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Preface

On the shores of the Baltic Sea, Latvia has abundant water resources and hosts a rich biodiversity. Forests cover half its territory and underpin a buoyant wood-processing sector. Biomass is the country's main domestic energy source, placing Latvia among the leading OECD countries in renewable energy sources and helping to mitigate greenhouse gas (GHG) emissions.

Harmonisation with European Union environmental requirements as well as major investments have driven progress in many areas such as air, water and waste management. However, some environmental pressures are likely to increase with sustained economic growth. More work is needed to comply with the Paris Agreement climate goals. This includes improving energy efficiency, promoting sustainable transport and controlling GHG emissions from agriculture and land use.

This first OECD Environmental Performance Review of Latvia assesses the country's environmental progress since the mid-2000s and highlights Latvia's significant opportunities to advance towards a greener, low-carbon economy. The Review calls for stronger price signals, more eco-innovation and major investment in environment-related infrastructure and services. The analysis places particular emphasis on better managing waste and materials on the path towards a circular economy, as well as on enhancing biodiversity conservation and sustainable use.

Latvia overhauled its waste management systems in the 2000s, and has since progressed with recovery, recycling and diverting waste from landfills. Yet, landfilling continues and waste is not managed consistently with the goals of a circular economy. Waste generation is growing much faster than the economy, despite a declining population. Better use of economic instruments, such as a higher landfill tax and pay-as-you-throw waste fees, would encourage waste prevention, sorting and recycling. Greater efforts are also needed to raise awareness among businesses about the benefits of circular approaches and to expand recycling markets.

Like most OECD countries, Latvia could improve the mainstreaming of biodiversity considerations in sectoral policies. Agriculture and forestry deserve particular attention, as they play key economic and social roles but exert increasing pressures on ecosystems. The protected area network is extensive, but more resources are needed to ensure that protected areas are well managed and contribute to halting biodiversity loss. A majority of habitats and species are in unfavourable conditions. In this respect, Latvia should swiftly develop a national biodiversity strategy and extend the use of economic instruments for biodiversity management.

These are just some of the key messages from the 46 recommendations provided in this Environmental Performance Review. The Review is the result of a constructive policy dialogue between Latvia and the countries participating in the OECD Working Party on Environmental Performance. I am confident that this collaborative effort and the Review's recommendations will help Latvia consolidate its environmental achievements and implement better environmental policies for better lives.

Angel Gurría
Secretary-General
Organisation for Economic Co-operation and Development

Foreword

The principal aim of the OECD Environmental Performance Review programme is to help member and selected partner countries improve their individual and collective performance in environmental management by:

- helping countries assess progress in achieving their environmental goals
- promoting continuous policy dialogue and peer learning
- stimulating greater accountability from governments towards each other and public opinion.

This report reviews the environmental performance of Latvia for the first time since its accession to the OECD in 2016. Progress in achieving domestic objectives and international commitments provides the basis for assessing the country's environmental performance. Such objectives and commitments may be broad aims, qualitative goals or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of Latvia's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions and demographic trends.

The OECD is indebted to the government of Latvia for its co-operation in providing information, for the organisation of the review mission (15-19 October 2018), and for facilitating contacts both inside and outside government institutions.

Thanks are also due to the representatives of the two examining countries, Rasmus Boldsen (Denmark) and Merit Otsus (Estonia).

The authors of this report are Ivana Capozza, Myriam Linster, Eugene Mazur, Alexa Piccolo and Mikaela Rambali from the OECD Secretariat, under the co-ordination of Ivana Capozza. Nathalie Girouard provided oversight and guidance. Mauro Migotto provided statistical support, Jennifer Humbert provided administrative support and Rebecca Brite copy-edited the report. Natasha Cline-Thomas provided communications support. Preparation of this report also benefited from inputs and comments from several members of the OECD Secretariat, including Morvarid Bagherzadeh, Peter Börkey, Nils Axel Braathen, Nicola Brandt, Juan Casado Asensio, Nathalie Cliquot, Jeremy Faroi, Florens Flues, Andrés Fuentes Hutfilter, Katia Karousakis, Xavier Leflaive and Will Symes, as well as Andrew Prag of the International Energy Agency.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of Latvia at its meeting on 24 April 2019 in Paris, and approved the Assessment and recommendations.

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Signs

The following signs are used in figures and tables:

.. : not available

– : nil or negligible

. : decimal point

Country aggregates

OECD Europe: This zone includes all European member countries of the OECD, i.e. Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all member countries of the OECD, i.e. the countries of OECD Europe plus Australia, Canada, Chile, Israel*, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: Euro

In 2018, USD 1 = EUR 0.847

In 2017, USD 1 = EUR 0.887

Cut-off date

This report is based on information and data available up to 20 March 2019.

Disclaimer

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Abbreviations and acronyms

BAT	Best available techniques
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CDW	Construction and demolition waste
CHP	Combined heat and power
CSCC	Cross-Sectoral Coordination Centre
EAAI	Emission Allowance Auctioning Instrument
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environment Agency
EEZ	Exclusive economic zone
EGS	Environmental goods and services
EIA	Environmental impact assessment
EMDP	Electromobility Development Plan
EMFF	European Maritime and Fisheries Fund
ESB	Environment State Bureau
ETS	Emissions Trading System
EU	European Union
GDP	Gross domestic product
GHG	Greenhouse gas
GPP	Green public procurement
IPPU	Industrial processes and product use
IUCN	International Union for Conservation of Nature
LEGMC	Latvian Environment, Geology and Meteorology Centre
LEIF	Latvian Environmental Investment Fund
LEPF	Latvian Environmental Protection Fund
LULUCF	Land use, land-use change and forestry
MAES	Mapping and Assessment of Ecosystems and their Services
MEPRD	Ministry of Environmental Protection and Regional Development
MSFD	Marine Strategy Framework Directive
NCA	Nature Conservation Agency
NDP	National development plan
NMVOC	Non-methane volatile organic compound

NREAP	National Renewable Energy Action Plan
ODA	Official development assistance
PAYT	Pay-as-you-throw
PES	Payment for ecosystem services
PET	Polyethylene terephthalate
PM	Particulate matter
PRO	Producer responsibility organisation
RBMP	River basin management plan
RDP	Rural development plan
R&D	Research and development
REB	Regional Environmental Board
SAC	Special Area of Conservation
SCI	Site of Community Importance
SDG	Sustainable Development Goal
SEA	Strategic environmental assessment
SES	State Environmental Service
SMEs	Small and medium-sized enterprises
SPA	Special Protection Area
SPNT	Specially protected nature territory
SWMP	State Waste Management Plan
SWPP	State Waste Prevention Programme
TFC	Total final energy consumption
toe	tonne of oil equivalent
TPES	Total primary energy supply
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UWWFD	Urban Waste Water Framework Directive
VAT	Value added tax
VOCs	Volatile organic compound
WMR	Waste management region

Country acronyms

Country	Code
Australia	AUS
Austria	AUT
Belgium	BEL
Canada	CAN
Chile	CHL
Czech Republic	CZE
Denmark	DNK
Estonia	EST
European Union	EU
Finland	FIN
France	FRA
Germany	DEU
Greece	GRC
Hungary	HUN
Iceland	ISL
Ireland	IRL
Israel	ISR
Italy	ITA
Japan	JPN
Korea	KOR
Latvia	LVA
Luxembourg	LUX
Mexico	MEX
Netherlands	NLD
New Zealand	NZL
Norway	NOR
Poland	POL
Portugal	PRT
Slovak Republic	SVK
Slovenia	SVN
Spain	ESP
Sweden	SWE
Switzerland	CHE
Turkey	TUR
United Kingdom	GBR
United States	USA

Basic statistics of Latvia

2018 or latest available year (OECD values in parentheses)[a]

PEOPLE AND SOCIETY					
Population (million)	1.9	(1 300)	Population density per km²	29.9	(35.5)
Share of population by type of region:			Population compound annual growth rate, latest 5 years	-1.1	(0.6)
Predominantly urban (%)	51.6	(47.5)	Income inequality (Gini coefficient)	0.35	(0.32)
Intermediate (%)	26.5	(27.4)	Poverty rate (% of pop. with less than 50% median income)	74.7	(80.8)
Rural (%)	21.9	(25.1)	Life expectancy		
ECONOMY AND EXTERNAL ACCOUNTS					
Total GDP (National currency, billion)	29		Imports of goods and services (% of GDP)	59.2	(28.9)
Total GDP (USD, billion, current prices and PPPs)	59	(60 068)	Main exports (% of total merchandise exports)		
GDP compound annual real growth rate, latest 5 years	3.2	(2.3)	Wood and articles of wood; wood charcoal	18.2	
GDP per capita (1 000 USD current PPPs)	30.5	(46.2)	Electrical machinery and equipment and parts thereof;	10.2	
Value added shares (%)			Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	8.0	
Agriculture	3.9	(1.7)	Main imports (% of total merchandise imports)		
Industry including construction	22.4	(24.9)	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	11.7	
Services	73.7	(73.4)	Electrical machinery and equipment and parts thereof	10.2	
Exports of goods and services (% of GDP)	58.6	(29.4)	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	9.1	
GENERAL GOVERNMENT Percentage of GDP					
Expenditure	37.8	(40.4)	Education expenditure	5.4	(5.1)
Revenue	36.4	(38.1)	Health expenditure	3.7	(7.7)
Gross financial debt	48.0	(110.4)	Environment protection expenditure	0.5	(0.5)
Fiscal balance	-0.6	-(2.3)	Environmental taxes: (% of GDP)	3.8	(1.6)
			(% of total tax revenue)	12.6	(5.3)
LABOUR MARKET, SKILLS AND INNOVATION					
Unemployment rate (% of civilian labour force)	8.7	(5.8)	Patent applications in environment-related technologies (% of all technologies, average of latest 3 years [b]	13.2	(9.5)
Tertiary educational attainment of 25-64 year-olds (%)	33.9	(36.9)	Environmental management	8.0	(4.2)
Gross expenditure on R&D, % of GDP	0.5	(2.4)	Water-related adaptation technologies	0.0	(0.5)
			Climate change mitigation technologies	9.7	(7.1)
ENVIRONMENT					
Energy intensity: TPES per capita (toe/cap.)	2.4	(4.1)	Road vehicle stock (vehicles./100 inhabitants)	39.5	
TPES per GDP (toe/1 000 USD, 2010 PPPs)	0.1	(0.1)	Water stress (abstraction as % of available resources)	0.7	(9.7)
Renewables (% of TPES)	40.4	(10.2)	Water abstraction per capita (m³/cap./year)	114	(804)
Carbon intensity (energy-related CO_2):			Municipal waste per capita, (kg/capita)	436	(524)
Emissions per capita (t/cap.)	3.5	(9.0)	Material productivity (USD, 2010 PPPs/DMC, kg)	1.1	(2.4)
Emissions per GDP (t/1 000 USD, 010 PPP)	0.15	(0.24)	Land area (1 000 km²)	62	(34 476)
GHG intensity: [c]			% of arable land and permanent crops	20.8	(12.0)
Emissions per capita (t/cap.)	5.7	(12.0)	% of permanent meadows and pastures	10.2	(22.4)
Emissions per GDP (t/1 000 USD, 2010 PPP)	0.25	(0.31)	% of forest area	54.0	(31.4)
Mean population exposure to air pollution (PM_{25}), µg/m³	14.1	(12.5)	% of other land (built-up and other land)	15.0	(34.3)

a) Values earlier than 2013 are not taken into consideration. OECD value: where the OECD aggregate is not provided in the source database, a simple OECD average of the latest available data is calculated where data exist for a significant number of countries.
b) Higher-value inventions that have sought protection in at least two jurisdictions. Average of the latest 3 years.
c) Excluding emissions/removals from land use, land-use change and forestry.
Source: Calculations based on data extracted from databases of the OECD, IEA/OECD, EUROSTAT and the World Bank.

Executive summary

Latvia has come a long way in improving environmental management and outcomes

Latvia's environmental performance and the well-being of the population have improved considerably since the mid-2000s, in a context of sustained economic growth and declining population. Implementation of the European Union (EU) environmental acquis and major investment have been key drivers of progress. However, more needs to be done to ensure environmental convergence with more advanced OECD economies. Poverty, inequality and regional disparity remain high. The post-2020 development planning cycle provides an opportunity to better align environmental and economic development objectives.

But it needs to maintain efforts to meet long-term climate goals…

Emissions of greenhouse gases (GHGs) have decreased slightly since the mid-2000s, thanks to improved energy efficiency and increased use of renewables. Renewables now cover 40% of the country's energy needs, among the highest shares in the OECD. Wood-based biomass is the main domestic energy source, reflecting the abundance of forest resources. However, GHG emissions from agriculture grew to about a quarter of the total, and are expected to continue rising with growing agricultural production and nitrogen fertiliser use. Forests' GHG removal capacity has been declining with increased logging and forest ageing. Latvia will likely meet its 2020 GHG mitigation target. But meeting long-term climate goals consistent with the Paris Agreement will require full and timely implementation of planned measures in the energy, building, transport and industry sectors, as well as additional efforts in the agriculture and forestry sectors. Synergies and trade-offs between biomass use and policy objectives related to climate, air pollution, water, land use and biodiversity need to be assessed.

…and to consolidate its achievements in water and air management

Most people have access to good water and wastewater management services, although less so in rural areas. Water infrastructure is ageing and deteriorating, however. Wastewater discharges and diffuse pollution from agriculture exert increasing pressures on water bodies. Air pollution has declined considerably, but implementation of air pollution control measures should be strengthened, as close to 90% of the population is still exposed to levels of fine particulate matter ($PM_{2.5}$) higher than the World Health Organization guideline value.

Waste management and recovery have improved…

Latvia has fairly complete policy and legal frameworks for waste management. It has expanded infrastructure for recycling and for production of biogas and compost from waste, but prevention has received less attention. Improved separate collection, extended producer responsibility and a natural resource tax on recyclable materials and products helped raise the municipal waste recovery rate from virtually zero in 2000 to 30% in 2016 (or more if

accounting for biogas recovery from biodegradable waste). Low-value recovery and recycling remain common for some waste streams, however. There is room to improve waste collection and sorting, as well as effectiveness and transparency of extended producer responsibility systems. Integrating municipal separate collection systems and those managed by extended producer responsibility companies would yield significant efficiency gains.

…but more needs to be done to move towards a circular economy

To lay the foundation for a circular economy, Latvia needs to improve waste management, increase waste prevention and recycling, and strengthen economic instruments. In particular, there is room to further raise the landfill tax and municipal waste fees, and to implement pay-as-you-throw systems in major cities. Innovation policy and support to businesses should take circular economy objectives fully into account. Recycling markets could be strengthened through synergies with neighbouring countries. Enhanced co-operation across ministries and with stakeholders will be instrumental in improving performance, as will mechanisms to cascade national targets to the local level.

The extensive network of protected areas requires better management

The country enjoys abundant biodiversity. Its diverse ecosystems include forests (which cover about half the territory), grasslands, coastal areas and peatlands. Latvia exceeds the 2020 Aichi targets for protected areas, with more than 16% of marine waters and 18% of land area under some form of protection. However, most protected areas lack management plans and are chronically short of human and financial resources. A majority of habitats and species are in unfavourable condition due to land-use change, poor connectivity, agricultural expansion, intensive resource use and pollution. Latvia needs to complete its ecosystem mapping and develop a national biodiversity strategy to set a coherent policy framework, increase awareness and mobilise resources to meet its biodiversity policy objectives.

Biodiversity mainstreaming should be a priority, especially in forestry and agriculture

The forestry and agricultural sectors play a key role in Latvia's economy and exert increasing pressures on biodiversity. Around half of forests have sustainable management certification, near the OECD average but well below other forest-rich countries. The next forestry strategy should fully integrate biodiversity-related objectives and provide for sufficient resources. Organic farming reached 13.5% of total agricultural land in 2017, not far from the 2030 national target of 15%. But support to farmers is partly based on production volume; this can encourage overproduction, with a potentially negative environmental impact. Expanding use of economic and voluntary instruments would help improve sustainable use of forest resources and agricultural land outside protected areas.

The transition towards green growth calls for more effective compliance monitoring and enforcement,…

The regulatory framework has substantially improved, in line with EU environmental requirements. The public can easily take part in decisions affecting the environment and has wide access to environmental information. Latvia follows good international practice

in using standard environmental requirements (general binding rules) to license activities with low environmental impact. However, inspection planning, administrative enforcement and the liability regime could be improved. The number of environmental inspections has been declining since 2009, primarily due to resource shortages. Despite the introduction of risk-based inspection planning, detection of non-compliance has not improved. There are no clear criteria for determining a proportionate response to non-compliance cases, and average administrative fines are low.

…stronger price signals,…

A wide range of environmentally related taxes and charges generates revenue equal to 3.8% of GDP, among the highest levels in the OECD. Since 2015, the government has raised the rates of several such taxes and reformed vehicle taxation to take account of fuel economy. These are welcome steps. Yet rates remain generally too low to effectively encourage low-carbon investment and more efficient use of energy, materials and natural resources. Three-quarters of carbon dioxide emissions from fuel combustion face a low price signal or are not priced at all. Support to fossil fuel use remains high, which runs counter to energy saving objectives. Latvia should continue reducing tax exemptions and raising the energy and carbon tax rates; close the petrol/diesel tax gap; and improve vehicle taxation and road charging. This approach would also help raise revenue to finance Latvia's high spending needs while reducing the tax burden on low-income households. Targeted social benefits can help address any adverse impact of higher taxes and prices on vulnerable groups.

