OECD Environmental Performance Reviews

Luxembourg

HIGHLIGHTS

2020

OECD

BETTER POLICIES FOR BETTER LIVES

OECD Environmental Performance Reviews

OECD Environmental Performance Reviews (EPRs) provide evidence-based analysis and assessment of countries' progress towards their environmental policy objectives.

They promote peer learning, enhance government accountability and provide targeted recommendations to help countries improve their environmental performance. They are supported by a broad range of economic and environmental data. Each EPR cycle covers all OECD member countries and selected partner countries.

All reports, and more information, are available on the EPR website: http://oe.cd/epr.

THE THIRD EPR OF LUXEMBOURG

Luxembourg is one of the founding members of the OECD. The previous Environmental Performance Reviews of Luxembourg were published in 2000 and 2010. The report reviews Luxembourg's environmental performance since 2005. It builds on a constructive dialogue between Luxembourg and the other countries participating in the OECD Working Party on Environmental Performance, in particular the two reviewing countries Belgium and Switzerland.

The Working Group reviewed the 40 recommendations presented in the report at its meeting in Paris on 25 February 2020, and approved them on 27 October 2020. They aim to help Luxembourg to adopt a greener and more inclusive economic model and improve environmental governance and management. The report includes two detailed chapters on air quality and sustainable mobility and on biodiversity.

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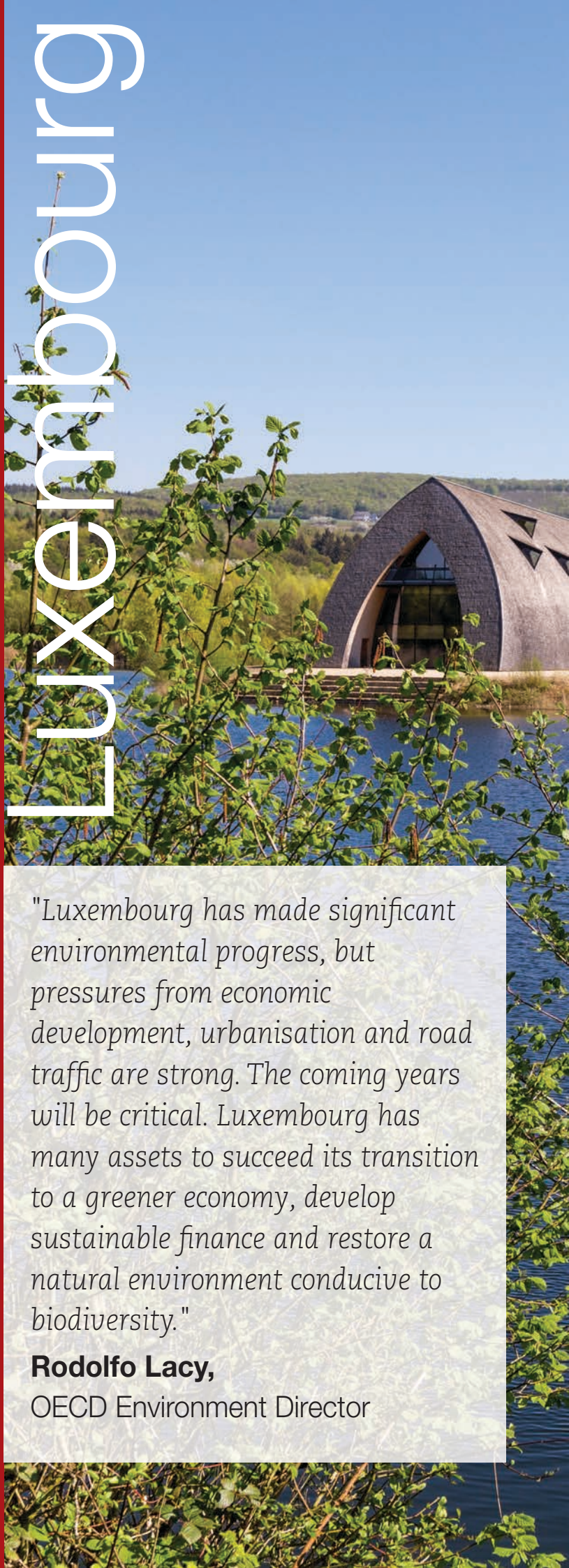
BETTER POLICIES FOR BETTER LIVES



"Luxembourg has made significant environmental progress, but pressures from economic development, urbanisation and road traffic are strong. The coming years will be critical. Luxembourg has many assets to succeed its transition to a greener economy, develop sustainable finance and restore a natural environment conducive to biodiversity."

Rodolfo Lacy,
OECD Environment Director

The Environmental Performance Review was conducted prior to the COVID-19 outbreak. It is predicted that the pandemic could reduce gross domestic product (GDP) by 7.7% in 2020 if the virus resurfaces, with a recovery of 0.2% expected in 2021.

LUXEMBOURG 2018

Population
600 000 inhabitants

GDP per habitant
(current purchasing power parities)
112 000 USD
(OECD average : 46 000)

Area
2 586 km²

Population density
233 inhabitants/km²
(OECD average: 36)

Currency
Euros (EUR)
In 2018, 1 USD = 0.847 EUR
In 2019, 1 USD = 0.893 EUR

*Note: Rounded figures.

Overview

Luxembourg is a dynamic economy characterised by strong international interdependence, an attractive labour market and a large number of cross-border workers. Until the health crisis caused by COVID-19, it had experienced faster economic and demographic growth than the average of OECD countries. This goes hand in hand with high levels of consumption and growing mobility and infrastructure needs. The resulting environmental pressures are many and strong. In this context, the country is pursuing ambitious and cross-cutting environmental policies, with some objectives going beyond international and European commitments. It has a solid legal and institutional framework for conducting and coordinating its sustainable development policies, and has made significant progress in environmental matters over the last decade.

But the progress made is not sufficient to alleviate the ever-increasing pressures from economic development, urbanisation and road traffic, and to restore a natural environment conducive to biodiversity conservation. The coming years will be critical. To succeed in reorienting its economy towards a greener and more inclusive model, Luxembourg will need to accelerate the implementation of measures in favour of a low-carbon and circular economy, while at the same time relaunching its economy after the COVID-19 health crisis.

