphological pressures.
- Ensure periodic reviews of permits for discharges, abstractions and other water uses, including hydropower pressures.
- Reduce pollution from nutrients, chemicals, metals and saline discharges.
- Better justify exemptions to the achievement of good status.
- Improve the classification of water bodies and strengthen monitoring systems.
- Develop more robust programmes of measures, tackle obstacles identified in the implementation of measures and ensure adequate financing for implementation, including through better use of cost recovery and the polluter-pays principle.
- FRMPs should provide details on how the FHRMs were used in the choice of measures and how to consider pluvial flooding.
- Consider future climate scenarios in the FRMPs.
- Better explain the choice and implementation of flood prevention and protection measures (prioritisation, monitoring, costs of measures).
- Improve public consultation and stakeholder involvement.
- Tackle nutrient pollution, especially nitrates from agriculture through the implementation of the Nitrates Directive.

Chemicals

- Upgrade the administrative capacities in implementation and enforcement to move towards a policy of zero tolerance for non-compliance.
- Increase customs checks and checks of products sold online with regard to compliance with chemicals legislation.

Climate action

- Implementing all polices and measures that are needed to achieve targets laid down in the Effort Sharing Regulation (ESR) and the Land Use and Land-Use Change and Forestry (LULUCF) Regulation. More detailed priority actions are set out in the assessment of the final National Energy and Climate Plan (NECP).

Financing

- Use more national funding (for instance by increasing taxes in favour of the environment and reducing environmentally harmful subsidies), EU funding and private funding to help close the investment gap

Environmental governance

- Encourage the use of training programmes provided by the Commission (or developed at the national level) covering the ELD and its interaction with the other national liability-related instruments, to ensure more efficient ELD implementation, improve the expertise of the competent authorities and raise awareness among all stakeholder groups.
- Improve overall national environmental governance, in particular administrative capacity to support the green transition and coordination at the local level.