…major investment in sustainable transport and clean energy,…

Latvia has used EU funds effectively to improve buildings' thermal efficiency and transport, water and waste infrastructure. Nevertheless, investment needs remain high, especially to provide good quality services in sparsely populated areas. Latvia needs to upgrade its transport infrastructure and public transport services linking Riga to its sprawling surroundings. Despite progress, improving energy performance in the predominantly old housing stock and in manufacturing should be a priority. An overly generous support system fostered the use of biomass for electricity and heat generation, putting Latvia on track to reach its 2020 renewables target. However, the country would benefit from diversifying its renewables mix. To this end, it should adopt more efficient and transparent support measures, such as competitive tenders and procurement auctions. Overall, Latvia should enhance cost-effectiveness in public spending, reduce dependence on EU funds and streamline financial support for business environmental investment.

…and more eco-innovation

Investment in environment-related research and development (R&D) has grown in recent years, as has the market for environmental technology, goods and services. However, Latvia's R&D spending and innovation capacity are generally modest, and business environmental investment has declined. More needs to be done to stimulate demand for eco-friendly products and services, including through green public procurement, market incentives and awareness raising. Further investment in education and innovation would help diversify the economy towards goods and activities with higher technological content while reducing reliance on natural resource-intensive exports, such as wood and food products.

Assessment and recommendations

The Assessment and recommendations present the main findings of the OECD Environmental Performance Review of Latvia and identify 46 recommendations to help the country make further progress towards its environmental policy objectives and international commitments. The OECD Working Party on Environmental Performance reviewed and approved the Assessment and recommendations at its meeting on 24 April 2019.

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1. Environmental performance: Trends and recent developments

Latvia's small open economy has been continuously growing since 2010, after recovering from the global economic crisis. It has made progress on increasing per capita income and on other well-being indicators, although income levels are still well below those in many other OECD economies. Poverty and income inequality, regional disparities, and an ageing and declining population are holding back the process of catching up with more advanced economies.

The natural environment is a key economic asset, although Latvia has limited mineral and non-renewable resources. Agriculture, forestry and fishery account for a larger share of value added than in most other OECD Europe countries. Natural resource-intensive products (wood products and paper, agricultural and food products) account for 40% of merchandise exports. With more than half its territory covered in forests, Latvia is among the world's leading exporters of wood pellets, and woody biomass is its major domestic energy source. Its forests, wetlands and seaside are deeply rooted in its cultural identity and attract growing number of tourists every year.

Latvia made some progress in decoupling economic growth and environmental pressures such as greenhouse gas (GHG) emissions and most air pollutants. Implementing the European Union (EU) environmental acquis and EU-funded investment brought about improvement in environmental performance in areas such as residential energy efficiency, wastewater treatment and waste management. However, more needs to be done and there is a need to better align environmental and economic development objectives. Some environmental pressures are likely to persist with sustained economic growth and higher income levels. These include emissions of GHGs and air pollutants; material use and waste generation (Section 4); release of nutrients to the sea and pressures on habitats and species (Section 5).

The energy sector plays a key role in decarbonising Latvia's economy

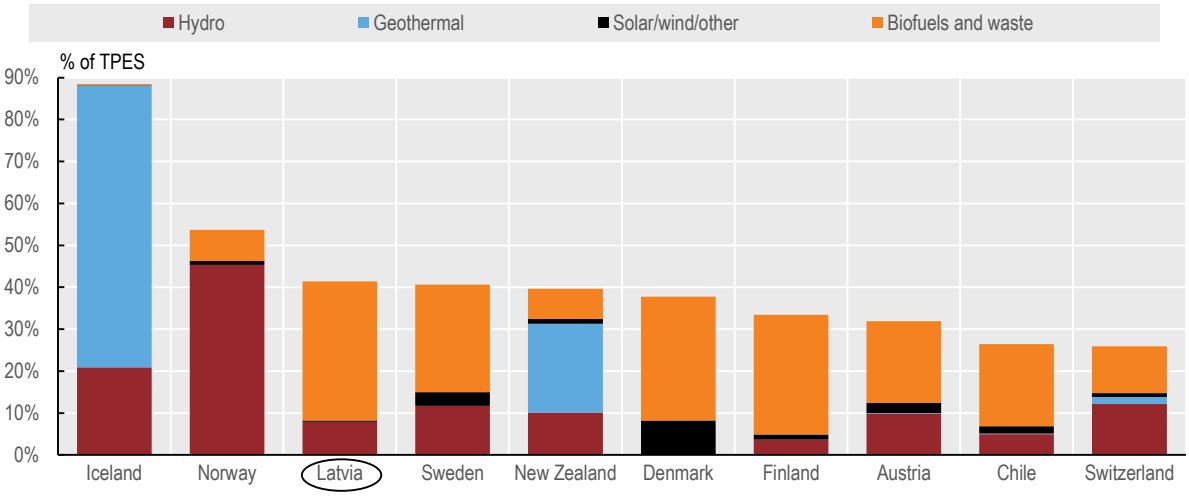
Renewables cover a large and growing share of Latvia's energy needs

Renewable energy sources account for 40% of the country's primary energy supply and more than half of electricity generation, on average – one of the highest shares in the OECD (Figure 1). Solid biofuels (wood pellets, wood chips, charcoal, wood waste and residue, and straw) are the main renewable source. They account for a third of the energy mix, the highest share in the EU. Hydropower is the other main renewable source and delivers most of the country's electricity. Wind and solar power generation remains negligible despite good potential (Lindroos et al., 2018). Fossil fuels, mostly natural gas and oil, cover the remaining energy needs.

The share of renewables in the energy mix has grown in the last decade. A generous feed-in tariff system has fostered the use of solid biofuels in combined heat and power (CHP) plants (Section 3). This has brought Latvia on track to reach its overall 2020 EU renewable energy target, and to exceed the indicative target in the heating and cooling sector. However, additional power generation is needed to meet the indicative renewable electricity target. Renewables cover less than 3% of transport fuel consumption, far from the EU 2020 target of 10% (Section 3). Given the current and expected increasing role of solid and liquid biofuels, Latvia should identify and assess synergies and trade-offs between further developing biofuel production and use and policy objectives related to climate, air pollution, water, land use and biodiversity.

Figure 1. Latvia is among the OECD leaders in the use of renewable energy sources

Proportion of renewable sources in primary energy supply, top 10 OECD countries, 2017



Note: Breakdown includes electricity trade.
Source: IEA (2019), *World Energy Statistics and Balances* (database).

StatLink http://dx.doi.org/10.1787/888933968822

Energy intensity has declined, but there is scope for large energy savings

Total final energy consumption decreased by 7% over 2005-16, despite sustained economic growth for most of the period. As a result, the final energy intensity of the economy declined, but remains above the OECD average. Latvia needs to tackle increasing energy consumption in agriculture, industry and transport, along with high energy use in buildings, to achieve the 2020 energy intensity and energy savings targets of the National Energy Efficiency Action Plan.

The residential sector is the main energy user, accounting for 30% of energy consumption, above the OECD average (Figure 2). Despite a decline in residential energy use, the building sector is still highly inefficient. Several barriers remain to investment in improving the energy performance of buildings; in addition, investment in improving industry energy efficiency is insufficient (Section 3).

Transport (road-based in particular) is the second largest energy user, the main source of GHG emissions and a major source of air pollutants (Figure 2). Latvia's vehicle fleet is largely above ten years old and diesel-fuelled, and new cars are carbon-intensive. The fleet is growing even as the population declines. The trend is linked to rising income levels combined with suburbanisation and the low density of rural areas, which prevent the development of efficient public transport services (Section 3).

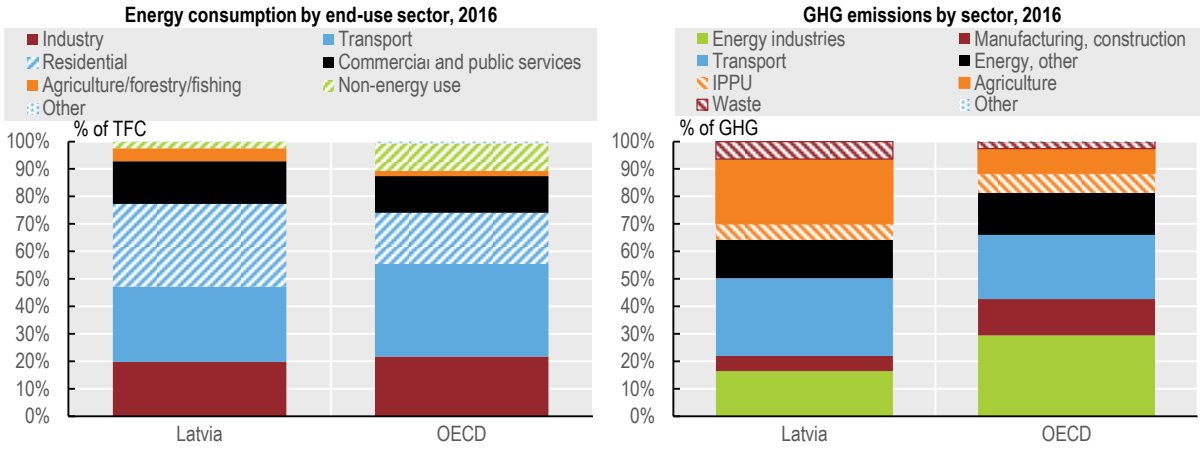
Latvia needs to maintain efforts to further curb GHG emissions

GHG emissions have been decoupled from economic growth

The GHG emission intensity of the Latvian economy has declined since 2010. It has remained well below the OECD average owing to a progressive switch from fossil fuels (mainly natural gas) to biomass for heat and power production, improved energy efficiency,

small industrial base and still relatively low incomes. After having broadly followed the economic cycle in the 2000s, GHG emissions declined in the early 2010s and have stabilised since 2013, despite sustained economic growth. Overall, total GHG emissions have decreased moderately, by 1.3%, since 2005.

Figure 2. Latvia has distinct energy use and GHG emission profiles



Note: TFC = total final consumption; GHG = greenhouse gas emissions; IPPU = industrial processes and product use.
Source: IEA (2019), *World Energy Statistics and Balances* (database); OECD (2019), "Air and climate: Greenhouse gas emissions by source", *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933968841

Therefore, Latvia is poised to meet its 2020 target under the EU Effort Sharing Decision of limiting the increase in GHG emissions to 17% of the 2005 level (Figure 3). The target covers emissions from sectors outside the EU Emissions Trading System (EU ETS), mostly from transport, agriculture, buildings, small industrial facilities and waste. The EU-wide cap-and-trade system covers only about a fifth of Latvia's emissions, i.e. from large power plants, most energy-intensive industrial installations and aviation. The small size of this share reflects Latvia's large share of emissions from transport (28%) and agriculture (24%), and lower-than-average shares of emissions from energy generation and industrial energy use (Figure 2). The result is that most of the country's mitigation efforts have to rely on domestic policies in the agriculture, residential and transport sectors.

Latvia needs to follow through on planned measures to meet long-term climate goals

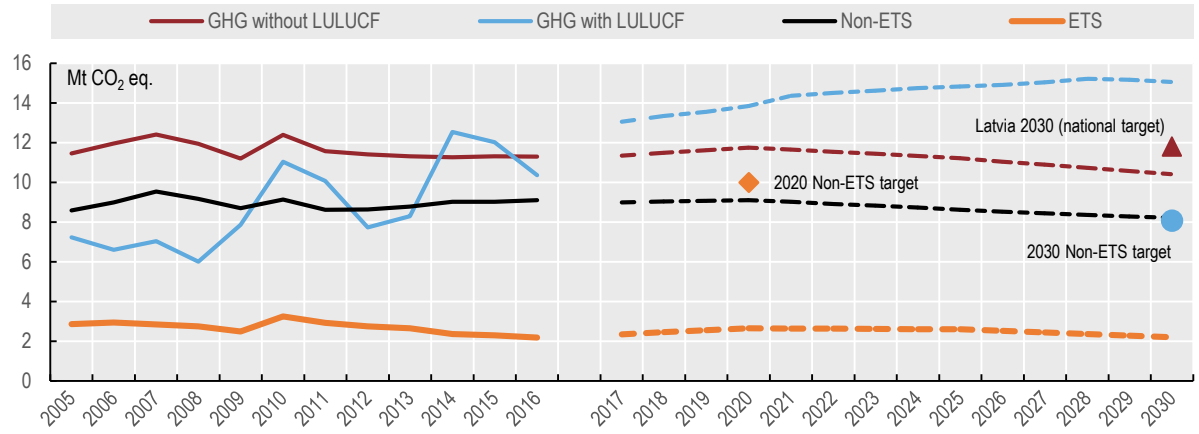
Projections show GHG emissions, excluding the land use, land-use change and forestry (LULUCF) sector, declining to 9% below the 2005 level by 2030. Emissions from power and heat generation, transport, and the residential and commercial sectors are projected to decrease. To realise the projections, it is essential for Latvia to fully implement planned measures to promote switching to renewables and improve the energy efficiency in buildings and industry. The adoption of cleaner vehicle technology and alternative transport fuels is expected to mitigate GHG emissions associated with increasing freight and passenger traffic (LEGMC and MEPRD, 2019).

However, emissions from agriculture are expected to continue rising with expansion of agricultural land, cultivation of organic soils, growing amounts of production and livestock,

and increased use of nitrogen fertilisers (LEGMC and MEPRD, 2019). Agriculture is projected to account for 30% of GHG emissions in 2030, with growth partially offsetting reductions in other non-EU ETS sectors. Overall, projections show non-EU ETS emissions decreasing by 4.4% by 2030 from 2005, and Latvia missing the 2030 target of a 6% cut in these emissions (Figure 3).

Figure 3. Latvia will likely meet its 2020 GHG mitigation target but not the 2030 target

GHG emission trends and projections towards targets



Note: Dotted lines refer to national projections with existing measures. Latvia 2030 (national target) refers to the target set in the Sustainable Development Strategy of Latvia 2030, requiring GHG emissions without LULUCF to be 45% below their 1990 level. The 2020 target allows emissions outside the scope of the EU ETS to be 17% higher than their 2005 level. The 2030 target requires non-ETS emissions to be 6% lower than their 2005 level, with flexibility through access to ETS allowances and credits from the land-use sector.
Source: MEPRD and LVGMC (2019), "National projections of greenhouse gas emissions and removals", submitted to the European Commission pursuant Commission Implementing Regulation (EU) No 749/2014 of 30 June 2014.

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With LULUCF, total GHG emissions are projected to more than double from the 2005 level by 2030 (Figure 3). The LULUCF sector's carbon sequestration capacity has declined markedly since 2005. The sector became a net GHG emitter in 2014 for the first time. Increased logging, forest ageing and conversion of grasslands into croplands will continue to reduce GHG removal capacity.

Latvia is preparing its National Energy and Climate Change Plan 2021-30, in line with EU requirements, and its Low Carbon Development Strategy 2050, as required by the Paris Agreement. The draft of the strategy, which is expected to be approved by the end of 2019, envisages reducing GHG emissions by 80% by 2050 from the 1990 level. The strategy should be integrated in a development planning framework covering the same time horizon (Section 3). Given the key economic and environmental roles of agriculture and forestry in Latvia, any climate change mitigation plan or strategy should include analysis of options for mitigating GHG emissions from these sectors, taking into account economic, social and environmental considerations. Options would include aligning price signals by removing implicit support measures to agriculture and to biomass production and use (Section 3). The long-term climate mitigation strategy should be based on a quantitative assessment of the climate mitigation and environmental benefits and impacts of using domestically produced biofuels, compared with those for other energy sources.

Planning for adaptation to climate change is at an early stage

Latvia is experiencing the impact of climate change, with higher mean annual temperature and increases in intensity and frequency of rainfall. Long-lasting periods of intense rainfall resulted in severe flooding events, such as in August-October 2017. In 2018, the government developed a draft plan for climate change adaptation up to 2030. Once it is adopted, its implementation will need to be closely monitored to ensure that actions are under way and can be adjusted as new information becomes available. Sectors identified as particularly vulnerable to climate change are biodiversity and ecosystem services; forestry and agriculture; tourism and landscape planning; health and welfare; building and infrastructure planning; and civil protection and emergency planning. In 2018, Latvia amended its legislation on environmental impact assessment (EIA) to require evaluation of the impact of climate change on development projects.