OPPORTUNITIES

- **Ambitious and cross-cutting environmental objectives**
- **A coherent sustainable development planning framework**
- **A solid legal framework and strong institutions**
- **Municipalities committed to climate and the environment**
- **Rising investment in environmental research and development**
- **Significant investments in public transport**
- **A financial centre well-equipped to develop green and sustainable finance.**

CHALLENGES

- **Strong and growing environmental pressures**
- **A declining biodiversity for more than forty years**
- **Growing needs for mobility and infrastructure**
- **A carbon-intensive economy still dependent on fossil fuels**
- **Mobility relying mainly on road transport**
- **A still limited use of economic instruments to achieve environmental objectives.**

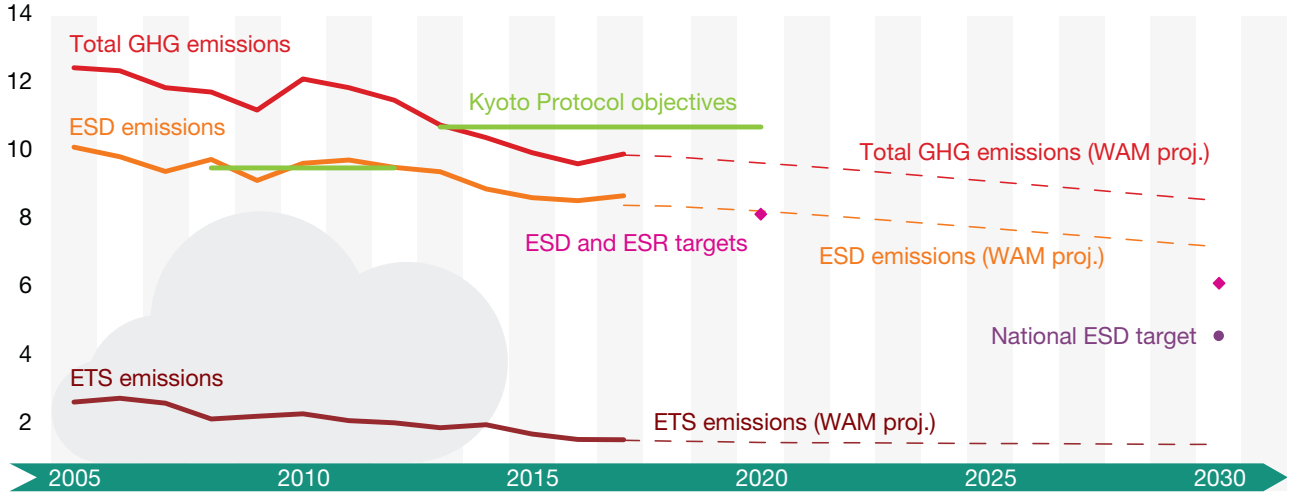
Environmental performance | **key trends**

Luxembourg has succeeded in reducing its energy consumption, greenhouse gas (GHG) emissions and atmospheric pollutants. It caught up on wastewater treatment and remained active in the field of waste and materials management. Despite everything, the Luxembourg economy is one of the most carbon intensive. Urbanization and agriculture are straining the country's natural heritage. The ecological quality of rivers and the risk of pollution from agricultural sources remain matters of concern. Luxembourg will have to redouble its efforts to meet future energy and climate objectives and respect European emission ceilings for certain air pollutants.

ACHIEVING ENERGY AND CLIMATE OBJECTIVES

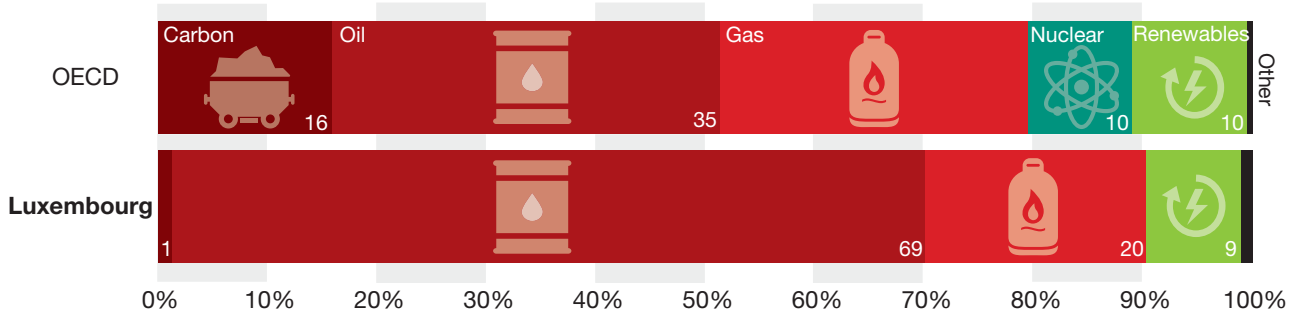
- Luxembourg's climate and energy policies are closely linked. Its climate objectives are ambitious and go beyond international and European commitments. A climate pact (see case study) offers municipalities the opportunity to play an active role in achieving these objectives and to implement measures for energy efficiency, sustainable mobility, air quality and circular economy.
- GHG emissions have decreased by 21% since 2005 due to increased use of lower-emitting fuels and lower sales of on-road fuels to non-residents (Figure 1). Energy intensity has decreased by 36% and the share of renewable energy in electricity generation has tripled to 71%.
- The use of renewable energy remains however below the OECD average. Luxembourg is one of the countries with the highest per capita GHG emissions in the OECD and the energy mix remains dependent on fossil fuels (Figure 2). The transport sector alone consumes 54% of energy (compared to 34% on average in the OECD).
- To achieve a 55% reduction in GHG emissions outside the European carbon market by 2030 compared to 2005 and to achieve climate neutrality by 2050, Luxembourg needs to strengthen the measures in favour of the climate and renewable energies. As the European carbon market covers only 15% of Luxembourg's emissions, efforts will have to focus on transport, the residential and commercial sector and agriculture.

Figure 1. **Additional efforts are necessary to achieve non-EU ETS targets,** Mt CO_2 eq



Notes : GHG emissions exclude emissions from land use, land use change and forestry (LULUCF). Dotted lines refer to national projections with additional measures (WAM). Reduction targets linked to the Effort Sharing Decision (ESD) and to the Effort Sharing Regulation (ESR) cover most sectors that are not part of the EU ETS, except the LULUCF sector and international maritime transports. *Sources :* Eurostat (2018), "ESD Emissions"; CDR (2018), "Projections"; EEA (2019), EU ETS Dataviewer; OECD, "Air and climate: Greenhouse gas emissions by source", OECD Environment Statistics (database); MDDI (2018), "Seventh National Communication of Luxembourg under the United Nations Framework Convention on Climate Change".