Air pollution has declined but its health impact persists

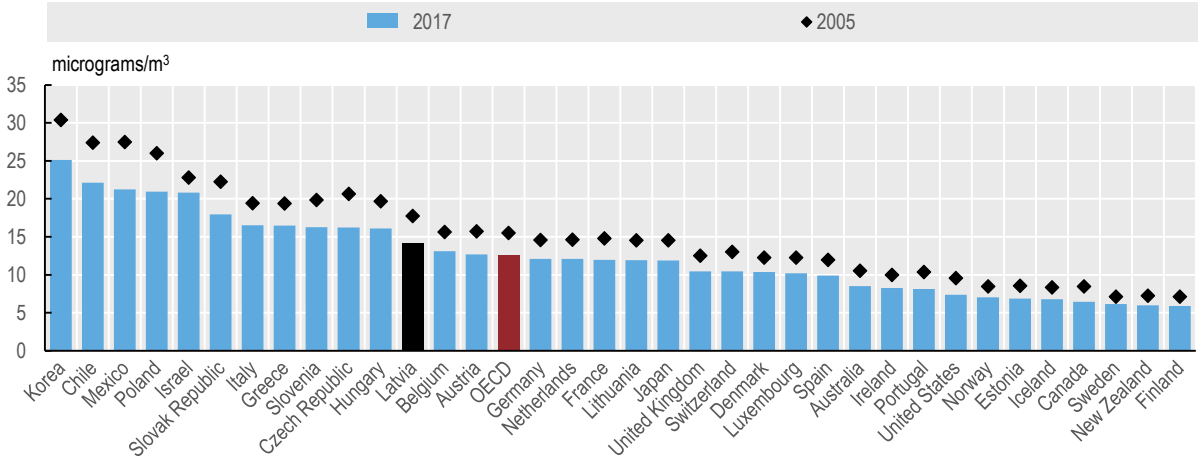
There has been an absolute decoupling of emissions of the main air pollutants from GDP growth since 2005. The decline in air emissions was driven by lower use of fuelwood in individual heating installations and strengthened vehicle standards. Latvia met its 2010 targets under the EU National Emission Ceilings Directive for sulphur oxides (SO_x), nitrogen oxides (NO_x), ammonia and non-methane volatile organic compounds. However, additional efforts will be needed to meet the 2020 and 2030 targets for NO_x and ammonia and the 2030 target for fine particulate matter ($PM_{2.5}$). Ammonia emissions have been rising with fertiliser use (OECD, 2019a). Strict enforcement of emission standards, increased use of best available techniques and higher tax rates on air emissions can help in meeting air emission targets (Section 3).

Air quality has improved over the past decade. Concentration levels of nitrogen dioxide and ozone are lower than in most other EU countries. Mean population exposure to $PM_{2.5}$ has declined, but Latvia's population is exposed to higher average concentrations of $PM_{2.5}$ than in most other OECD countries (Figure 4). Close to 90% of the population is exposed to $PM_{2.5}$ levels higher than the World Health Organization guideline value of 10 µg/m^3. Exceedances of the PM_{10} and NO_x limit values prompted the Riga municipality to implement several air quality action programmes, most recently for 2016-20, to address emissions from vehicle use and industrial activities. The air quality monitoring network needs to be extended and upgraded.

Latvia's population is vulnerable to the health impact of air pollution due to the compound effect of its relatively poor health status, ageing, the persistence of risk factors (e.g. smoking, alcohol consumption, obesity) and uneven access to good quality health care (OECD, 2016a). This mix of factors explains Latvia's high estimated mortality and welfare costs from exposure to outdoor $PM_{2.5}$, with an estimate of over 600 premature deaths per million inhabitants, more than double the OECD average. The welfare cost of $PM_{2.5}$ pollution has declined, but is still put at 6.9% of GDP, the second highest in the OECD (OECD, 2019b).

Figure 4. $PM_{2.5}$ concentrations are high by international comparison

Mean population exposure to $PM_{2.5}$, OECD countries, 2005 and 2017



Source: OECD (2019), "Air quality and health: Exposure to $PM_{2.5}$ fine particles - countries and regions", *OECD Environment Statistics* (database).

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There is room to further improve material productivity and waste recovery

Domestic material productivity (GDP per unit of domestic material consumption) improved by 29% over 2005-16, albeit from a low level; it is still less than half the OECD average. Biomass dominates the materials mix, reflecting the country's large wood processing sector and the use of biomass as an energy source.

Waste management is a challenge. The amount of waste generated more than doubled between 2004 and 2016, driven by economic development and insufficient incentive for prevention. Municipal waste generated per capita rose by 28%, though the recovery rate also grew, from 5% in 2005 to about 30% in 2016, or 45% if taking biodegradable waste recovery for biogas production into account. These developments benefitted from increased landfill charges, separate collection and extended producer responsibility programmes, and EU financial support. However, landfilling is still used more than in many other OECD countries (Section 4).

Stronger measures are needed within and outside protected areas

Forests, grasslands and wetlands, as well as agricultural land, are home to abundant biodiversity and ecosystems. To preserve its living standards, Latvia needs to significantly boost efforts to reduce pressures from intensive resource use, land-use change, fragmentation, pollution and agricultural expansion. Latvia surpasses the 2020 Aichi targets for terrestrial and marine protected areas, but the majority of habitats and species are in an unfavourable state. Developing and implementing additional management plans in protected areas, combined with adequate options to conserve biodiversity outside protected areas, could be an effective way to halt biodiversity loss (Section 5).

More efforts are urgently needed to achieve good environmental status under the Marine Strategy Framework Directive. Latvian marine waters are affected by nutrient pollution and eutrophication, discharges of hazardous substances, invasive species and marine litter

(EC, 2017a; EC, 2019), which all put pressure on marine biodiversity. Some commercial fish stocks in the Baltic Sea have declined or are depleted (Section 5).

Water services have improved but pressures on water bodies are high

Although water resources are abundant, their quality is threatened

Latvia has considerable water resources and low and declining levels of water abstraction per capita. It has river basin management plans (RBMPs) for its four river basin districts (Daugava, Lielupe, Venta and Gauja). The second cycle RBMPs show the ecological status of water bodies to be below the EU average.[1] Only about 20% of identified surface water bodies have high or good ecological status, and about 20% have poor or bad status. The chemical status of most surface water bodies is still unknown.

Diffuse pollution from agriculture, point-source pollution and morphological alterations are the main pressures on water bodies. The growing use of nitrogen fertilisers has resulted in an increased nitrogen surplus (although from relatively low levels), potentially affecting water and soil quality.

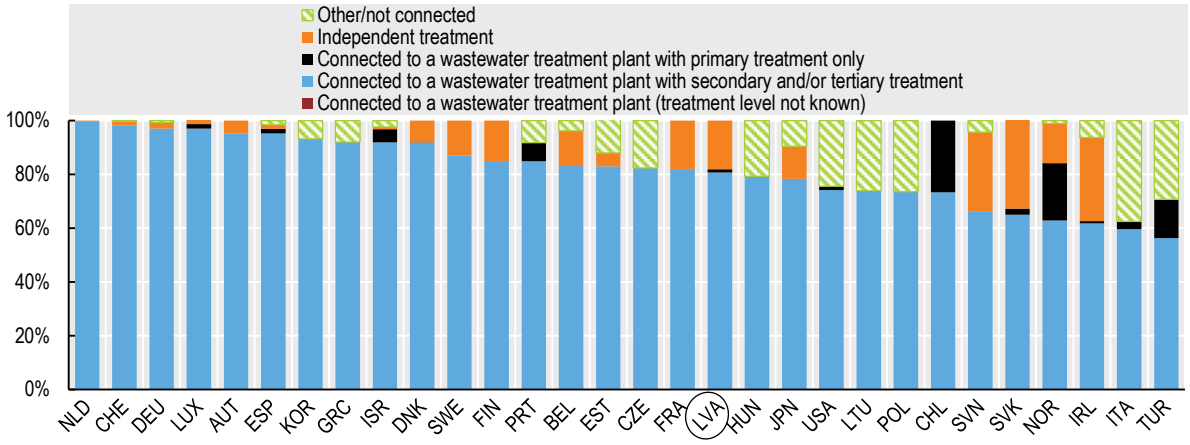
More people have access to good water services

Public investment, largely EU-funded, has helped improve water infrastructure and widen access to water and wastewater management services. The share of population connected to a wastewater treatment plant reached nearly 82% in 2017, mostly with tertiary treatment. The connection rate is below many other OECD countries (Figure 5) due to the high cost of connecting sparsely populated areas to the network, reducing tariff affordability. Latvia has achieved good compliance under the EU Urban Waste Water Framework Directive, which helped improve bathing water quality: nearly all bathing waters are of excellent or good quality. However, part of wastewater in 14 agglomerations is treated through individual systems potentially inappropriate for environmental protection (EC, 2019). Large quantities of sludge are disposed of at temporary storage sites.

The quality of drinking water has generally improved over time, but varies depending on whether it is from large or small water supply zones. The 30 large water supply zones, covering about 60% of the population, reached a very high level of compliance with all parameters in the EU Drinking Water Directive. Small water supplies have lower rates of compliance with chemical parameters, due largely to natural high iron concentrations and the high investment cost for removing iron.

Figure 5. Most of the population has access to advanced wastewater treatment

Percentage of population connected to public wastewater treatment, OECD countries, 2017



Note: Preliminary data. 2017 or latest available year (no earlier than 2013). Data for Latvia refer to 2017. The category "other" includes connected without treatment, not connected or independent treatment (where there is no data for independent treatment).
Source: OECD (2019), "Water: Wastewater treatment", *OECD Environment Statistics* (database).

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Box 1. Recommendations on climate, air and water management

Mitigating climate change and adapting to its impact

- Ensure that any new climate mitigation strategy is consistent with a cost-effective pathway towards being a net zero GHG emission country by 2050; guide this transition with a plan that identifies the expected contribution of each economic sector to domestic emission mitigation and lays out gradually stricter targets.
- Improve the knowledge base on available mitigation options, especially in the agriculture and forestry sectors, along with their costs and trade-offs, building on sound socio-economic and environmental indicators; assess and quantify the climate mitigation and environmental benefits and impact of using domestically produced biofuels, comparing them with those of other energy sources.
- Adopt the draft national plan for climate change adaptation to 2030 and monitor its implementation; ensure compliance with the legislative requirement of considering climate change impact and resilience in EIA procedures; assist municipalities in integrating climate change adaptation in their land-use and development plans.

Improving air quality

- Improve and extend the air quality monitoring network; promote adoption of best available techniques in the household, transport, industry and energy sectors and thoroughly enforce compliance with emission standards; integrate air quality objectives and measures in climate, energy, transport, agriculture and tax policies and plans, with a view to reducing emissions from $PM_{2.5}$, NO_X and ammonia.

- Strengthen implementation of the current air quality action programme in the Riga metropolitan area to reduce emissions from vehicles, industrial facilities and households; update the programme to introduce additional measures for the post-2020 period; consider establishing low-emission zones while ensuring adequate public transport services.

Ensuring good water quality and services

- Improve monitoring and evaluation of the quality of water bodies; identify environmental pressures and possible risks.
- Reduce diffuse water pollution from agriculture through a combination of measures: regulatory (e.g. technology, performance standards), economic (e.g. taxes on fertilisers and pesticides) and voluntary (e.g. awareness-raising initiatives, training).
- Complement EU funds with national public and private investment to upgrade wastewater treatment and water supply infrastructure; ensure that independent wastewater treatment systems comply with environmental regulations; improve small-scale water supply systems (e.g. wells) to extend access to good quality drinking water.
- Undertake a feasibility study to assess cost-effectiveness of alternative sludge reuse or disposal options and prepare to implement the best solution.

2. Environmental governance and management

Latvia has a centralised system of environmental governance, with stable institutions and a strong emphasis on public participation. The regulatory framework has been reinforced through alignment of the country's environmental legislation with EU directives. However, the adoption of good practices for implementing environmental law has been uneven, with significant room for improvement in compliance assurance. Co-ordination across the central government is insufficient for adequate integration of environmental considerations into sectoral policies or for implementation of cross-sectoral policies, such as those concerning transition to a circular economy.

Institutional stability is adequate but effective co-ordination lacking

The majority of environmental policy and regulatory powers is in the hands of the Ministry of Environmental Protection and Regional Development (MEPRD) and its subordinate institutions. Institutional stability since 2011 has contributed to the higher quality of human resources of environmental authorities. However, their financial resources and staff continue to be below the levels of 2007, before the recession and related budget cuts. The Ministry of Economy plays a key role in the energy sector, and the Ministry of Agriculture in forestry and fisheries.

Data are shared through multilateral or bilateral co-operation agreements between public authorities (EC, 2017a). The Cross-Sectoral Co-ordination Centre under the Prime Minister's Office oversees implementation of the sustainable development strategy and national development plan and promotes coherence among sectoral policies. It is largely advisory, however; its opinions may be discussed by the cabinet but are not binding. This

is insufficient to ensure good inter-ministerial co-ordination on environment-related policies.

Local governments are responsible for land-use planning and environmental services. Vertical coherence of local spatial and development planning with national and regional planning documents is required by law, but local implementation is often inconsistent with national policy objectives. Local plans follow regulatory environmental requirements but appear to be dominated by development priorities and are not directly affected by municipal sustainable development strategies.

Regulatory requirements have improved but need better impact assessment

Latvia has firm constitutional guarantees in the environmental domain. Strategic environmental assessment is conducted for all planning documents in relevant sectors. Yet assessment quality is uneven due to a shortage of competent experts. Regulatory impact assessment (RIA) is supposed to consider the environmental impact of draft laws and regulations, but does so only superficially and does not involve appropriate cost-benefit analysis. Latvia ranks last in the OECD on RIA quality (OECD, 2018a). Post-implementation reviews are mandatory for plans and expected to be introduced for regulations once the relevant methodology is approved (OECD, 2018b).

Harmonisation with EU requirements on environment has substantially improved the regulatory framework, particularly in waste management and nature protection. The EIA process is well developed; EIA conclusions are considered in permit determination. Latvia follows good international practice in using general binding rules for several industrial sectors and cross-sectoral activities with low environmental impact.

Compliance monitoring, enforcement and damage remediation need to be strengthened

Latvia has been slow to adopt good international practices in compliance assurance. This is particularly true with regard to inspection planning, administrative enforcement and liability, where good international practices co-exist with historical approaches common in Eastern European countries. Further reforms in these areas are needed to achieve greater coherence and effectiveness of policy implementation.

The number of inspections for all categories of installations has been declining since 2009, primarily due to resource shortages. Despite the introduction of risk-based planning, a good international practice, detection of non-compliance did not improve. The State Environmental Service (SES), Latvia's enforcement authority, has not published any criteria for determining a proportionate response to various types of non-compliance behaviour. There are no specific criteria for levels of administrative fines. The fines do not reflect the economic benefit the offender receives from non-compliance behaviour – a common shortcoming in most OECD countries. Average fines are low, and only 80% of fines imposed on enterprises are paid voluntarily or after a first warning – a rather low collection rate by international standards. Criminal enforcement focuses primarily on nature conservation offences. The SES does not collect data by which to evaluate enforcement tools' effectiveness (EC, 2017a).

Latvia's regime of liability for current damage to the environment incorporates remediation-focused provisions required by EU legislation, which include procedures for detection and remediation of environmental damage. When remediation is impossible, Latvia requires monetary compensation, calculated according to fixed rates per pollutant

or damaged species. The revenue goes to the state budget but is usually not spent on restoring the environment. As the use of financial guarantees against environmental damage is voluntary and very limited, there is a significant burden on the state for environmental remediation in case the responsible party is insolvent. Cleanup of pre-1990 contaminated sites is also a challenge for the government: it is proceeding slowly and relies heavily on donor funding.

The country is making some progress in promoting voluntary compliance and green business practices. For example, the annual number of new certifications to the ISO 14001 environmental management system standard grew more than ninefold over 2007-17 despite a lack of government incentives. However, compliance promotion by Regional Environmental Boards, voluntary agreements with industry and recognition of environmental excellence remain sporadic. Latvia assigns priority to green public procurement but has relatively modest near-term targets for the share of green purchasing in total public procurement (Section 3).

There is a high degree of public openness but insufficient awareness raising

Latvia ranks second on the 70-country Environmental Democracy Index (WRI, 2019). It gives the public broad opportunities to take part at an early stage in most decisions affecting the environment. The MEPRD has established multiple consultative bodies to engage professional associations, non-government organisations, businesses and academia in various policy areas. However, the general public does not actively participate in local environment-related decisions. This is due in part to insufficient awareness raising beyond formal education curricula.

The public has practically unrestricted access to environmental information. There are information systems for environmental quality data, permits, land-use planning and biodiversity conservation, as well as a pollutant release and transfer register, all open to the public. However, user-friendliness of environmental information could be improved.

Rules for appealing environmental decisions are often more favourable to the public than general administrative appeal procedures (European e-Justice Portal, 2018). Judges receive environmental training. Administrative courts are extensively used to review EIA results and environmental permits. However, appeal procedures can be quite lengthy.

Box 2. Recommendations on environmental governance and management

Strengthening the institutional and regulatory framework

- Reinforce the role of the Cross-Sectoral Co-ordination Centre in inter-ministerial collaboration to promote coherence of sectoral policies with the country's sustainable development objectives; enhance the central government's oversight of municipal land-use planning and environmental service delivery.
- Strengthen environmental aspects of regulatory impact assessment; ensure that environmental and social costs of proposed laws and regulations are appropriately quantified; enhance the use of *ex post* regulatory and policy evaluation.

Improving enforcement and compliance

- Expand the use of risk-based planning of environmental inspections to improve detection and deterrence of non-compliance.

- Reform the system of enforcement sanctions by adopting sound methodology for determination of administrative fines, based on the gravity of the offence and economic benefit of non-compliance; develop an enforcement policy with clear guidance on proportionate use of administrative and criminal sanctions and evaluate their effectiveness.
- Facilitate full implementation of environmental liability regulations to ensure remediation of damage to the environment at the expense of the responsible party; require financial guarantees for potential environmental damage from hazardous activities.
- Accelerate the cleanup of old contaminated sites by securing adequate financial resources.
- Enhance efforts to promote environmental compliance and green business practices by using information-based tools and regulatory incentives as well as by expanding green public procurement; support voluntary business initiatives.

Enhancing environmental democracy

- Expand environmental awareness raising and adult education, and more actively engage the general public in local environmental decision making.

3. Towards green growth

Latvia is on a good pathway towards reaching many of the Sustainable Development Goals (SDGs) (OECD, 2019c). It has significant opportunities to accelerate the transition towards a low-carbon, greener and more inclusive economy, especially by investing in energy efficiency, renewables, sustainable forestry and sound waste and material management. To seize these opportunities, it should make better use of economic instruments, remove potentially perverse incentives and improve the quality of its environment-related infrastructure and services. At the same time, Latvia should tackle poverty and regional disparities, as well as invest in education, research and innovation. This will help the country further diversify its exports towards products and services with higher technological content and value added.

Latvia has a comprehensive framework for sustainable development

Latvia has legislation envisaging vertically and horizontally co-ordinated development planning documents with a 2030 horizon. The Sustainable Development Strategy of Latvia 2030 (Latvia 2030) is the highest-level and longest-term development plan, and it is broadly consistent with the SDGs. The seven-year national development plans (NDPs) include main policy objectives, outcome indicators and indicative financing for most sectors of the economy. Latvia is also working on a Low-Carbon Development Strategy 2050. However, it is not always clear how Latvia 2030 and the NDPs ensure coherence among policies. There is scope for further integrating environmental objectives in sectoral policies, and the post-2020 planning cycle provides an opportunity to do so. The law-enshrined 2030 horizon is too short to allow for the radical economic and societal changes implied by the Paris Agreement and the EU long-term climate ambition.

There is scope to further green the system of taxes, charges and subsidies

Environmentally related taxes generate high revenue but their effectiveness is limited

Latvia has long applied a wide range of environmentally related taxes and charges. Since 2015, the government has raised energy taxes and the natural resource tax, removed or reduced some tax exemptions and reformed vehicle taxation. These are all welcome steps. In 2016, revenue from environmentally related taxes accounted for 12.6% of total tax revenue and 3.8% of GDP. While well above the respective OECD averages, these shares are not an indicator of tax effectiveness. Overall, environmentally related taxes have delivered few tangible environmental outcomes (Jurušs and Brizga, 2017). Latvia needs to raise more revenue to finance its high spending needs (including for infrastructure investment, education and health), while at the same time further reducing the tax burden on low-income households (OECD, 2019d). Expanding the use of environmentally related taxes could help achieve both goals, in addition to their main objective of encouraging more efficient use of energy, materials and natural resources.

The carbon price signal is weak

Latvia puts a price on CO_2 emissions via energy taxes, a carbon tax and participation in the EU ETS. The trading system covers only about 20% of Latvia's emissions, due to the country's economic structure and biomass-based energy mix (Section 1). It has had limited effect in promoting low-carbon investment, given the surplus of emission allowances, free allocations to the manufacturing sector (in accordance with EU regulations) and low carbon prices in the market. The carbon tax applies to CO_2 emissions of stationary facilities outside the scope of the EU ETS (i.e. small heating, industrial and commercial facilities). In 2017, the government raised the carbon and energy tax rates as part of a broader tax reform. However, the rates do not fully reflect the estimated environmental cost of energy use and CO_2 emissions. The carbon tax rate is EUR 4.5 per tonne of CO_2 (t CO_2), well below a conservative estimate of the social costs of CO_2 emissions, EUR 30/t CO_2 (OECD, 2018c). Emissions from biomass and peat combustion are exempt from the carbon tax, although peat is a non-renewable fuel with high carbon content and the lifecycle carbon neutrality of biomass is increasingly debated (OECD, 2018c). Tax rates on fuels are also low and many tax exemptions are in place. There is a wide tax gap between petrol and diesel, despite diesel's higher carbon content and local air pollution cost.

Effective tax rates on CO_2 emissions from energy use in road transport are the lowest in OECD Europe, and those on emissions from other energy uses are among the ten lowest in OECD Europe (OECD, 2018d). Accounting for energy and carbon taxes and the EU ETS allowance price, 55% of CO_2 emissions from energy use face some kind of carbon price signal in Latvia, the fifth lowest share in the OECD. This reflects the high share (34%) of energy sourced from biofuels, which are mostly not taxed. Three-quarters of emissions, i.e. nearly all emissions from sectors other than road transport, are priced below the low-end benchmark value of EUR 30/t CO_2 or are not priced at all (Figure 6).

High support to fossil fuel use runs counter to energy savings objectives

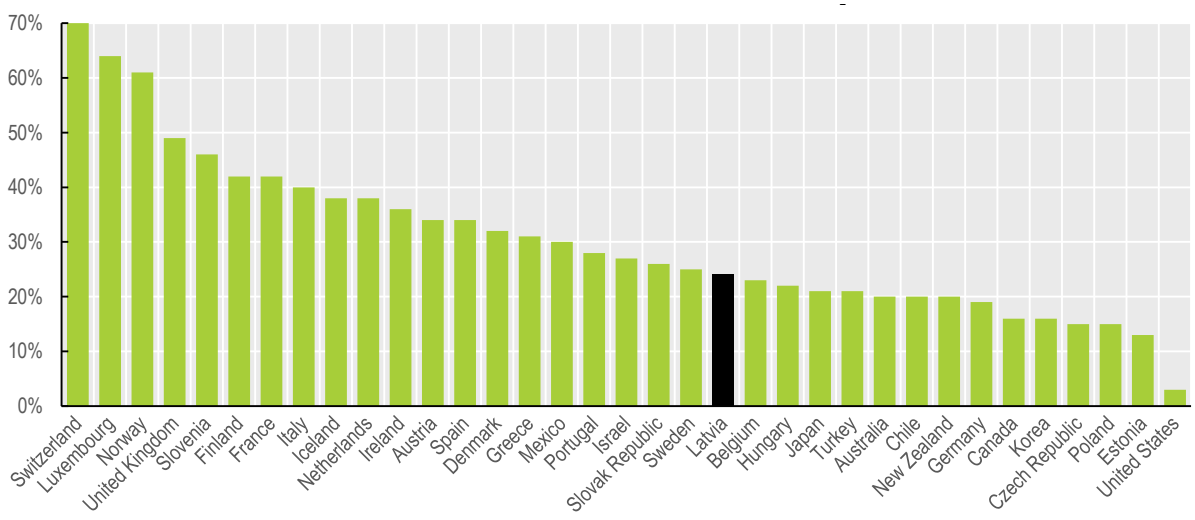
Despite progress in removing tax exemptions, fuel use in many sectors is still exempt or benefits from reduced rates. The fuels involved include biodiesel from rapeseed oil and some fuels used for heating and in agriculture, fishing, electricity generation and industry. This undermines the carbon price signal and the government's efforts to improve energy

efficiency and reduce CO_2 emissions across the economy. A Ministry of Finance review of tax expenditure, conducted since 2011, shows that these exemptions weigh heavily on the government budget. Support for fossil fuel consumption is high. When measured as a share of energy tax revenue, Latvia's level of fossil fuel consumption support is among the ten highest in the OECD. Fossil fuel consumption support hovered around 25% of energy tax revenue in 2006-16. This included payments to CHP plants using natural gas.

Latvia should consider reducing tax exemptions and further raising the energy and carbon tax rates to reflect environmental and climate damage from energy use. Increasing transport fuel taxes could also help make the tax system more progressive (Flues and Thomas, 2015). However, energy affordability is still an issue in Latvia, as in other Central and Eastern European countries. Providing targeted social benefits that are not linked to energy consumption (e.g. income-tested support) can help address any adverse impact of higher taxes on low-income households and other vulnerable groups (Flues and van Dender, 2017).

Figure 6. Only a quarter of CO_2 emissions face a sufficiently high carbon price

Proportion of CO_2 emissions priced at or above EUR 30 per tonne of CO_2, OECD countries, 2015



Source: OECD (2018), *Effective Carbon Rates 2018*.

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Taxation of other pollution and natural resource use is well developed

A broad-based tax on pollution and natural resource use, the so-called natural resource tax, has been in place since 1991. It applies to water and natural resource extraction, water and air pollution, CO_2 emissions, waste disposal, packaging materials and environmentally harmful goods (such as oil, tyres and electric appliances). This tax accounts for about 3% of environment-related tax revenue. In 2014 and 2017 most tax rates increased by between 20% and 25%. However, rates are still relatively low and some have been stable for several years, including those on emissions of the air pollutants NO_X and ammonia, for which Latvia is not on track to reach its 2020 and 2030 targets (Section 1).

Several tax exemptions have hindered the environmental effectiveness of the natural resource tax and reduced its revenue to about one-tenth of what it could be. An exemption

applies to packaging materials and environmentally harmful goods for companies that join extended producer responsibility systems and meet the corresponding recycling and recovery targets. The tax rates double in case of non-compliance with the targets. This exemption has helped expand participation in extended producer responsibility programmes to over 90% of regulated companies and improve recycling and recovery (Section 4). However, it mainly acts as a fine; it does not stimulate companies to go beyond the set targets, nor does it sufficiently encourage waste prevention. An ongoing review of the natural resource tax legislation aims to link the exemptions to stricter performance requirements.

The CO_2-based car tax is welcome, but perverse incentives to road transport remain

In 2017, Latvia restructured the annual tax on cars and linked it to CO_2 emissions (for vehicles registered since 2009). The new system is a step forward, as it aims to encourage renewal of the car fleet with more fuel-efficient vehicles. The previous system had not been effective in this respect: the vehicle fleet is particularly old and energy intensive (Section 1). However, a vehicle tax based exclusively on CO_2 emissions, without consideration of local air pollutants, can stimulate further dieselisation of the fleet, with adverse effects on urban air quality (EEA, 2018). Taxation of heavy goods vehicles does not consider environmental parameters. Road tolls for trucks are differentiated by test-cycle engine emission level, though the differentiation is not pronounced and the toll does not change with distance travelled. Nor do road tolls apply to passenger vehicles.

Latvia imposes a company car tax at company level, but is among the few EU countries not taxing employees for the benefits arising from their personal use of company cars (EC, 2017b). This tends to encourage private car use and long-distance commuting, potentially leading to higher GHG and local air pollutant emissions, noise and congestion. This adds to problems related to disorganised suburbanisation around Riga and difficult access to public transport in many peripheral areas (OECD, 2019d). The company car tax is based on engine capacity, so it does not provide an incentive to companies to choose less emitting vehicles for their car fleets.

Transition to green growth requires major investment

Public and private environment-related investment largely relies on EU funds

The public sector is the main driver of environment-related investment. Latvia has significantly benefited from EU funds to finance public investment. Over 2007-20, EU funds allocated to Latvia averaged between 2.5% and 3% of GDP a year. About a third of these funds targeted environment-related investment and helped in extending and upgrading infrastructure for transport, energy, water supply, wastewater treatment and waste disposal (Section 1; Section 4). Nevertheless, considerable investment is still needed to extend and upgrade ageing infrastructure at a time when local governments face pressing resource constraints, and EU funds will eventually diminish.

Business environmental expenditure has declined since the mid-2000s, especially in terms of investment. Over 2005-17, private investment amounted to only 11.5% of total environmental investment in the country. Price signals and financial incentives do not sufficiently encourage private investment. Businesses have an incentive to postpone investment and wait for public funding opportunities. Thus, there is a risk of EU and national funds being used for investment that would have been made anyway, rather than

for financing additional, more productive growth-inducing investment. There is a need to reduce dependence on EU funds and streamline the multiple fragmented financial support mechanisms available to encourage environment-related investment.

Improving energy efficiency is a priority

Most of the building stock is over 25 years old and consists of multi-owner buildings with poor energy performance. Since 2007, Latvia has used EU and national funds effectively to upgrade district heating networks and improve buildings' thermal efficiency. This has contributed to remarkable energy savings, above the EU average (Odyssee-Mure, 2018). However, investment is needed to expand and renovate district heating networks in some municipalities. Heat consumption per square metre is among the highest in Europe, well above that of most other northern European countries. Heat consumption in apartment buildings is generally metered at building level and allocated and charged to households based on apartment size, which provides no incentive for energy savings. The government estimates it would cost EUR 6 billion (more than 20% of GDP) to thermally renovate all apartment building stock.

Hence there is a need to accelerate investment in residential energy efficiency and differentiate the financing sources. Barriers to private investment include the large numbers of owners per building, the fact that many have low income and limited access to bank credit, the long payback and complexity of energy efficiency projects and a lack of energy efficiency specialists and energy service companies. Instruments such as subsidised loans, credit guarantees and energy performance contracts can help overcome some of these barriers.[2]

More work is also needed to improve energy efficiency in industry. The energy intensity of manufacturing industry is well above the EU average and has increased since the end of the recession. The 2016 Energy Efficiency Law introduced energy saving obligations and laid the groundwork for implementing industrial energy efficiency measures. Consistent price signals are needed, in addition to industrial energy audits, voluntary agreements and financial support.

Latvia needs to diversify its renewables mix

Latvia has made considerable progress in expanding the use of renewables, especially from biomass (fuelwood) in CHP plants (Section 1). However, it needs to expand the use of other renewables, especially solar and wind, to attain its 2020 indicative target of nearly 60% renewables in gross final electricity consumption[3] and ensure more sustainable biomass production and use (Section 1; Section 5). The large wind potential has remained largely unexploited in comparison to other Baltic states.

A mix of feed-in tariffs and capacity payments helped increase installed capacity. However, the support system was poorly designed, overly generous and not transparent. It resulted in high costs and windfall profits in some cases (Dreblow et al., 2013; Rubins and Pilvere, 2017). In addition, energy-efficient natural gas CHP plants were eligible for support and attracted much of it. All this triggered changes in the calculation of the support amount, the introduction of a tax on subsidised companies' profits and, finally, a moratorium until 2020 on the support system, which is being revised. Latvia needs to quickly restore investor confidence and consider more cost-effective and transparent measures to support renewables-based generation, such as competitive tenders and procurement auctions (OECD, 2019d).

Renewables play a negligible role in the transport sector (Section 1). Latvia exports most of its rapeseed-based biodiesel production. Domestic use is low, partly due to the low mandatory blending requirement (4.5% by volume), which covers petrol and diesel sales during the warmer months (mid-April to end-October). An in-depth assessment of the impact of biofuel production and use on net GHG emissions, biodiversity, water and soil is needed. No sustainability criteria are in place beyond those required by the EU. Latvia has not started to produce second-generation biofuels (e.g. from waste, residues).

Integrated transport services can improve environmental outcomes

Most transport-related investment has focused on the road network. While this is needed to improve the network's low quality and safety (OECD, 2017), Latvia should ensure transport investment priorities are consistent with long-term climate and environmental objectives. Latvia has the longest railway network in the Baltic states. It is largely not electrified and most trains run on diesel. In 2018, the government launched a major railway electrification project to be completed by 2030. Rail is the main freight transport mode but has a marginal role in passenger transport.

Cars account for the vast majority of passenger travel in Latvia. Bus and rail services incur high costs serving sparsely populated areas. The public transport network is dense in the Riga city centre, but becomes thin towards the borders of the city (Yatskiv and Budilovich, 2017). There is no integrated public transport system linking Riga to its sprawling surroundings, and congestion and pollution around the city have increased. There is a need for co-ordinated planning of transport infrastructure, public transport and urban development. Integrated route planning, pricing and ticketing across providers and municipalities would help increase public transport use. Latvia also needs to further extend the charging facility network for electric vehicles, with a view to expanding their use. The number of such vehicles has increased, but they are still just 0.1% of the fleet, compared with the EU-wide rate of 1.5%.

The environmental technology, goods and services sector shows signs of dynamism

Eco-innovation is promising despite generally low innovation capacity

Latvia's innovation system and performance are generally modest (OECD, 2019d). The country has a low rate of both private and public research and development (R&D) investment; the state budget and EU funds are the main sources of R&D funding; and co-operation between industry and public research is weak. The generally low innovation capacity of companies, the shortage of highly skilled workers and the small number and size of companies active in environmental technology hinder eco-innovation (EC, 2019).

Nonetheless, with increased public R&D funding, Latvia has developed a specialisation in environmental technology in recent years. It spends nearly 10% of the government R&D budget on environment- and energy-related research, putting it among the top ten OECD countries despite the context of an inadequate overall R&D budget. Patent applications for environment-related technology reached 13% of all patent applications in 2013-15, although the absolute number remains extremely modest.

Higher demand is needed to expand the markets for cleaner goods and services

The environmental goods and services sector had grown to nearly 3% of GDP by 2015. Renewables, energy efficiency in buildings, forest-based industry, eco-cosmetics and water

management are the most dynamic sectors. Compared with the EU average, however, Latvia's businesses have a lower propensity to produce greener products and invest in goods and services that would improve their environmental performance. Only 13 products produced in Latvia have been awarded the EU ecolabel. Low demand for cleaner products and services is the main barrier to developing these markets. Product price is the dominant driver of consumer choice (EC, 2017a). More efforts are needed to stimulate demand for greener products and services, e.g. through green public procurement, ecolabelling, market incentives, awareness raising and better enforcement (Section 2). Green public procurement accounted for 18% of total public procurement value in 2018, not far from the modest target of 20% by 2020.