Figure 2. **Oil dominates Luxembourg's energy mix**

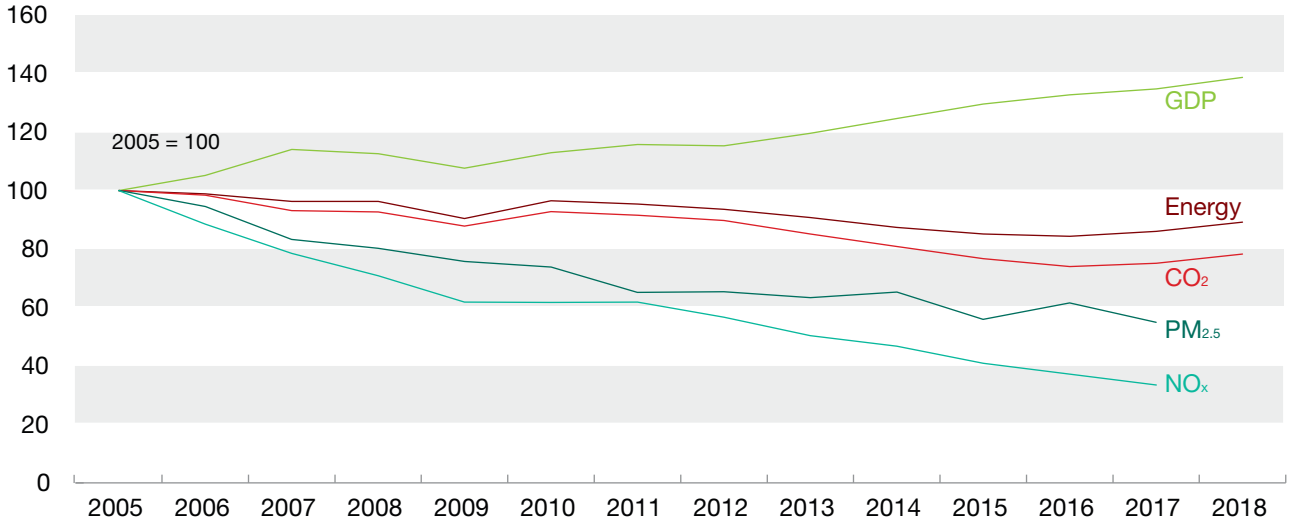


Note : Total primary energy supply excludes electricity trade.
Source : IEA (2019), "World energy statistics", IEA World Energy Statistics and Balances (database).

ACHIEVING AIR QUALITY OBJECTIVES

- Emissions of major local air pollutants have been decreasing since 2005 (Figure 3), revealing a decoupling from economic growth (-45% for $PM_{2.5}$; -67% for NO_x). This is largely due to reduced transport emissions, which have fallen much more than total emissions.
- Despite this progress, Luxembourg will have to redouble its efforts to comply with European emission ceilings for 2030, in particular those concerning NO_x, NMVOCs, fine particulates, and ammonia from agricultural sources.

Figure 3. **Progress in decoupling from economic growth**



Notes : GDP expressed at 2010 prices and purchasing power parities. Air pollutant estimates based on fuel sold. CO2: emissions from fuel combustion. Total primary energy supply (TPES) excludes electricity trade.
Sources : OECD (2020), OECD Environment Statistics (database); IEA (2019), "Detailed CO_2 estimates", IEA CO2 Emissions from Fuel Combustion Statistics (database); IEA (2019), "World energy statistics", IEA World Energy Statistics and Balances (database); OECD (2019), "Aggregate National Accounts, 2008 (or SNA 1993): Gross Domestic Product", OECD National Accounts Statistics (database).

Next steps | energy, climate and air

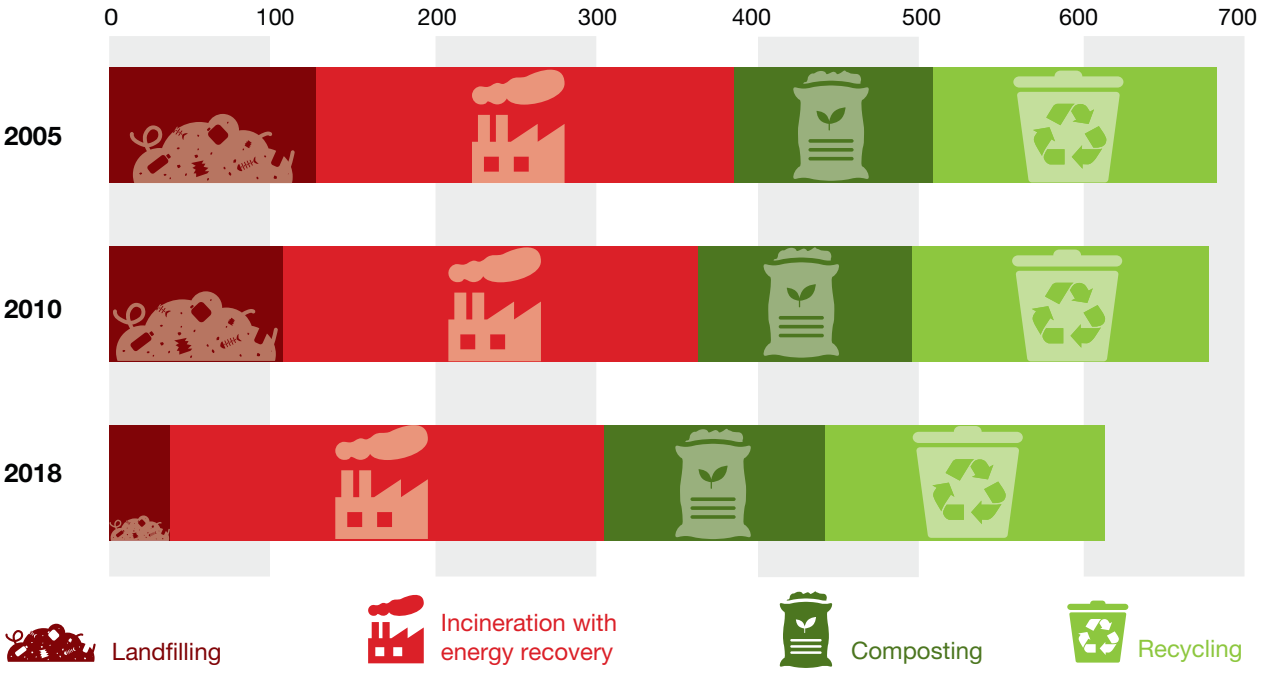
- Adopt the climate framework law and include the commitments of the Paris Agreement on financial flows and carbon pricing.
- Implement the climate change adaptation strategy and ensure that climate risks are taken into account in insurance products and in environmental impact assessment and strategic environmental assessment procedures.
- Establish scenarios for achieving the renewable energy and energy efficiency targets for 2030 without losing sight of air quality and climate objectives, and specify the contribution of each sector to these objectives, including transport.

Environmental performance | **key trends** *continued*

ACHIEVING WASTE AND MATERIALS MANAGEMENT OBJECTIVES

- The high standard of living, the daily presence of many cross-border workers and infrastructure development lead to high levels of material consumption and waste generation (Figure 4). The amount of materials consumed per capita [24 tonnes] is much higher than the OECD average [15 tonnes]. The amount of waste generated per capita is 3.5 times higher than the European Union average; construction waste represent 76% of all waste.
- Luxembourg encourages waste prevention and recovery, and the use of secondary raw materials. Material productivity is among the highest in the OECD: the country generates about USD 3 800 of economic wealth per tonne of materials consumed compared to the OECD average of USD 2 600.
- The Superdreckskëscht (SDK) system, which has enabled Luxembourg to be a leader in the management of problematic waste, continues to develop with actions to avoid food waste (see case study), enable separate collection in residential buildings and shopping centres, and support businesses in their transition to a circular economy.
- However, progress is slowing down. The recycling rate for municipal waste is stagnating at around 50%, revealing an unexploited recovery potential, particularly for organic materials and plastics. In order to successfully implement the "Luxembourg Zero Waste" strategy for a circular economy, additional efforts are needed.