Latvia is a good international player, but its development aid is low

Latvia has a strong tradition of international, regional and bilateral co-operation in the environment field, especially to address regional issues related to the Baltic Sea. Since 2004, when it joined the EU, Latvia has substantially increased the volume of its official development assistance (ODA), mainly through to contributions to the EU budget and the European Development Fund. However, at 0.11% of gross national income (GNI), Latvia's ODA/GNI is among the lowest in the OECD and falls below the target of 0.33% of GNI by 2030 for countries that have joined the EU since 2002. Bilateral ODA commitments for general environmental protection, renewables and water represent only 0.2% of ODA (sectoral allocable aid), the lowest share in the OECD. Latvia should consider increasing its aid programme, particularly bilateral and environment-related ODA activities, in line with the 2030 EU target and other international goals, and taking into account its areas of expertise. Joining the OECD Development Assistance Committee would help Latvia improve the effectiveness, visibility and coherence of its development assistance activities.

Box 3. Recommendations on green growth

Strengthening the strategic framework for sustainable development and green growth

- Better align the post-2020 NDP, and sectoral policies at large, with environmental and green growth objectives; consider extending the 2030 horizon of development planning to 2050.

Greening the system of taxes, charges and subsidies

- Implement a green tax reform to provide stronger incentives for sustainable resource use, increase overall tax revenue and reduce the tax burden on low-income households:
  - Continue to reduce tax exemptions and discounts (e.g. on rapeseed biodiesel, as well as on fuels used for agriculture, fishing, electricity, heating and industry production).
  - Further raise energy tax rates and close the petrol/diesel tax gap to adequately reflect environmental damage from energy use, while providing targeted support to vulnerable groups through social benefits not linked to energy consumption.
  - Consider raising the natural resource tax rates on air pollutants on the basis of a cost-effectiveness assessment.

  - Gradually raise the carbon tax rate; remove its exemption on emissions from peat combustion; consider extending the carbon tax to transport fuels and biomass.
  - Revise the vehicle tax to take into account air pollutants in addition to CO_2; reform the tax treatment of personal use of company cars and link the company car tax to vehicle emission standards and fuel economy; link taxation of heavy goods vehicles to their environmental performance.
  - Link road tolls for commercial vehicles to distance travelled, in addition to vehicle emission standards; introduce similar road charges for passenger cars.
- Build on the annual review of the tax exemptions' fiscal impact to establish a systematic review process on environmentally harmful subsidies.

Investing in low-carbon infrastructure

- Increase and enhance cost-effectiveness of public spending on environment-related infrastructure; streamline and better target financial support for business environmental investment.
- Continue to improve residential energy efficiency by i) further scaling up public finance for energy efficiency renovation of buildings; ii) encouraging the use of energy performance contracts, subsidised loans and credit guarantees to foster private investment; iii) investing in training energy efficiency specialists; iv) assisting homeowner associations in the design and management of energy efficiency projects; v) accelerating retrofitting investment on the public building stock; vi) upgrading district heating networks; and vii) extending heat metering and charging heat based on actual use.
- Review the design of the renewables support system at the earliest opportunity and consider introducing competitive tendering to improve cost-effectiveness.
- Establish an integrated public transport system, with comprehensive route planning, pricing and ticketing, linking Riga to surrounding municipalities; promote transport-on-demand systems to provide public transport services in low populated rural areas; continue to extend the charging facility network for electric vehicles.

Promoting eco-innovation and green markets

- Further increase public R&D funding for environment-related innovation and monitor the efficiency and effectiveness of its allocation; strengthen measures to stimulate demand for energy efficient and cleaner products, technologies and services, including green public procurement, eco-labelling, market incentives, awareness raising and better enforcement.

4. Waste management and circular economy

Latvia completely reconstructed its waste management systems in the 2000s. Today it has fairly complete policy and legal frameworks for waste management, supported by quantitative targets and economic instruments. As in other environmental policy areas, most developments are driven by EU requirements and supported by EU funding. The country has increased recovery and decreased landfilling. Progress has been made with separate collection and recovery of municipal waste, recycling capacity and the use of economic instruments to encourage recovery and divert waste from landfills.

However, waste is not yet managed cost-effectively, and related policy implementation is insufficiently co-ordinated and monitored. The economic instruments used do not provide strong enough incentives for moving towards a circular economy; some targets will be difficult to meet. Waste reduction and prevention and the management of specific waste streams, such as construction and demolition waste, have received little attention.

To lay the groundwork for circular economy approaches, it is essential to improve waste management, including separate collection and sorting; strengthen the use of economic instruments; and improve the economic performance and transparency of extended producer responsibility systems. The potential for progress is good with encouraging recent developments. However, the country needs to plan for reducing its reliance on EU funding, better use synergies with eco-innovation and public procurement programmes, and increase co-operation with neighbouring countries to strengthen recycling markets and efficiently use existing capacity in the region.

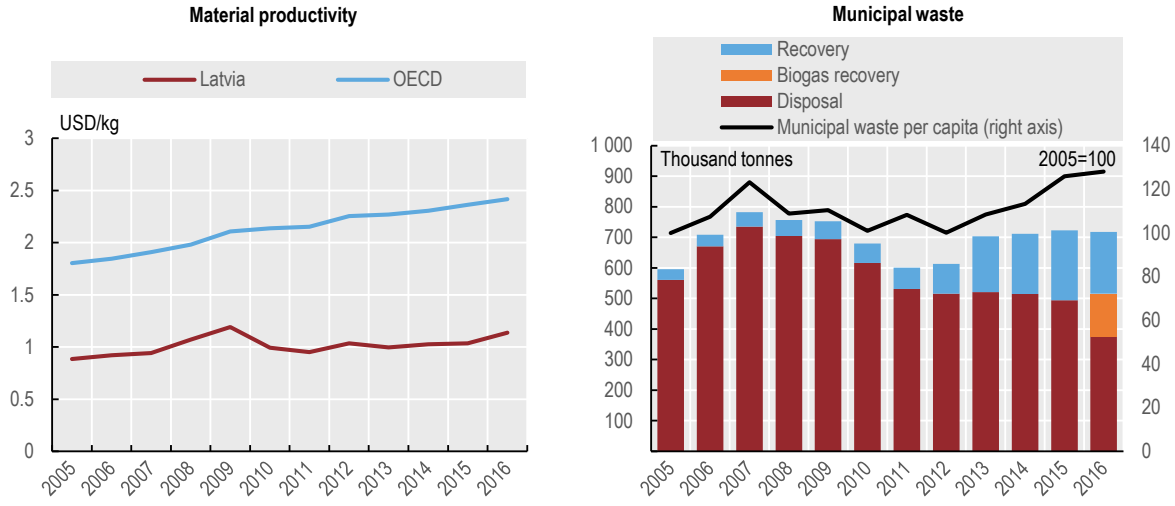
There is room for further improving waste management

Material productivity and recovery rates are growing, but remain low

The material productivity of the economy has improved (by 29% since 2005), but remains lower than in many other OECD and EU countries. Latvia generates less than half the economic value per tonne of materials used than the OECD average (Figure 7). The amount of waste recovered and associated recovery rates are rising, but landfilling, though decreasing, still represents more than 20% of all waste generated. Low-value recovery remains common for some waste streams (e.g. construction and demolition waste); recycled feedstocks (e.g. plastics) are often exported for reprocessing and generate little value domestically. Official data on recycling often refer to amounts being prepared for reuse, recycling or recovery; little is known about the types of products that arise from recycling. Many recoverable and recycled materials get lost for the economy.

The recovery rate of municipal waste grew significantly from a very low 5% in 2005 to about 30% in 2016 (Figure 7). Separate collection of municipal waste has been mandatory since 2015 for paper, glass, metal and plastic waste, and will become mandatory for biodegradable waste in 2021. However, collection performance and the quality of subsequent sorting need to be improved. Two systems for separate collection coexist, with insufficient co-ordination and a risk of duplication: those of municipalities and those of extended producer responsibility organisations. Mixed municipal waste still contains many recoverable and biodegradable materials. The recovery target for municipal waste of 50% by 2020 may thus be difficult to reach (EC, 2019).

Figure 7. Progress on material productivity and waste recovery needs to be consolidated



Note: In panel 1, USD are expressed in 2010 prices and purchasing power parity. In panel 2, "Recovery" refers to amount designated for recovery operations; data for biogas recovery refers to amounts of biodegradable waste undergoing anaerobic digestion with biogas recovery.
Source: OECD (2019), "Waste: Municipal waste", *OECD Environment Statistics* (database); OECD (2019), "Material resources", *OECD Environment Statistics* (database).

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Waste is increasingly diverted from landfills, but recycling markets remain weak

Latvia has invested in the development of its recycling infrastructure, and is well placed as regards recycling of paper, cardboard and polymers. In recent years, the focus has been on production of biogas and compost from waste, with a view to diverting waste from landfills and contributing to renewables targets. The establishment of domestic waste-to-energy capacity is also being considered as a way to achieve EU landfilling reduction targets. Given the significant investment involved in such infrastructure and the need to avoid a lock-in effect, it is important the long-term costs and benefits of alternative waste technology and infrastructure be carefully assessed, in line with the waste hierarchy. More attention needs to be given to markets for recycled products, which remain weak and suffer from mistrust of the quality of recycled goods (e.g. compost) and from insufficient investment in domestic high-value recycling. Greater use of synergies within the Baltic Sea region and other neighbouring countries will be instrumental.

Waste prevention in the business sector and measures further upstream the value chain are not well monitored

Little is known about specific waste prevention efforts in production processes and further upstream in the value chain (design phases), and about measures to minimise the environmental impact of waste and materials over their life cycle. Awareness among businesses about the benefits of waste prevention and a circular economy seems low, but promising developments are taking place in eco-innovation and technology development (e.g. competence centres, technology clusters under the Ministry of Economy) (EC, 2017a). Innovation policies and support measures to businesses should fully take into account the objectives of closing material loops, preventing waste generation and establishing circular business models. Doing so could drive growth in sectors that contribute to the transformation of the Latvian economy.

Institutional co-operation could be strengthened

Encouraging life-cycle-based management and circular economy approaches will have to be on a par with effective alignment of measures and objectives across policies and ministries. At the national level, co-operation between the MEPRD and other ministries works well for issues related to traditional waste management and development of bioenergy projects. But practical co-operation on eco-innovation and new technology is not yet well established, and synergies between measures promoted by the MEPRD and the Ministry of Economy are not yet exploited. This hampers the implementation of waste prevention measures and the uptake of new technology and innovation in production processes. To steer the transition to a circular economy and guide related investment choices, Latvia needs to further broaden co-operation across ministries and with stakeholders, and consider establishing a dedicated institutional platform.

At the local level, waste management regions and municipalities are given flexibility in managing waste, but this leads to implementation gaps and incomplete monitoring. Regional and local waste management plans are no longer mandatory. There is no mechanism for cascading national waste targets to the local level and for monitoring local performance in this respect. Many municipalities lack the capacity to implement new policies and targets. They need more support and harmonised guidance by the government to carry out their responsibilities.

Stronger incentives are needed to move towards a circular economy

Economic instruments are well established…

The use of economic instruments is well established, including a differentiated natural resource tax that applies to material extraction, landfilling, and products for which special end-of-life management objectives have been set; municipal waste fees; and extended producer responsibility systems. The natural resource tax and exemptions from it helped encourage businesses to join extended producer responsibility programmes, achieve several related EU targets and stimulate adoption of reusable packaging. These systems are complemented with a deposit-refund system for certain types of beverage packaging, with plans to make its use compulsory.

…but incentives to move towards a more circular economy remain insufficient

The instruments in place do not yet create sufficient incentives to comply with the waste hierarchy and move towards a more circular economy. Despite recent and planned increases, landfill tariffs will remain below the EU average until 2020 – too low to incentivise recycling and spur investment in alternative waste technology. Municipal waste fee levels are still too low to cover service provision costs and encourage households to reduce unsorted mixed waste. Little use is made of pay–as-you-throw (PAYT) systems for mixed household waste collection, though a pilot is being conducted in one city (Jūrmala). The application of PAYT systems in major cities should be encouraged; it could become an important tool for reducing waste going to final disposal, associated with well-functioning separate collection of recyclables. More attention should be given to measures that influence consumer behaviour and product design. Most existing instruments target the extraction and post-consumption phases of the value chain.

Extended producer responsibility systems lack transparency and their economic performance is not well monitored

Several of Latvia's extended producer responsibility systems lack transparency and their activities are not well co-ordinated. Strengthened controls in 2017 revealed many deficiencies concerning their operation and compliance with recycling targets. Little is known about their financing, cost recovery and economic performance; the data reported annually by producer responsibility organisations are often incomplete and of insufficient quality. A clearinghouse mechanism would help establish a level playing field for all extended producer responsibility systems and make it easier to assess their economic performance. It would also help streamline and consolidate extended producer responsibility for products for which existing systems are scattered or not yet reaching the recycling targets (e.g. electrical and electronic equipment) (OECD, 2016b). Significant efficiency gains could be obtained by ensuring proper co-ordination of service provision and cost sharing with municipalities, and by fully integrating the waste collection systems managed by extended producer responsibility companies and those set up by municipalities.

Better information on waste and materials is needed to support decision making

Latvia regularly produces statistics on waste generation and treatment, and macro-level material flow accounts. But reporting obligations do not cover all information needed for effective policy making, and data quality varies. Latvia should improve its information base by further harmonising and integrating data, ensuring better coverage of all management steps and treatment routes, and filling gaps as regards data on specific waste streams, recycling efforts in the business sector, extended producer responsibility systems' performance, waste movements, and reuse and repair activities.

Box 4. Recommendations on waste management and circular economy

Improving the effectiveness and governance of waste management

- Review the taxation of waste management in line with the waste hierarchy: Further increase the natural resource tax for landfilling beyond 2020; encourage municipalities to increase municipal waste fees to ensure full cost recovery of service provision; apply PAYT systems in major cities to provide greater incentives to households to participate in separate collection; implement measures to change consumer behaviour and product design.
- Merge the separate collection programmes operated through extended producer responsibility systems and those operated by or for municipalities to improve the cost-effectiveness of these systems and the quality of the covered materials.
- Specify the requirements for extended producer responsibility systems (calculation of fees, eco-design, recycling objectives, arrangements for service provision and cost-sharing with local authorities, reporting obligations, including on financial aspects) to improve their cost-effectiveness, transparency and co-ordination; increase resources for compliance monitoring and quality assurance; consider establishing a clearinghouse mechanism to assist in these tasks.

- Ensure that national waste policies and targets are cascaded at local level, including through systematic establishment of regional and local waste management plans and regular reporting on results, including on financial aspects.
- Exploit synergies with neighbouring countries to efficiently use waste treatment capacities in line with the waste hierarchy and to ensure adequate co-ordination of deposit-refund systems.

Promoting waste prevention and circular business models

- Improve the material productivity and efficiency of the economy and encourage waste prevention in industry and upstream in the value chain (design phase); fully integrate the objectives of closing material loops and preventing waste generation into innovation policies; exploit synergies between measures on cleaner production, eco-innovation, waste prevention, bioenergy and smart specialisation by establishing effective mechanisms for co-ordinating and monitoring the actions of all ministries involved.
- Strengthen markets for secondary raw materials and recycled goods through public procurement and increased co-operation with neighbouring countries; encourage investment in high-value domestic recycling.
- Broaden institutional co-operation to steer the transition to a circular economy and related investment choices, and deepen co-operation between the MEPRD and the Ministry of Economy.

Improving the information basis on waste and materials

- Improve and expand national waste management information and official statistics on waste and materials; create a consolidated, transparent and integrated system that covers all management steps and treatment routes, including transboundary movements, and that supports the development, implementation and monitoring of national policies, along with international reporting.

5. Biodiversity conservation and sustainable use

Biodiversity pressures are expected to increase with economic growth

Latvia's forests, grasslands, and coastal and marine areas are home to species of international significance, such as lesser spotted eagle, black stork, lynx and wolf. The conservation status of habitats and species is mostly unfavorable and has been declining. Forest and grassland habitats have worse conservation status than other habitats. Only around 10% of habitats and one-third of species have favourable conservation status (EC, 2017a). Threatened species account for 2% of known species, with amphibians and reptiles being the most vulnerable.

Greater effort to improve biodiversity is urgently required, in light of rising pressures. Sustained economic growth and reliance on forestry, agriculture and fisheries are expected to increasingly affect biodiversity. Nutrient pollution in the Baltic Sea has serious consequences for marine habitats and species. Effectively managing protected areas and better mainstreaming biodiversity considerations in other sectoral policies are key to addressing the drivers of biodiversity loss.

The legal framework is in line with EU requirements but a biodiversity strategy is needed

Latvian biodiversity policy is mostly governed by EU legislation, particularly the Habitats and Birds Directives. The establishment of Natura 2000 raised the profile of biodiversity conservation, along with the special procedure for assessing the potential impact of projects in Natura 2000 sites. Implementing the EU acquis has brought Latvia closer to fulfilling its international commitments, such as those under the Convention on Biological Diversity and the SDGs. Latvia is an active international player and co-operates bilaterally with countries in the region on protected area management and awareness-raising initiatives.

Latvia is one of the few OECD countries lacking a national biodiversity strategy. It has strategies and plans that include biodiversity objectives, but they do not amount to a coherent framework. The 2014-20 Environmental Policy Strategy sets the main biodiversity goals, primarily aimed at fulfilling EU requirements. As the baseline of targets shows a modest starting point for biodiversity conservation activities, the established objectives can be considered relatively far reaching. A long-term vision for biodiversity would need to scale up targets, e.g. developing additional management plans for protected areas to meet the relevant national target.

The MEPRD is responsible for the design and implementation of biodiversity policy. The Nature Conservation Agency is responsible for protected area management, control of international trade in endangered species, and granting compensations. Forestry, fisheries and agriculture are within the purview of the Ministry of Agriculture. There are some co-operation mechanisms between the two ministries, especially on fisheries, but overall co-ordination could be strengthened. Human and financial resources represent an obstacle in advancing biodiversity goals.

Latvia needs a comprehensive national approach to biodiversity monitoring

Despite the lack of a comprehensive national approach to mapping and assessing ecosystems and their services, there are ad hoc projects that should help address data gaps and improve biodiversity knowledge.

Latvia has undertaken an assessment of its marine ecosystems and is mapping terrestrial ones. It implemented the EU Mapping and Assessment of Ecosystems and their Services initiative for marine waters in 2016, under the EU Biodiversity Strategy to 2020. The assessment mapped areas of high ecological value, although more data is needed to complete the process (BISE, 2016). Latvia's marine strategy lacks definitions of key biodiversity pressures (e.g. contaminants, marine litter) (Milieu, 2018).

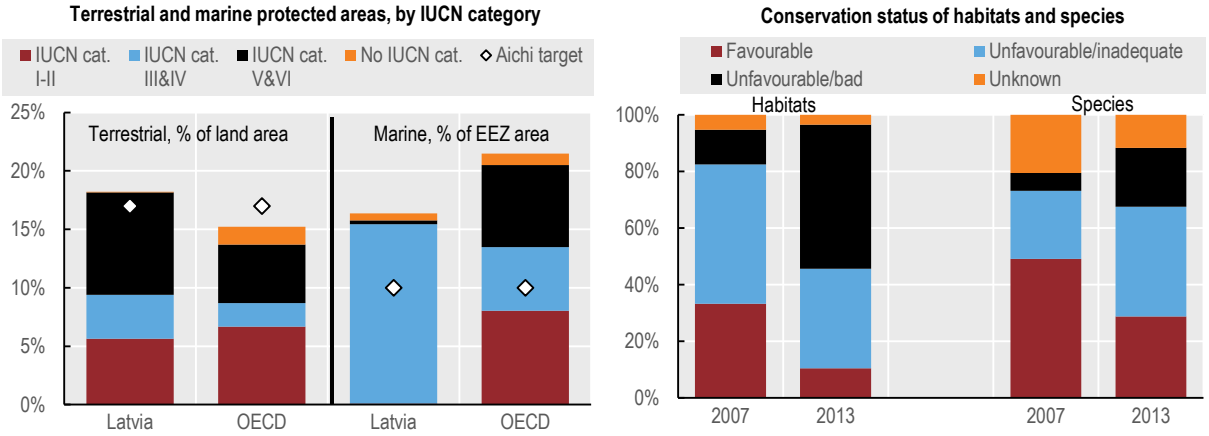
The policy mix is biased towards regulatory instruments

Protected areas are the main measure

As in most OECD countries, protected areas are the main biodiversity conservation tool. Protected terrestrial areas called Specially Protected Nature Territories (SPNTs) represent 18.2% of total land, while protected marine and coastal areas represent 16.4%, surpassing the corresponding 2020 Aichi targets (Figure 8). Since EU accession in 2004, protected areas have increased and almost correspond to Natura 2000 sites. The latest EU assessments show insufficient designation of terrestrial Sites of Community Importance under the Habitats Directive (EC, 2019). With less than 40% of protected areas having a management plan in place, and most suffering from chronic lack of human and financial resources,

stronger efforts are needed to improve the conservation status of terrestrial habitats and species (Figure 8).

Figure 8. Current protection efforts are not sufficient to reverse biodiversity loss



Note: IUCN categories reflect management objectives. Categories I and II refer to strict nature reserves, wilderness areas and national parks. Categories III and IV refer to natural monuments and habitat/species management areas. Categories V and VI refer to protected landscapes/seascapes and areas with sustainable use of natural resources. Other nationally designated areas with no IUCN category are grouped with regionally and internationally designated areas. Data refer to metropolitan or mainland countries; overseas territories are not included. EEZ = Exclusive economic zone.
Source: OECD (2018), "Biodiversity: Protected areas", *OECD Environment Statistics* (database); EEA (2019), *Habitats of European interest* (database); Eionet (2019), *Reporting under Article 17 of the Habitats Directive*.

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Other regulatory instruments used to conserve wild fauna and flora include exploitation bans on certain species, hunting and fishing restrictions, and measures to control artificial propagation of certain plants (Pierhurovičа and Grantiņš, 2017). There have been few green infrastructure initiatives and further efforts are needed to increase connectivity between habitats (EC, 2018).

EIA, strategic environmental assessment (SEA) and spatial planning are cross-sectoral tools used to prevent biodiversity loss. Natura 2000 sites have specific EIA requirements, and SEA is performed for all planning documents with expected significant impact. The Sustainable Development Strategy until 2030 states that the government should introduce a plan for the preservation and restoration of natural capital, which would also include spatial planning of nature preservation and restoration.

Economic instruments can be expanded

The main economic instrument for conservation and sustainable use of biodiversity is compensation to private owners for restriction of economic activities in SPNTs, a form of payment for ecosystem services. Compensation is co-financed by the European Agricultural Fund for Rural Development, which covers Natura 2000 payments for agricultural and forest land. In addition, there are payments for maintaining biodiversity on grasslands and preserving genetic resources of farm animals (MEPRD, 2014).

Other economic instruments are tax exemptions for private owners within certain areas of SPNTs, a tax on resource use for commercial activities, licence fees for fishing and hunting, non-compliance fees related to forestry use, fishing and hunting, and liability charges for damage to biodiversity.

Over 2008-18, public support was the main source of funding, which heavily relies on EU contributions. Project-based funding is provided by national funds, such as the Forestry Development Fund, the Latvian Environmental Protection Fund and the Fishery Fund; resources for the latter two have increased since 2008, despite some decrease during the economic crisis of 2008-09.

Mainstreaming biodiversity into economic sectors is an opportunity to balance trade-offs

Biodiversity and ecosystem services underpin key sectors outside the purview of the MEPRD, such as forestry, fisheries and agriculture. As in most OECD countries, there is a need to better mainstream biodiversity into national objectives of other economic sectors, especially in light of expected economic growth.

Forestry needs to better integrate biodiversity considerations

Around half of Latvia's territory is covered by forests, mostly natural. The proportion of primary forests remained stable over the last decade and accounts for 0.5% of total forest area, more than in many other European countries. Forests are an important economic resource: exports of forestry-related products account for 6.5% of GDP, the highest share in the OECD.

All forest habitats of EU importance have bad conservation status. Protected forests represent 17.5% of total forests (MEPRD, 2014). Management consists of restrictions on economic activities in around 14% of forests (including outside protected areas), with around 3% of forests under strict protection. Outside protected areas, additional nature protection involves sustainable management certification, which covers about half of forests (Pierhuroviča and Grantiņš, 2017). To ensure sustainable forest management a policy vision to 2050 is needed, fully integrating biodiversity-related objectives and supported by sufficient resources.

Fisheries, agriculture and tourism exacerbate biodiversity pressures

Latvia has a strong fishery tradition, reflecting its geographical position. The main pressures on biodiversity are by-catch (fish unintentionally caught by commercial nets) and invasive alien species. Latvian fishing quotas have declined over the last decade and are used in full.

Agricultural land covers 31% of the territory. It consists of 65% arable land and 35% pastures and meadows, with a negligible share of grasslands, which are rich in biodiversity. Unlike in other European countries, the nitrogen surplus[4] has increased since the early 2000s, and could grow further with the expected intensification of agricultural activity. Organic farming increased to 13.5% in 2017 from 6.8% in 2005; the share is among the highest in the EU. Latvia surpassed its national 2020 target and is on track to meet the 2030 target of 15%.

The Common Agricultural Policy (CAP) provides direct payments to farmers, who are supposed to respect certain environmental requirements. However, producers benefit from credit subsidies (OECD, 2019a) and relief on diesel fuel excise tax (Section 3). Support is also based on animal numbers and production volumes, thus negatively affecting the environment by favouring more intensive practices. Payments per hectare of grass rather than per animal could be a first step towards greening the sector. Credit subsidies could be used for investment in more sustainable and environment-friendly production methods.

Latvia is not fully integrating biodiversity considerations into the agricultural sector. The farmland bird index, an indicator of change in the biodiversity of agricultural land, shows that Latvia is among the top three OECD countries for farmland bird population. Farmland birds increased in territories that received CAP payments, while other indicators of biodiversity quality in the same territories, such as the botanical quality of grassland habitats, deteriorated (OECD, 2019a). This may be due to the reduction of grassland management (e.g. through grazing and mowing), which is essential to prevent unwanted tree growth and conserve biodiversity.

Latvia does not systematically collect tourism data related to biodiversity and protected areas. Tourism surveys in 2014 and 2015 indicated that most tourists chose natural areas, including water bodies and the seashore, with 14% of respondents indicating they visited protected areas. Thus, there is potential to further encourage sustainable tourism in protected areas.

Box 5. Recommendations on biodiversity conservation and sustainable use

Strengthening the policy framework

- Develop a national biodiversity strategy and related implementation plan, with measurable targets, clear indicators and adequate human and financial resources for implementation.

Improving biodiversity knowledge

- Complete the comprehensive mapping of terrestrial ecosystems.
- Define research priorities and identify key data gaps and biodiversity pressures on marine and terrestrial ecosystems; assess the economic value of biodiversity and ecosystem services, and the cost associated with their loss, to better support policy implementation.
- Strengthen dissemination of biodiversity-relevant information to improve awareness among policy makers and the public.

Implementing effective policy instruments and financing mechanisms

- Update and complete the designation of protected areas; ensure that all ecologically important areas have management plans; develop additional management plans to meet the national target and allocate sufficient human and financial resources for implementation.
- Extend the use of economic instruments for biodiversity management; explore opportunities to increase payments for ecosystem services for forest conservation.
- Develop a comprehensive financing strategy to encourage private sector investment and reduce reliance on project-specific EU support.
- Systematically integrate biodiversity conservation objectives into land-use planning; ensure that biodiversity is effectively considered in SEA.
- Develop a strategic policy framework for green infrastructure and improve wildlife corridors to reduce fragmentation of habitats.

Mainstreaming biodiversity in forestry, agriculture and tourism

- Ensure that the next forestry policy strategy includes a long-term vision for sustainable management, with biodiversity-related objectives and sufficient resources, and is developed with wide participation by all relevant stakeholders; implement additional economic and voluntary instruments to ensure the sustainable use of forests outside protected areas and to improve the status of forest habitats (e.g. voluntary offset programmes, sustainable forest/timber certification, green public procurement for timber).
- Strengthen the link between agricultural support and environmental performance by, for example, decoupling payments to farmers from production requirements; efficiently use agricultural inputs; promote organic farming to achieve the national 2030 target.
- Collect information related to tourism in natural areas; pursue measures to mitigate the impact of tourism on biodiversity; identify areas with high tourism potential and develop eco-tourism in protected areas; consider introducing fees for tourism operators in protected areas.

Notes

[1] "Ecological status or potential" is an assessment of the quality of the structure and functioning of surface water ecosystems, including rivers, lakes, transitional waters and coastal waters. It shows the influence of pollution and habitat degradation. Ecological status is based on biological quality elements and supporting physico-chemical and hydromorphological quality elements.

[2] Under an energy performance contract, an energy service company implements energy efficiency measures (e.g. thermal renovation of a building) and uses the income stream from the energy savings to repay the cost of the project.

[3] Gross final electricity consumption includes total gross national electricity generation from all fuels, plus electricity imports, minus exports.

[4] Expressed in kg/ha of agricultural area.

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Part I. Progress towards sustainable development

Chapter 1. Environmental performance: Trends and recent developments

Latvia's environmental performance has improved in several areas, such as emissions of greenhouse gases and most air pollutants, residential energy efficiency, wastewater treatment and waste management. However, sustained economic growth is likely to intensify pressures on the environment and biodiversity. This chapter provides an overview of Latvia's environmental achievements since the mid-2000s, and its remaining challenges. It reviews progress in reducing the energy and carbon intensity of the economy, improving air quality, strengthening waste and water management, and halting biodiversity loss.

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1.1. Introduction

Latvia joined the European Union (EU) in 2004 and the OECD in 2016. Its small, open economy has been continuously growing since 2010, which helped increase per capita income and well-being of the country's 2 million people. However, income levels are still well below those in many other OECD economies. Poverty, income inequality and regional disparity in accessing public services remain widespread. The population is ageing and declining.

A lowland country on the shores of the Baltic Sea, Latvia has abundant forest and water resources. Forests cover about half its territory, are a key economic asset and provide the country's main domestic energy source, biomass. The use of renewable energy sources has expanded and energy efficiency increased. Environmental performance has improved in many areas, including greenhouse gas (GHG) emissions, air pollution, wastewater treatment, waste management and protected natural areas. However, more needs to be done. Some environmental pressures are likely to increase with sustained economic growth and higher income levels, requiring better alignment of environmental and development objectives.

1.2. Main economic and social developments

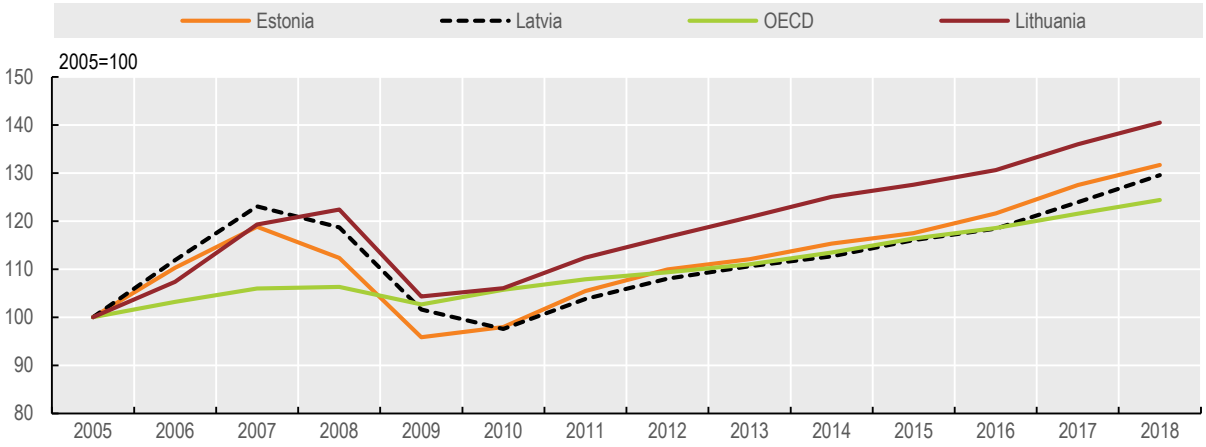
1.2.1. Economic structure and performance

The small and open Latvian economy has experienced strong growth in recent years. Growth is expected to continue at 2.7% in 2020 (OECD, 2019a). Latvia implemented wide-ranging structural reforms in response to the 2008-09 global economic crisis, such as in the areas of fiscal policies, social protection and the business environment. However, it took longer than the neighbouring Baltic countries Estonia and Lithuania to return to pre-crisis level (Figure 1.1). Although gross domestic product (GDP) per capita increased over the past decade, it is still lower than that of the other Baltic states and about two-thirds of the OECD average. Although unemployment has fallen, it remains above the OECD average (Basic statistics).

Latvia does not have many mineral resources other than peat, dolomite, sand and gravel. It is rich in forest and water resources, however. Its industrial base is smaller than in many other OECD countries (Basic statistics). Agriculture, forestry and fishing account for a larger share of value added and employment than in most OECD countries. Wood processing and food and beverages are the main manufacturing and exporting industries. Imports and exports of goods and services, mostly to neighbouring countries, accounted for more than 60% of GDP in 2016. The export performance has been improving in terms of product and destination diversification, but a general skill mismatch and weak innovation have kept firms from moving further up global value chains. Productivity growth slowed considerably in the past decade (OECD, 2019b).

Figure 1.1. The Latvian economy has been growing steadily since 2010

GDP of the Baltic states, 2005-18



Note: GDP expressed at 2010 prices and purchasing power parities.
Source: OECD (2018), "Aggregate National Accounts, SNA 2008 (or SNA 1993): Gross domestic product", *OECD National Accounts Statistics* (database).