Figure 4. **Waste recovery is growing faster than production,**
Kilograms per capita



Source : OECD (2020), OECD Environment Statistics (database).

ACHIEVING WATER MANAGEMENT OBJECTIVES

- Water resources are generally well managed and per capita withdrawals are below the OECD average. But Luxembourg will need to carefully monitor the evolution of water demand in the coming years. The natural groundwater recharge has been deficient in recent years, and population growth and the development of economic activities and irrigation in agriculture could increase water needs in the future.
- Luxembourg has caught up on its backlog in waste water treatment and has invested heavily since 2014. Today all residents are connected to a treatment plant; 77% benefit from advanced treatment of their wastewater, and it is planned to equip the country's main treatment plants with a fourth level of treatment by 2023, allowing the treatment of micropollutants and the elimination of micro-plastics.
- The ecological quality of surface water has improved since the previous OECD review, but still falls short of the results in other countries. Achievement of European targets has been delayed. This is due to poor hydro-morphological quality and high levels of nutrients from agriculture, delays in the implementation of water management plans and a lack of coherence between water and agricultural policies.

Next steps | waste, materials and water

- Better exploit the stock of materials in mixed municipal waste, further develop the extended producer responsibility regime and strengthen the use of economic incentive instruments.
- Implement the "Luxembourg Zero Waste" strategy for a circular economy by using synergies with the development of environmental technologies and green public procurement, and by enabling banks, enterprises and other stakeholders to coordinate their actions for a circular economy.
- Accelerate the implementation of measures to preserve and improve water quality, secure the supply of drinking water through a more rigorous preventive approach, and improve coherence between environmental and agricultural policies.

Environmental governance and management

Luxembourg has improved co-ordination on environmental issues between the central government and municipalities and has made significant progress on public participation and education. However, compliance promotion and monitoring need to be scaled up.

INSTITUTIONAL AND REGULATORY FRAMEWORK

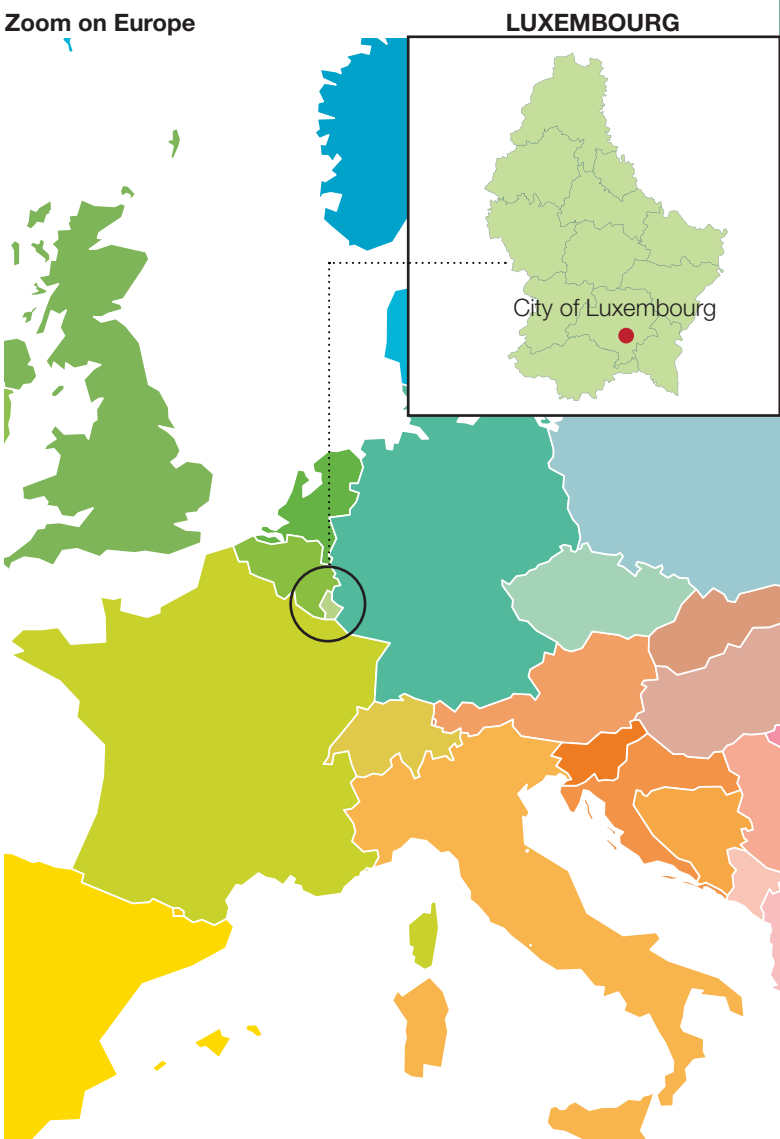
- The government supports communes with guidance and resources to implement green practices.
- A "sustainability check" is planned for all draft laws.
- Strategic environmental assessment (SEA) of policies and spatial plans is often superficial.

COMPLIANCE ASSURANCE

- Few inspections conducted due to shortage of resources.
- Administrative and criminal fines are too low to have a deterrent impact.
- There is no programme for remediation of contaminated sites.

ENVIRONMENTAL DEMOCRACY

- Public participation in environmental decision-making is widespread and effective.
- Major efforts are made to improve environmental and sustainable development education.
- Environmental information is not always easily accessible or user-friendly.



Next steps | governance

- Introduce environmental aspects into the assessment of draft laws and regulations.
- Ensure consistent application of SEA to all communal land-use plans.
- Enhance resources dedicated to compliance promotion and monitoring, expand proactive risk-based inspections.
- Adopt the draft law on soil protection and management of contaminated sites.
- Provide full public access to environmental information.

Case studies

HAFF RÉIMECH: SUCCESSFUL RESTORATION OF A NATURAL AREA

Formerly an area of gravel pits on the alluvial deposits of the Moselle and bordered by vineyards, the "Haff Réimech" site was restored and developed into a 100-hectare natural area with around forty ponds bordered by reed beds and swampy areas. Today it is the most important wetland in Luxembourg. It is home to 76% of the bird species observed in Luxembourg and provides a stopover for many migratory birds. Classified as a national nature reserve in 1998, Haff Réimech is part of the European Natura 2000 network and wetlands of international importance protected by the Ramsar Convention. Its visitor centre, the "Biodiversum", houses interactive exhibitions and raises awareness about biodiversity and sustainable development.

FREE PUBLIC TRANSPORT FOR A MORE SUSTAINABLE MOBILITY

As part of its sustainable mobility strategy, in March 2020 Luxembourg made public transport throughout the country completely free of charge for all users - including a large number of daily cross-border commuters. Free travel applies to all modes of transport on Luxembourg territory financed by the State, whether buses, trains or trams, including Luxembourg City buses. Only first-class seats continue to be charged for. This measure is financed by the government and the City of Luxembourg. It is seen as a catalyst to induce behavioural changes and a modal shift from private cars to public transport, but also as a social measure.

ECOPOINTS FOR MORE EFFICIENT ECOLOGICAL OFFSETS

The new ecological compensation system, adopted in 2018, is based on an assessment that gives a monetary value to ecological values. Measures to compensate for the ecological damage caused by a project are determined using ecological balances expressed in eco-points, the number of which depends on the biotope, habitat or type of land-use. An eco-point is worth 1 euro.

To meet their obligation to offset the impact of their projects on ecosystems, project owners pay a tax equivalent in euros to the ecological balance sheet of their project. This tax enables the State to finance actions to compensate for the eco-points lost in the biotope. In order to ensure ecological consistency between the actions carried out and to enable the compensation from several projects to be pooled, the compensation is made (in advance) in "compensation pools". These are land reserves created by the State, which carries out restoration and ecological improvement actions. These measures will then be allocated to projects requiring compensation. The environmental quality of the measures and their management must be ensured and monitored for 25 years.

THE CLIMATE PACT : STRENGTHENING THE ROLE OF MUNICIPALITIES

The Climate Pact, launched in 2012, is a cooperative agreement through which municipalities commit to act in favour of the climate and the environment by implementing an energy accounting system and carrying out projects related to energy efficiency, GHG emissions, air pollution, mobility and the circular economy. In return, the State provides technical assistance and financial support from the Environmental Protection Fund, including an annual flat-rate grant of EUR 10,000.

Depending on the number of implemented measures and the quality of their management, municipalities can obtain a "European Energy Award®" certification and receive an additional annual subsidy. This subsidy varies according to the level of their certification and the achievement of their GHG reduction targets. All 102 municipalities have signed the Pact and most of them are certified.

POST COVID RECOVERY MEASURES

In order to stimulate its economy affected by the COVID-19 crisis, Luxembourg has taken measures that represent direct expenditures of around 5% of GDP. The "Neistart Lëtzebuerg" programme (a new start for Luxembourg) aims at a sustainable and inclusive recovery of the economy and provides cyclical support to the most affected economic sectors. Its green stimulus measures encourage responsible consumption, energy-efficient renovation of buildings, investment in renewable energy and the transition to soft and sustainable mobility. Some of them reinforce measures of the National Energy-Climate Plan. A structural aid scheme has also been set up to stimulate sustainable business investment. It encourages companies, through higher investment aid than in normal times (up to 50% of eligible costs), to carry out economic development, digitalisation or environmental protection projects

AN ECO-BOX FOR PREVENTING FOOD WASTE

The Ecobox is a multi-purpose deposit system for food products. It consists of a recycled plastic container (available in participating restaurants), which allows you to take your meal with you in exchange for a deposit of 5 euros. After use, the Ecobox can be taken back to the restaurant to collect the deposit or in exchange for another Ecobox, professionally cleaned, and take away another meal. Defective Ecoboxes are exchanged free of charge.

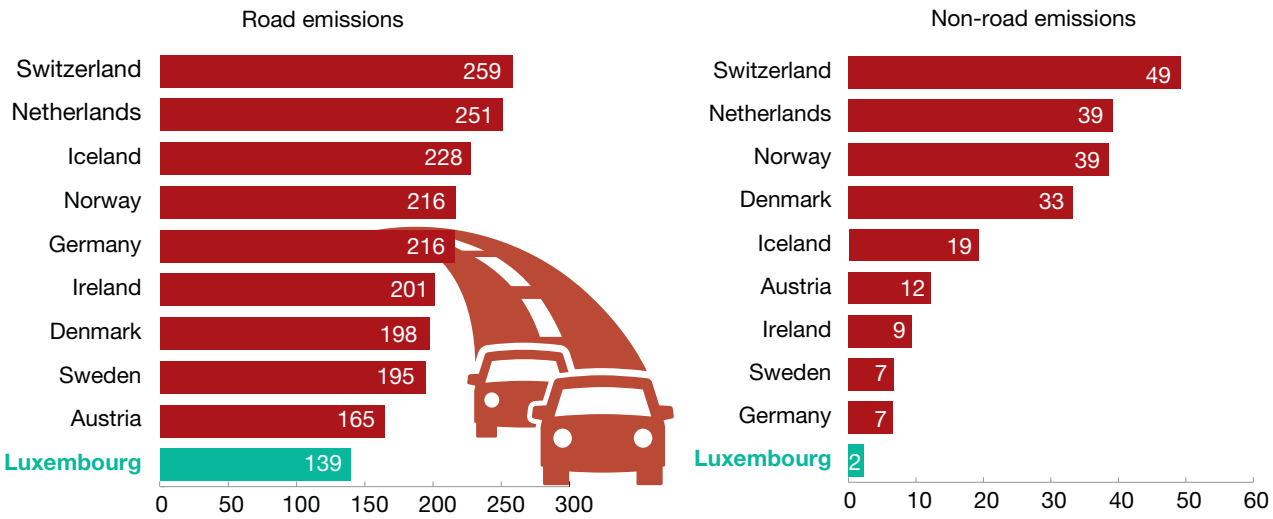
Green growth

Luxembourg authorities have committed to diversify the economy towards a greener and more inclusive model. This is one of the priorities of the 2019 National Plan for Sustainable Development and the ultimate goal of the 2016 *Third Industrial Revolution* report. However, ensuring policy coherence towards green growth and sustainable development remains a challenge, particularly with regards to fiscal, transport, housing and agriculture policies. To accelerate its transition towards a more diversified, low-carbon and circular economy, Luxembourg should convey strong and consistent price signals, remove potentially harmful incentives, further promote innovation and tap into its strong financial sector.

STRENGTHENING CARBON PRICING

- Energy taxes are the main way CO_2 emissions are priced in Luxembourg. However, tax rates are low and subject to several exemptions, especially in agriculture, electricity production and heating. Diesel is taxed less than petrol even though it is more polluting.
- Effective tax rates on CO_2 emissions are among the lowest in the OECD (Figure 5). They do not reflect climate damage of fuel use and provide little incentive to invest in low-carbon energy and mobility solutions.
- Tax rates on petrol and diesel are lower than in neighbouring countries. This encourages heavy goods vehicles in transit, daily cross-border commuters and residents in border regions to refuel in Luxembourg.
- Since 2019, Luxembourg is gradually increasing tax rates on fuels, especially diesel, to counteract increasing fuel sales and GHG emissions. Revenue from the tax hikes are allocated to low-carbon investment and social measures. However, the fuel tax gap with neighbouring countries remains.