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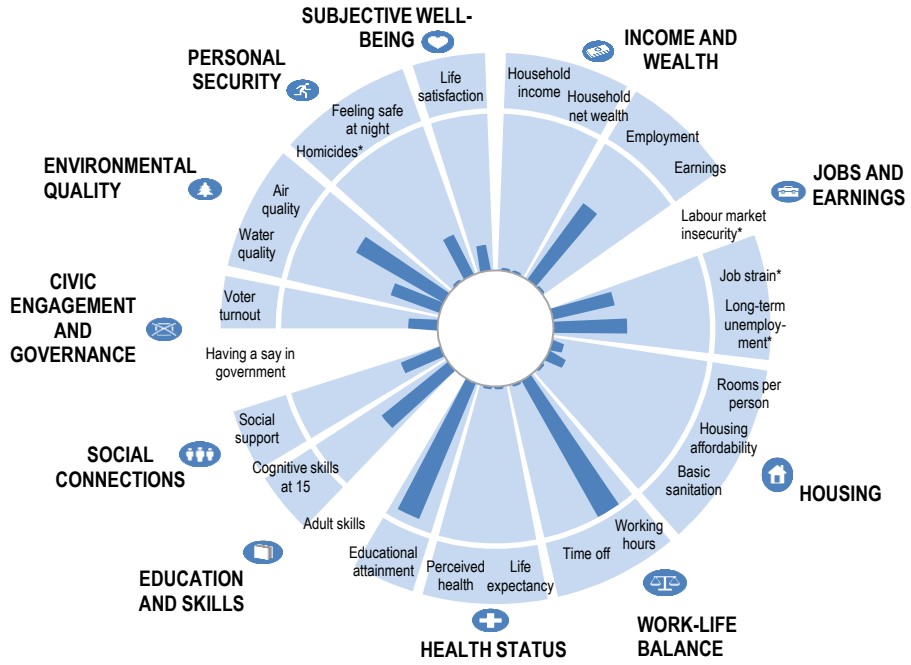
1.2.2. Well-being and quality of life

Territorial inequality, emigration and a decreasing and ageing population have been identified as major challenges to future sustainable growth prospects (Cross-Sectoral Coordination Centre, 2018). In 2017, Latvia had just under 2 million inhabitants, 13% below the 2005 level. Its population density (30 people/km^2) is lower than in most OECD Europe countries, with population concentrated in a few urban areas. The sparse population makes it costly to provide widespread access to public services and infrastructure, which contributes to persistent regional disparity in economic and employment opportunities and, in turn, quality of life.

The capital, Riga, is at the centre of the economy. More than half the population lives in the city and surrounding municipalities in the Pierīga region. Riga has lost inhabitants mostly to this region in a process of unco-ordinated low-density development driven by middle- to high-income households moving outside the city. Urban sprawl, which was fairly insignificant in the past, intensified, with an annual net take rate (0.38%) not far below the European average (0.41%) in 2006-12 (EEA, 2017a). Urban sprawl reduces the extent of natural areas and causes landscape fragmentation (State Land Service, 2016). At the same time, rural-to-urban migration and ageing of the rural population have led to abandonment of farmland, contributing to persistent rural unemployment and poverty.

Latvia has experienced improvement in a large number of indicators of the OECD Better Life Index. Nevertheless, it performs poorly in many dimensions of the index, such as access to well-paid jobs, health care system and affordable, good quality housing (Figure 1.2). Poverty and income inequality are high (Basic statistics). Despite gains over the past decade, Latvian life expectancy is still six years below the OECD average, at 74 years, as a result of higher mortality from cardiovascular disease and cancer, as well as accidents and injuries.

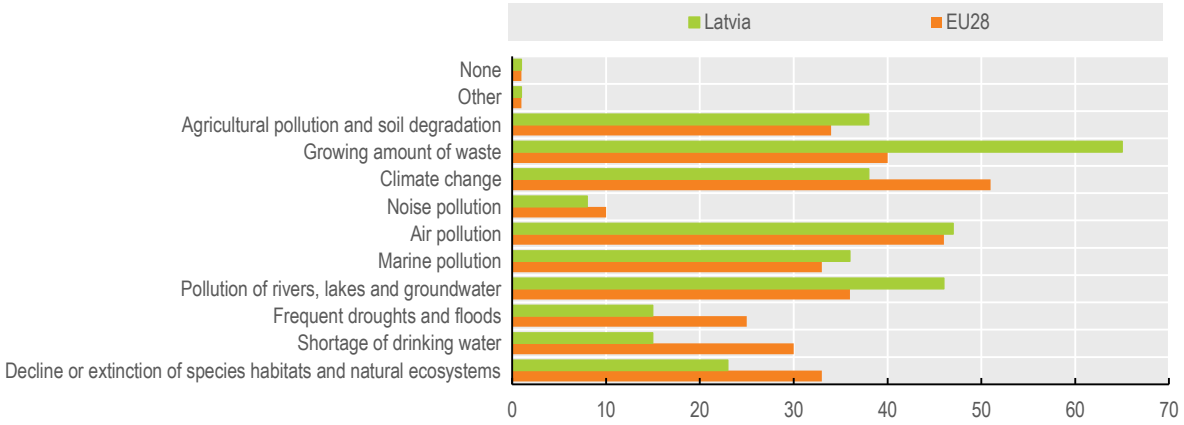
Figure 1.2. Well-being indicators suggest room for improvement



Note: The chart shows Latvia's relative strengths and weaknesses in well-being compared with other OECD countries. The internal white circle shows the minimum. If the bar is short, e.g. on household income, the country has among the worst performances in the OECD. The external white circle shows the maximum; if the bar is close to the circle, e.g. working hours, the country's performance is among the best in the OECD. Negative indicators, such as Homicides, are marked with an asterisk. For both positive and negative indicators, longer bars indicate better outcomes (higher well-being) and shorter bars worse outcomes (lower well-being). If data are missing for an indicator, the relevant segment of the circle is shaded in white.
Source: OECD calculations based on OECD *How's Life? 2017: Measuring Well-being.*

Latvia ranks at about the OECD average in Better Life Index environmental quality indicators (Figure 1.2). Over 60% of Latvians who responded to an EU survey said growing waste generation was among the most important environmental issues – more than in other EU countries (Figure 1.3; Chapter 4). Nearly half of Latvian respondents thought pollution of air and of rivers, lakes and groundwater were also important. Fewer Latvians than in the EU as a whole flagged climate change and decline of species and ecosystems as a source of concern (EC, 2017a). Regional economic fragmentation is reflected in people's concerns. Latvians have diverse views on what the main environmental issue is. People from Riga are concerned about pollution from vehicles and industries, those from Vidzeme about excessive use of natural resources and those from Zemgale and Kurzeme about agricultural pollution. A majority of Latvians, however, would prioritise investing in the country's forests and the Baltic Sea if they had funds available for environmental protection (Baltic International Bank, 2017).

Figure 1.3. Latvians are most worried about waste and pollution of air and water



Note: Response to the question, "From the following list, please pick the four environmental issues which you consider the most important", in a survey of about 1 000 Latvians.
Source: EC (2017), "Attitudes of European citizens towards the environment", Special Eurobarometer 468.

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1.3. Moving towards an energy-efficient and low-carbon economy

1.3.1. Energy structure and consumption

The Sustainable Development Strategy until 2030 (Latvia 2030) and 2030 Energy Policy call for continuing to increase the use of renewables and implementing energy efficiency measures as ways to contribute to both energy independence and environmental sustainability. The National Renewable Energy Action Plan (NREAP) and National Energy Efficiency Action Plan lay out key targets and actions for 2020 (Table 1.1).

Table 1.1. Latvia's renewables and energy efficiency targets

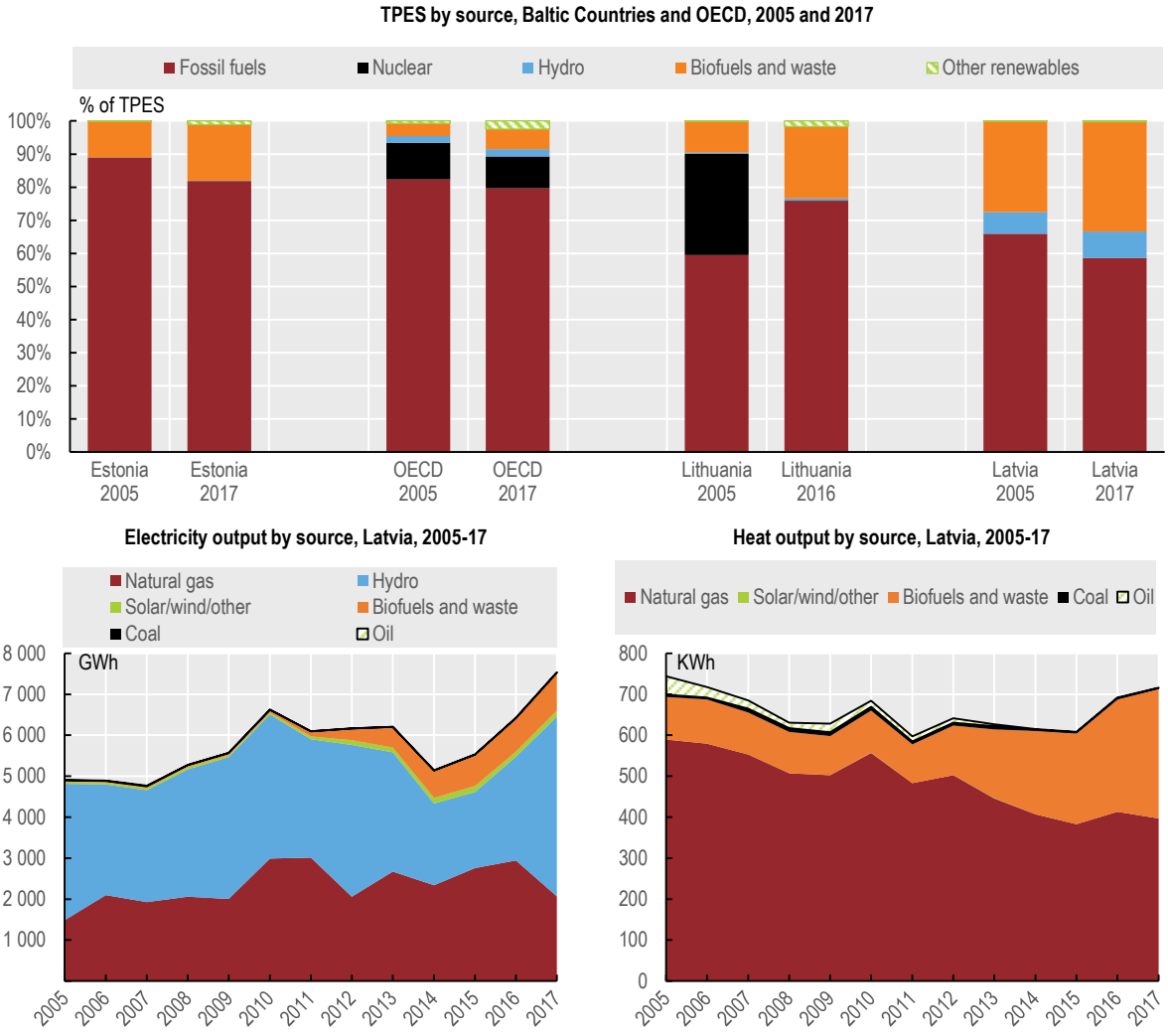
	2017 or latest available year	2020	2030
Renewable energy sources (% of gross national energy consumption), of which:	39%	40%	50%
Heating and cooling (%)	54.6%	53.4%	
Electricity (%)	54.4%	59.8%	
Transport (%)	2.5%	10%	
Energy intensity (kg of oil equivalent per EUR 1 000 of GDP)	202.8	195	Less than 150
Energy savings (primary energy savings, Mtoe)	0.514	0.670	
Reducing heat consumption in buildings (kWh/m²)	195	150	Less than 100

Note: Mtoe = million tonnes of oil equivalent.
Source: Cross-Sectoral Coordination Centre (2018), "Implementation of the Sustainable Development Goals"; Eurostat (2019), "Share of energy from renewable sources", *Renewable Energy Statistics* (database); Ministry of Economy (2017), "Information report on progress towards the indicative national energy efficiency target in 2017-2019 in accordance with Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency"; Odysee-Mure (2019), *Key indicators* (database).

The energy mix and renewables

Latvia is among the leaders on renewables in the OECD. In 2017, renewables accounted for 40% of its total primary energy supply (TPES), well above the OECD average and the shares of Estonia and Lithuania (Figure 1.4). Solid biofuels (wood pellets, wood chips, charcoal, wood waste and residue, and straw) are the main renewable source. Biofuels and renewable waste account for a third of the energy mix, the highest share in the EU.

Figure 1.4. Renewables cover a large and increasing share of energy needs



Note: Breakdown includes electricity trade.
Source: IEA (2019), *World Energy Statistics and Balances* (database).

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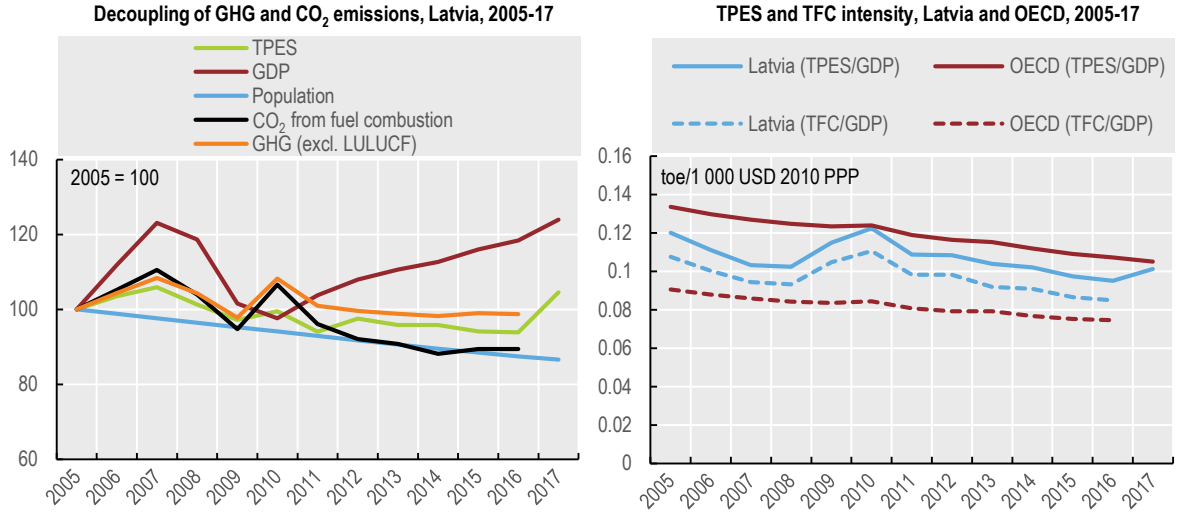
Hydropower is the second largest renewable source, with three large plants on the River Daugava and several smaller plants. They deliver half the country's electricity, on average, depending on precipitation levels. Favourable hydrological conditions have led to higher hydropower output in recent years (Figure 1.4). With less than 70 MW of installed capacity,

wind power plays a limited role, despite good potential in the Baltic countries (Lindroos et al., 2018). Estonia, for example, has over four times as much installed wind capacity as Latvia, and Lithuania six times as much. Solar power is virtually non-existent.

Energy supply from renewables increased by 29% over 2005-17. This growth helped reduce the CO_2 intensity of heat and power generation (Figure 1.5) and increase energy independence. However, Latvia remains heavily dependent on energy imports,[1] especially of transport fuels and natural gas. Natural gas is mainly imported from the Russian Federation and used for electricity and heat generation in combined heat and power (CHP) plants. Overall, fossil fuels account for nearly 60% of TPES, well below the OECD average of 80% (Figure 1.4).

Figure 1.5. Latvia has made progress in decoupling economic growth from energy use and GHG emissions



Note: GDP is expressed in 2010 prices and purchasing power parities. LULUCF = land use, land-use change and forestry.
Source: IEA (2019), *World Energy Statistics and Balances* (database); OECD (2018), "Aggregate National Accounts, SNA 2008 (or SNA 1993): Gross domestic product", *OECD National Accounts Statistics* (database); OECD (2018), "Environmental Performance Indicators", *OECD Environment Statistics* (database); OECD (2018), "Air and climate: Greenhouse gas emissions by source", *OECD Environment Statistics* (database); IEA (2019), "CO_2 emissions by product and flow", *CO_2 Emissions from Fuel Combustion* (database).

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Latvia is on track to reach its overall 2020 EU renewables target and has already exceeded the NREAP indicative target for the heating and cooling sector (Table 1.1). A generous support system fostered the use of solid biofuels and natural gas in high-efficiency CHP plants (Chapter 3), and helped increase electricity and heat production from renewables (Figure 1.4). Solid biofuels cover nearly half of heating needs, mostly as firewood in individual heating systems and biomass in CHP plants of district heating networks.

However, additional power generation is needed to meet the NREAP renewable electricity target of nearly 60% of electricity consumption. Renewables cover less than 3% of transport fuel consumption, far from the 2020 EU target of 10%. Most domestic biofuel production consists of biodiesel from rapeseed and rapeseed oil, the majority of which is exported (Chapter 3). Given the current and expected role of solid and liquid biofuels, Latvia should identify and assess synergies and trade-offs between further development of

biofuel production and use, and the policy objectives related to climate, air pollution, water, land use and biodiversity (Box 1.1).

Box 1.1. Sustainability indicators for bioenergy

Bioenergy technology is projected to increasingly contribute to energy use for electricity, heating and transport. In the International Energy Agency 2°C Scenario, bioenergy provides nearly 17% of final energy demand by 2060, compared to 4.5% in 2015.

Bioenergy is a complex field, as it interacts with sectors such as agriculture and food production, forestry and waste management. For example, production of wood-based biomass or crop-based biofuels can affect land use, biodiversity, water and carbon absorption capacity. If bioenergy supply and use are to expand, they need to be sustainable.