Figure 5. **Effective tax rates on CO_2 emissions are low,** Euros per tonne of CO_2



Note : 2018 tax rates as applicable on 1 July 2018.
Source : OECD (2019), Taxing Energy Use 2019: Using Taxes for Climate Action.

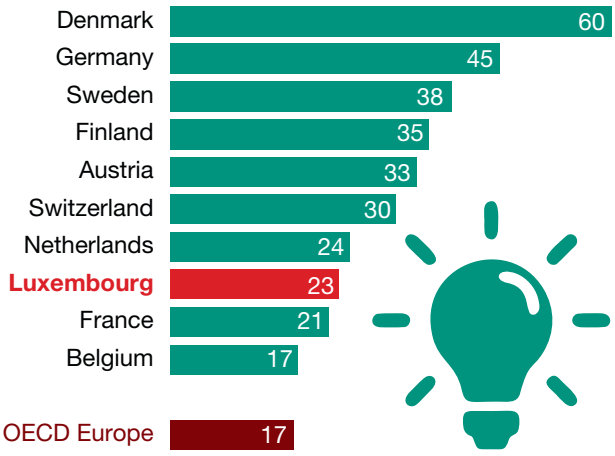
PROMOTING ECO-INNOVATION AND GREEN INVESTMENT

- Eco-innovation and the circular economy are integrated into innovation promotion programmes. Increased policy focus and public funding have helped Luxembourg become a European eco-innovation leader (Figure 6).
- However, the internal market for "green" technology, goods and services is small (2% of gross added value in 2008-16). Flagship initiatives such as PRIMe House, Clever akafen [Buy Smart] and the Climate Pact (see case study) have helped stimulate demand for cleaner products and technology, but low demand remains the main barrier to eco-innovation. There are no green public procurement targets and mandatory criteria.
- The government provides financial support to climate, water and environmental protection projects of local communities, companies and individuals. However, the environmental effectiveness of the supported projects is seldom assessed. Hence, there is a risk of using public funds to finance projects that provide little additional environmental benefits.

GREENING FINANCE

- Luxembourg has grown as a green finance centre since the first-ever green bond was listed on the Luxembourg Stock Exchange in 2007. The Luxembourg Green Exchange, established in 2016, was the first platform dedicated exclusively to green, social and sustainable securities. It lists half of the world's market of these bonds.
- The government is committed to implement the recommendations of the 2018 Luxembourg Sustainable Finance Roadmap and to develop a national green finance strategy.
- Several public-private green finance initiatives and partnership have emerged in recent years. Most focus on climate change mitigation. Other environmental issues (biodiversity, water, circular economy) deserve more attention.
- There is a lack of indicators and monitoring instruments to measure the actual environmental impact of investment funded through green finance instruments, ensure their credibility and avoid "greenwashing".
- The climate framework law provides an opportunity to enshrine in legislation the commitment under the Paris Agreement to make financial flows compatible with climate objectives.

Figure 6. **A large share of Luxembourg's inventions is environment-related,**
Number of environment-related inventions per capita, top OECD Europe countries



Notes : 2014-16 average. Higher value inventions that have sought patent protection in at least two jurisdictions (family size: two or more). Data are based on patent applications and refer to fractional counts of patents by inventor's country of residence and priority date.
Sources : OECD (2019), "Patent in environment-related technologies: Technology development by inventor country", OECD Environment Statistics (database).

Next steps | green growth

- Progressively raise tax rates on energy products in the framework of a broader fiscal reform; raise the diesel excise rate to match the petrol rate, and continue to gradually reduce the tax gap with neighbouring countries.
- Follow through on the plan to introduce carbon pricing outside the European carbon market and systematically monitor its effect on GHG emissions.
- Systematically assess subsidies and tax provisions and remove those that are environmentally harmful.
- Implement a clear policy on green public procurement based on mandatory environmental criteria and targets.
- Streamline, better target and evaluate public financial assistance for environment- and climate-related investment.
- Consider integrating the commitment under Article 2.1c of the Paris Agreement into the climate framework law.
- Extend the focus of green finance initiatives "beyond climate".
- Develop official statistics and indicators for green and sustainable finance to monitor the environmental impact of green finance products.

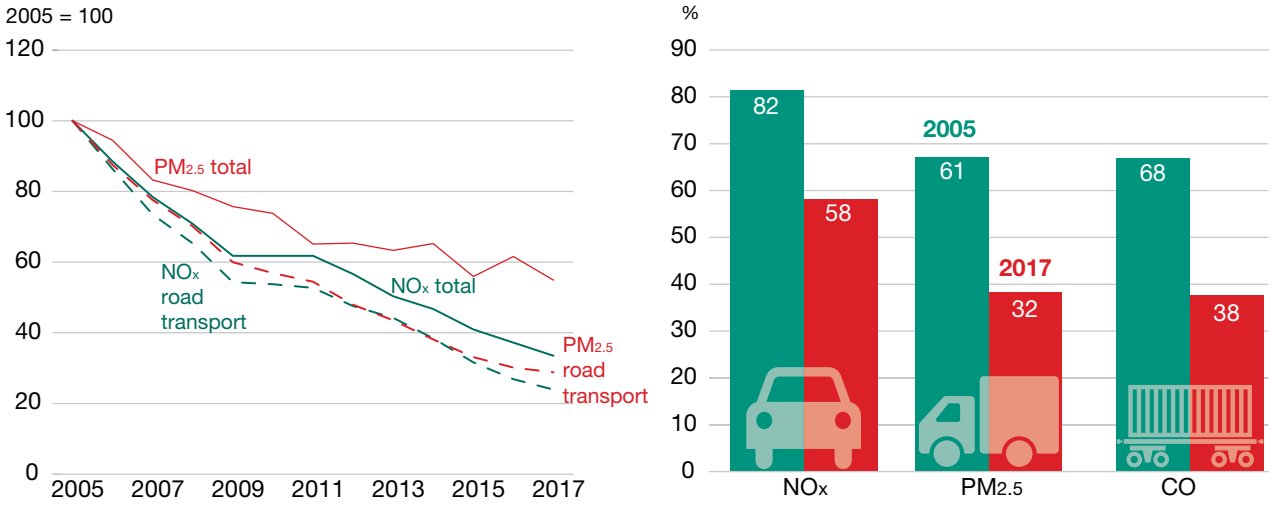
Air quality and mobility

Mobility is a major environmental and economic issue for Luxembourg. Situated at the heart of the main routes for the movement of goods and a pole of attraction for employment in the Greater Region, Luxembourg attracts every day a significant transit road traffic and more than 200 000 cross-border commuters . More than 44% of jobs are held by workers living in neighbouring countries. This comes with problems of road saturation and exacerbates air pollution. More than half of GHG emissions come from transport, which remains the country's largest energy consumer. The external costs of transport - the social costs of air pollution and the costs of climate change, habitat degradation, noise, accidents and congestion - are high.

IMPROVING AIR QUALITY

- The share of road transport in total emissions decreased significantly between 2005 and 2017. However, in 2017 road transport remained the largest source of NO_x (58%), $PM_{2.5}$ (32%) and CO (38%) emissions (Figure 7). A significant share of these emissions comes from non-residents.
- Air quality has generally improved. The average exposure of the population to fine particles ($PM_{2.5}$) has decreased by 17% since 2005. $PM_{2.5}$ concentrations have decreased and are at the limit of the guideline value of 10 micrograms/m³ recommended by the World Health Organization. Critical points remain in areas with heavy traffic where NO_2 concentrations can still exceed the annual limit value (Figure 8).
- Estimates indicate that exposure to fine particulate matter and ozone in ambient air causes about 150 premature deaths in Luxembourg, resulting in a welfare cost comparable to 2% of GDP in 2017.
- Further efforts are needed to eliminate the remaining black spots of local pollution, further reduce exposure to fine particles, and meet the emission ceilings by 2030.

Figure 7. **Emissions from transport have decreased but still represent a large share of total emissions**

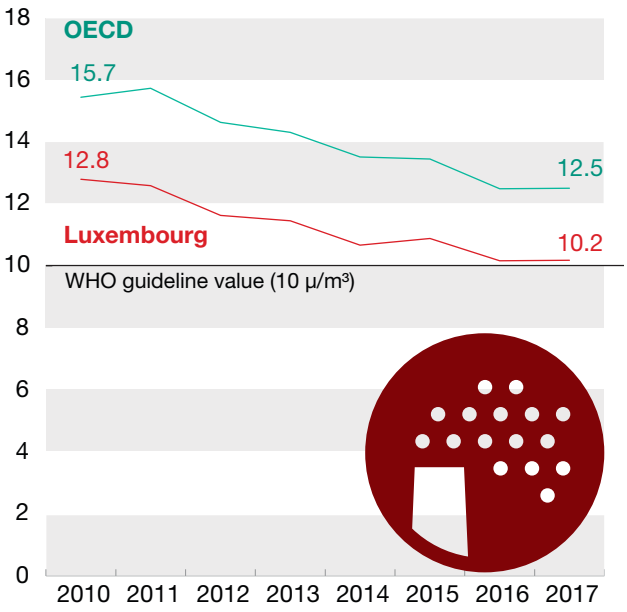


Note : Estimates based on fuel sold.
Source : OECD (2020), OECD Environment Statistics (database).

MAKING MOBILITY MORE SUSTAINABLE

- As in many countries, mobility in Luxembourg is dominated by road transport and the majority of personal trips are made by car. Car ownership is the highest in Europe (with more than 600 registered passenger cars per 1 000 inhabitants). The car fleet is relatively young but with an average engine capacity higher than in other countries.
- Per capita fuel sales in Luxembourg are several times higher than the OECD average. Around 70% of fuel is sold to foreign drivers who fill up their tanks in Luxembourg to take advantage of the traditionally favourable fuel taxes.
- To meet growing mobility needs while improving air quality, the updated 2018 Sustainable Mobility Strategy (Modu 2.0) sets ambitious and welcome targets. The aim is to rebalance the modal split and encourage active modes of travel (walking, cycling).
- Between 2015 and 2019, Luxembourg has invested around EUR 1.8 billion in public transport infrastructure and services: construction of a first tramway line; creation of new bus corridors; purchase of low-emission buses; increase in the number of park-and-ride facilities on the national territory and in border areas; new data systems to provide real-time information to passengers. The country has also invested in the creation of multimodal platforms and cycle paths.
- In March 2020, public transport became free of charge on the national territory in order to stimulate a modal shift from car travel to public transport and soft mobility (see case study).
- The purchase of electric vehicles benefits from financial incentives and a large network of charging stations is being deployed. The objective is to have a private car fleet with almost half of it being electric cars by 2030.
- To achieve its sustainable mobility objectives, the State will need to engage all actors - municipalities, employers, citizens - and cooperate effectively with neighbouring countries. It will also have to make full use of synergies between measures concerning transport, housing, spatial planning, air quality, climate and energy efficiency, and review the range of economic instruments that apply to transport (fuel taxes, vehicle subsidies and taxes, company car taxes, commuting allowances, road charges).

Figure 8. **Population exposure to particulates has decreased but remain above WHO guideline value**



Note : Average population exposure to ($PM_{2.5}$), µ/m³.
Source : OECD (2020), OECD Environment Statistics (database).

Next steps | air quality and mobility

- Take measures in all sectors to achieve the 2030 emission reduction objectives for major air pollutants.
- Promote increased coordination on spatial planning between ministries and between the national government and municipalities, to advance sustainable mobility.
- Evaluate within two to three years the experience gained from measures that encourage the use of public transport, car-pooling and active mobility, including the introduction of free public transport.
- Review the effectiveness of the mix of economic instruments that apply to transport and mobility.
- Invest sufficient resources in developing the systems necessary to obtain accurate, complete and up-to-date data for sustainable mobility planning.

Biodiversity

Despite its small size, Luxembourg has a varied biodiversity and landscape owing to a high degree of geological and microclimatic diversity. It pursues an active nature conservation policy, building on an appropriate institutional, legislative and financial framework. The country has made progress in key areas, but needs to intensify its actions to halt the decline in biodiversity that has been going on for more than forty years. Progress has been slow. Biodiversity conservation is still often considered in isolation and perceived as being in conflict with other activities. The true socio-economic and cultural value of natural capital is not sufficiently taken into account in decisions concerning the country's development. There have been delays in the adoption of the second National Nature Protection Plan (PNPN2) and in the implementation of action plans in the field or in the restoration of ecosystems. This has delayed the implementation of interventions to restore a natural environment conducive to biodiversity conservation.

PRESSURES ON BIODIVERSITY ARE NUMEROUS AND STRONG

- The conservation status of species and habitats is mostly unfavourable. Luxembourg is one of the European countries with the highest number of common species in decline. The decline of insects, which are at the base of the food chain and the survival of ecosystems, is worrying. There is also a continuous degradation of habitats rich in biodiversity: wetlands, dry meadows, orchards. The objective of the first PNPN to halt the decline in biodiversity was ambitious; it was not achieved (Figure 9).
- The main threats come from the homogenisation of natural environments, landscape degradation and soil artificialisation, associated with the intensification of agricultural practices, the development of transport infrastructures and urban sprawl. The built-up area has doubled since 1960. Today Luxembourg is the most highly fragmented country in Europe (Figure 10).

CONSERVING NATURAL HABITATS AND SPECIES

- Since the last OECD review, Luxembourg has progressed in the establishment of protected areas that currently cover half of the national territory, the restoration of ecological corridors, and the rehabilitation of degraded land. It has two wetlands of international importance on the Ramsar list, namely "Haff Réimech" in the municipality of Schengen (see case study), and the "Vallée de la Haute-Sûre", a cross-border area.
- Luxembourg completed its Natura 2000 network in 2018; it consists of 66 sites and covers 27% of the territory (compared to 18% on average in the EU). It includes 18 Special Protection Areas designated under the Birds Directive and 48 Sites of Community Importance designated under the Habitats Directive. The management plans are almost finalised with specific measures for the species and habitats concerned.
- The approach is mixed. It includes a contractual approach to compensate owners for their participation in the Natura 2000 programme, an administrative approach through the purchase or management of land of high ecological value, and a regulatory approach through the classification of certain areas as nature reserves.
- The observation and monitoring of ecosystems have been strengthened. Luxembourg does however not evaluate the effectiveness of protected areas and their impact on threatened species and biodiversity. Monitoring of the implementation of the PNPN is carried out at the national level by the Natural Environment Observatory.

IMPLEMENTING CONCRETE MEASURES TO CONSERVE BIODIVERSITY

- With the 2nd PNPN, Luxembourg has renewed its strategic framework and increased the budgets for its implementation. In 2018, it revised its ecological compensation system and introduced an eco-points system to quantify the ecological value of biotopes

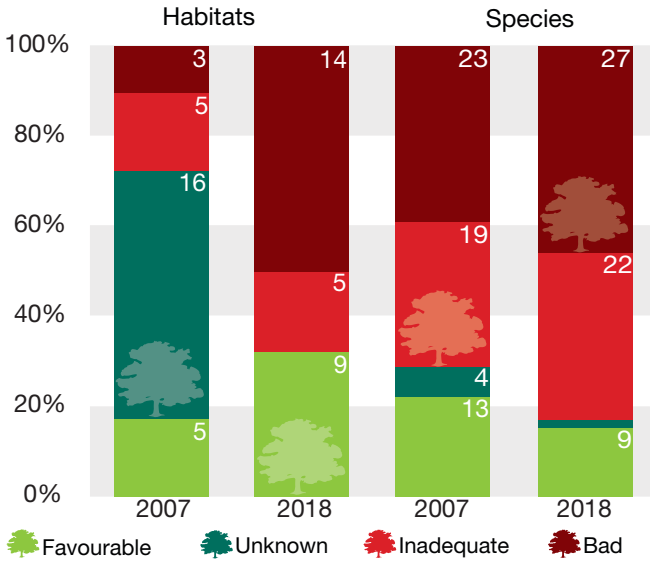
and natural habitats and calculate the financial compensation due for biodiversity losses caused by development projects. This system enables more targeted upstream compensation in line with the objectives of the PNPN2 via compensation pools (see case study).

- To manage Natura 2000 sites, Luxembourg is setting up regional steering committees, composed of representatives of various public and municipal institutions, and non-governmental and private organisations. These committees facilitate the implementation of conservation measures by coordinating the actions of local stakeholders with those of administrations and by encouraging good practices.
- The implementation of a Biodiversity PACT, inspired by the Climate PACT, should further make it possible to reward municipalities for their action in favour of biodiversity and natural habitats.
- Agriculture, which manages almost half of the national territory, has a high potential for nature conservation. Biodiversity contracts with farmers aim at the conservation and ecological management of land that is home to species or habitats of particular ecological interest. The environmental effectiveness of these contracts needs however to be strengthened. Luxembourg also encourages organic farming, which occupies a bit more 4% of the territory; the objective is to reach 20% by 2025.

MEETING THE CHALLENGES AHEAD

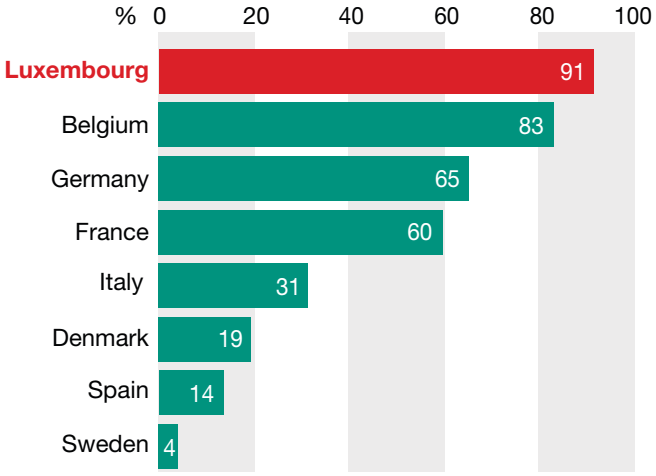
- In the coming years, the pressures on biodiversity are likely to increase further with the expected increase in the number of inhabitants and cross-border workers and the continued development of infrastructure. The trend of biodiversity decline is further exacerbated by climate change with the arrival of invasive alien species and the ever-increasing intensification of agriculture.
- To meet this challenge, Luxembourg will need to progress in three key areas: speed up the implementation of PNPN2 and initiate without delay the preparation of the third PNPN for 2022-27; complete the implementation of the management plans for Natura 2000 sites and endangered species; make the steering committees function effectively and provide them with adequate resources before the end of PNPN2.
- In a country like Luxembourg, where space is a scarce resource and where the preservation of natural areas and ecosystems is of great importance, the governance challenge is particularly great. Luxembourg will need ensure that biodiversity issues are fully integrated into agricultural, land use planning and other sectoral policies (climate, housing, transport, etc.) with good coordination between the national and local levels and a strong commitment from the municipalities.
- This will have to go hand in hand with a review of the costs and benefits of the various economic instruments used in biodiversity management and in sectoral activities that have an impact on biodiversity.

Figure 9. **The conservation status of habitats and species is far from favourable**



Note : These figures show the percentage of biogeographic assessments in each conservation status category for habitats and species. *Source:* EEA (2019), "Conservation status and trends", State of Nature in the EU: Article 17 national summary dashboards.

Figure 10. **Luxembourg is the most fragmented country in Europe,** selected EU countries, 2015



Note : Measured by areas with more than 50 landscape elements per 1 000 km² that are considered very strongly fragmented (based on a statistical distribution).
Source : EEA (2019), "Landscape fragmentation pressure and trends in Europe", Indicator Assessment.

Next steps | biodiversity

- Accelerate the implementation of concrete actions and quickly prepare the next PNPN with specific objectives, monitoring indicators and increased resources.
- Set up a programme to assess the socio-economic and cultural value of ecosystem services.
- Fully integrate biodiversity into sectoral policies and decisions concerning the country's development, and support the transition to organic agriculture and agro-ecology.
- Promote the application of an ecological compensation system in other countries, and make biodiversity a strategic focus of development assistance.

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CONTACTS

Head of Division: **Nathalie Girouard**
Nathalie.Girouard@oecd.org

Report Co-ordinator: **Myriam Linster**
Myriam.Linster@oecd.org

Communications: **Natasha Cline-Thomas**
Natasha.Cline-Thomas@oecd.org

Follow us on Twitter: @OECD_ENV

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