The Global Bioenergy Partnership, an initiative bringing together 50 national governments and 26 international organisations, developed 24 indicators to help track bioenergy sustainability:

- The environmental indicators are life-cycle GHG emissions; soil quality; harvest levels of wood resources; emissions of air pollutants; water use and efficiency; water quality; biological diversity in landscape; and land use and land-use change related to bioenergy feedstock production.
- The social indicators are allocation and tenure of land for new bioenergy production; price and supply of a national food basket; change in income; jobs in the bioenergy sector; change in unpaid time spent by women and children collecting biomass; bioenergy used to expand access to modern energy services; change in mortality and burden of disease attributable to indoor smoke; and incidence of occupational injury, illness and fatalities.
- The economic indicators are productivity; net energy balance; energy diversity; gross value added; change in fossil fuel consumption and traditional biomass use; workforce training and requalification; infrastructure and logistics for bioenergy distribution; and capacity and flexibility of bioenergy use.

Source: IEA (2017), *Delivering Sustainable Bioenergy*.

Energy intensity

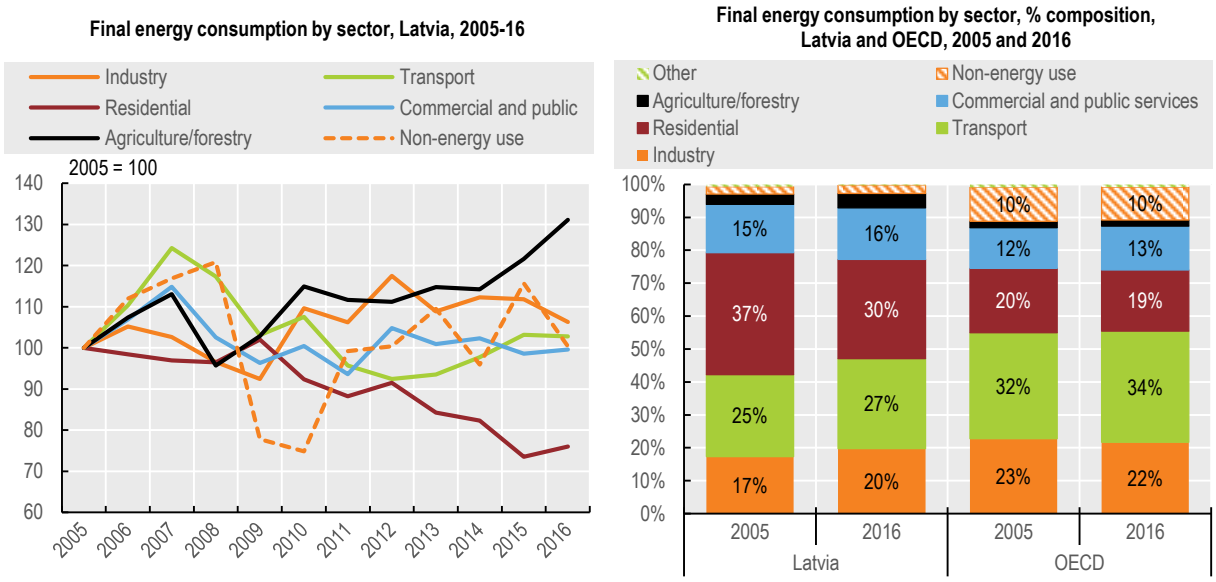
Energy use and intensity have declined, but there is scope for significant energy savings. Between 2005 and 2016, TPES decreased by 6% and total final energy consumption (TFC) by 7%, despite sustained economic growth for most of the period (Figure 1.5). As a result, the primary energy intensity of the economy (as measured by TPES per unit of GDP) fell below both the OECD average and those of many economies in transition. However, it picked up again in 2017, mostly due to increased used of diesel for transport. Final energy intensity (as measured by TFC per unit of GDP) also declined, but remains steadily above the OECD average (Figure 1.5). This indicates that Latvia has a relatively efficient energy transformation sector compared to other OECD countries, but efficiency in final energy use is below the OECD average.

Energy use

Latvia needs to tackle increasing energy consumption in agriculture, industry and transport, along with persistently high energy use in buildings, to achieve the 2020 energy intensity and energy savings targets in the National Energy Efficiency Action Plan (Table 1.1). While agriculture accounts for a relatively minor 4% of energy use, its energy consumption has increased more than in all other sectors (by 22% over 2005-16) with growing production and extension of cultivated area. Industry accounts for a lower share of energy use than the OECD average (Figure 1.5), reflecting the relatively small industrial base. However, industrial energy use rose by 12% between 2005 and 2016. While energy use in most manufacturing sectors declined, it boomed in the wood and wood products sector to reach 60% of all industrial energy use.

The residential sector is the main energy user, accounting for 30% of energy consumption, higher than the OECD average (Figure 1.6). Latvia has implemented several measures to improve energy performance of buildings, including minimum energy performance requirements and thermal insulation standards. It has also provided financial support for investment in upgrading district heating networks and thermal renovation of residential buildings, with large EU funding contributions (Chapter 3). Energy efficiency gains and population decline drove consumption down by 26% over 2005-16. However, most of the building stock is over 25 years old and consists of multi-owner buildings with poor energy performance. In 2016, heat consumption per square metre was about 14 kg of oil equivalent (kgoe), among the highest in Europe and well above that of most other northern European countries (which also experience freezing winter temperature) (Odyssee-Mure, 2019).[2] Continuing to improve efficiency in residential buildings would have multiple benefits, including reducing GHG and air pollutant emissions and energy poverty risk (Chapter 3). In 2018, 7.5% of households could not keep their home adequately warm, more than twice the share in most other northern European countries.[3]

Figure 1.6. Household buildings and transport are the main energy users



Source: IEA (2019), *World Energy Statistics and Balances* (database).

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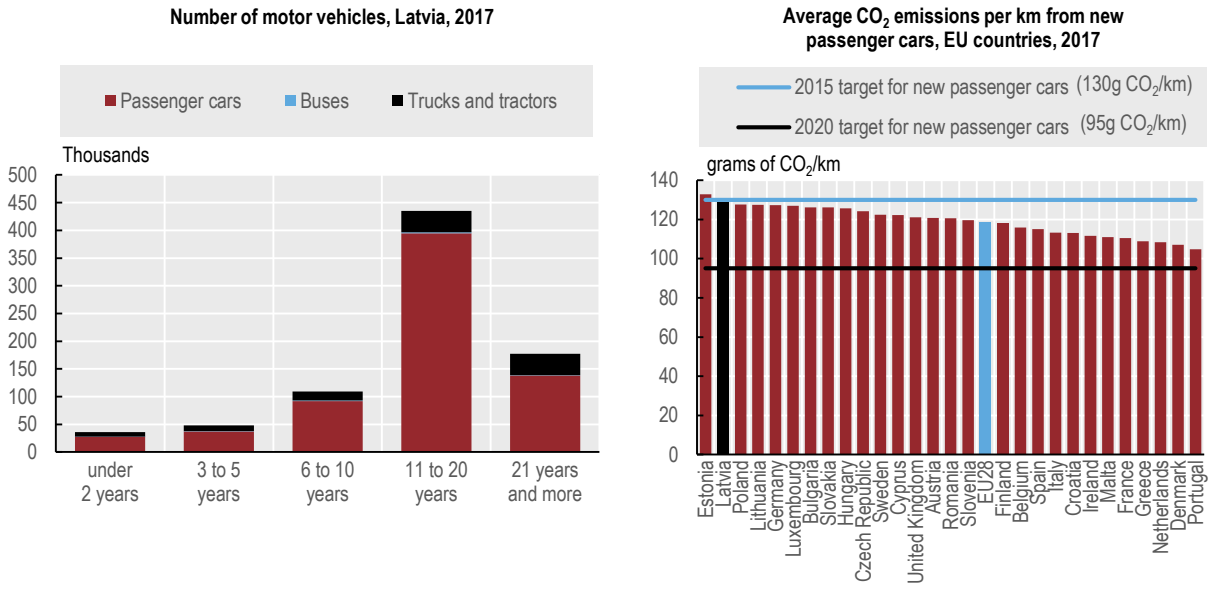
Transport is the second largest energy user, accounting for more than a quarter of energy consumption, as well as the main source of GHG emissions (Figure 1.6; Section 1.3.2). Rail accounts for 76% of freight transport, its largest market share in the EU. However, the share has decreased in the 2010s in favour of roads, and most trains run on diesel. The role of rail in passenger traffic is low and declining, accounting for less than 5% of passenger travel. The sparse and declining population makes it costly to provide widespread access to public transport (Chapter 3). Hence cars are by far the dominant mode of transport (80% of passenger travel).

Energy consumption in road transport, which accounts for over 90% of energy used in transport, has increased by 5% since 2005. Motor vehicle ownership is below the OECD average, but is expected to increase along with income level and suburbanisation, despite population decline. Close to 80% of the passenger vehicle fleet is over ten years old (Figure 1.7), as in many other Central and Eastern European countries. The fleet age hinders development of renewables in transport. Dieselisation of the car fleet has been rapid: the number of diesel cars rose from a third of the fleet in 2010 to more than half in 2017. Although newly registered passenger cars in Latvia are less carbon intensive than in the past, they still are the second most carbon-intensive cars in the EU. Their emissions are just below the 2015 target, but far from the 2020 target (Figure 1.7).

Figure 1.7. The vehicle fleet is old and carbon-intensive



Source: Central Statistical Bureau of Latvia (2018), *Transport in Latvia 2018*; Eurostat (2019), Average carbon dioxide emissions per km from new passenger cars" (grams of CO_2 per km) (database).

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1.3.2. Climate change mitigation and adaptation

GHG emission mitigation performance

Latvia more than achieved its Kyoto target of reducing emissions by 8% in 2008-12 from 1990 levels. Gross GHG emissions (without emissions and removals from land use,

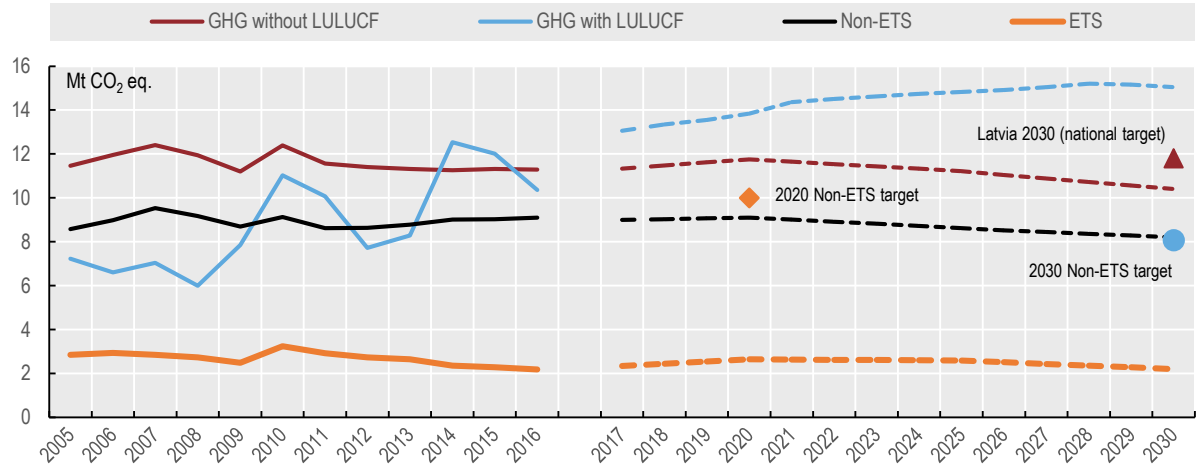
land-use change and forestry, or LULUCF) declined by 60% between 1990 and 2000 due to the shift from central planning to a market-based economy, with a shrinking industrial base and growing service sector.

After having broadly followed the economic cycle in the 2000s, gross GHG emissions slightly declined in the early 2010s and have stabilised at around 11 million tonnes of CO_2 equivalent (Mt CO_2 eq.) since 2013, despite steady economic growth. As a result, since 2011, Latvia has decoupled GHG emissions and CO_2 emissions from fuel combustion from economic growth (Figure 1.5), thanks to a gradual switch from fossil fuels to biomass for heat and power production and to improved energy efficiency (Section 1.3.1). The GHG emission intensity of the economy has thus declined, and has remained well below the OECD average (Basic statistics). This also reflects the small industrial base and still relatively low incomes.

Overall, gross GHG emissions decreased by 1.3% between 2005 and 2016. This puts Latvia on track to meet its 2020 target, under the EU Effort Sharing Decision, of limiting the increase in GHG emissions to 17% of the 2005 level (Figure 1.8). The target covers emissions from sectors outside the EU Emissions Trading System (EU ETS), mostly transport, agriculture, buildings, small industrial facilities and waste.

Figure 1.8. Further efforts are needed to meet the 2030 EU target

GHG emission trends and projections towards targets



Note: Dotted lines refer to national projections with existing measures. Latvia 2030 (national target) refers to the target set in the Sustainable Development Strategy of Latvia 2030, requiring GHG emissions without LULUCF to be 45% below their 1990 level. The 2020 target allows emissions outside the scope of the EU ETS to be 17% higher than their 2005 level. The 2030 target requires non-ETS emissions to be 6% lower than their 2005 level, with flexibility through access to ETS allowances and credits from the land-use sector.
Source: MEPRD and LVGMC (2019), "National projections of greenhouse gas emissions and removals", submitted to the European Commission pursuant to Commission Implementing Regulation (EU) No 749/2014 of 30 June 2014.

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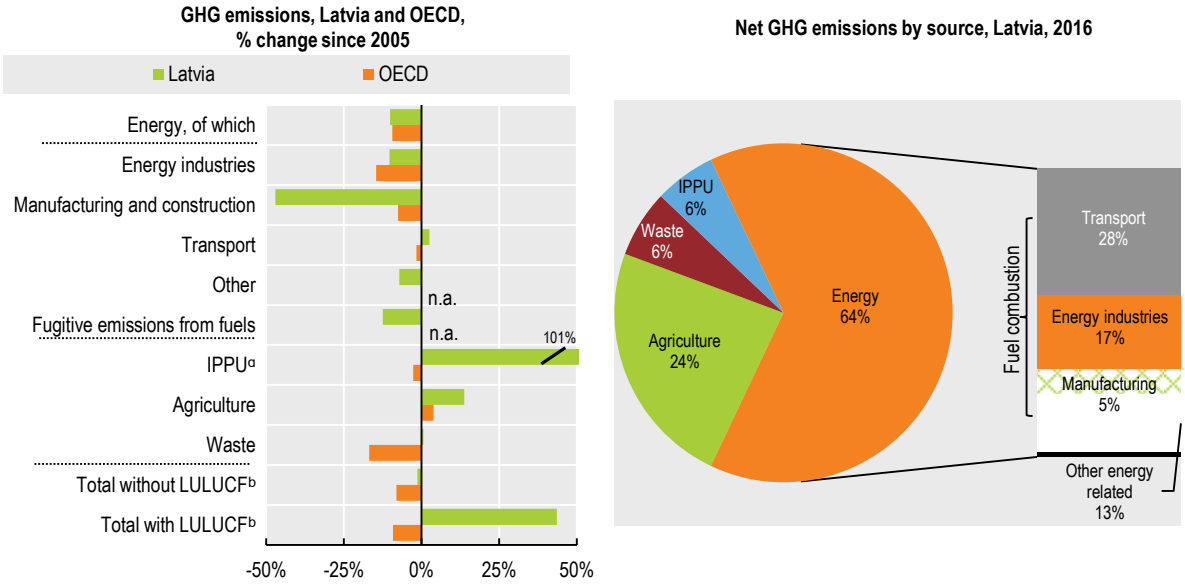
The EU-wide cap-and-trade system covers only about a fifth of Latvia's emissions, i.e. those from large power plants, most energy-intensive industrial installations and aviation. By comparison, the EU ETS covers about half of EU emissions. The difference reflects Latvia's limited number of industrial installations above the capacity threshold, the large share of renewables in the energy mix and the large shares of emissions from transport and agriculture (Figure 1.9), which are excluded from the cap.

Transport is the largest source of GHG emissions. Transport emissions rose by 3% over 2005-16, to 28% of total GHG emissions (Figure 1.9). Latvia is among the OECD countries with the highest shares of emissions from agriculture (25%) and where emissions from agriculture have grown the most (by 4% over 2005-16) (Figure 1.9). This is due to increases in cultivated area, cattle and fertiliser consumption.

Figure 1.9. Transport and agriculture are the main sources of GHG emissions



Note: a) Industrial processes and product use; *b)* Land use, land-use change and forestry.
Source: OECD (2018), "Air and climate: Greenhouse gas emissions by source", *OECD Environment Statistics* (database).

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GHG emission mitigation outlook to 2030

Projections show GHG emissions excluding LULUCF declining to 9% below the 2005 level by 2030, or to 60% below the 1990 level. Hence Latvia is projected to exceed the 2030 target of a 45% reduction set by the Sustainable Development Strategy. Emissions from power and heat generation, transport, and the residential and commercial sectors are projected to decrease. These projections refer to a with-existing-measures scenario, i.e. they take into account the effect of planned measures to promote switching to renewables and improve energy efficiency in buildings and industry. The adoption of cleaner vehicle technology and alternative transport fuels is expected to mitigate GHG emissions associated with increasing freight and passenger traffic (LEGMC and MEPRD, 2019). To realise the projections, it is essential for Latvia to fully and timely implement those measures.

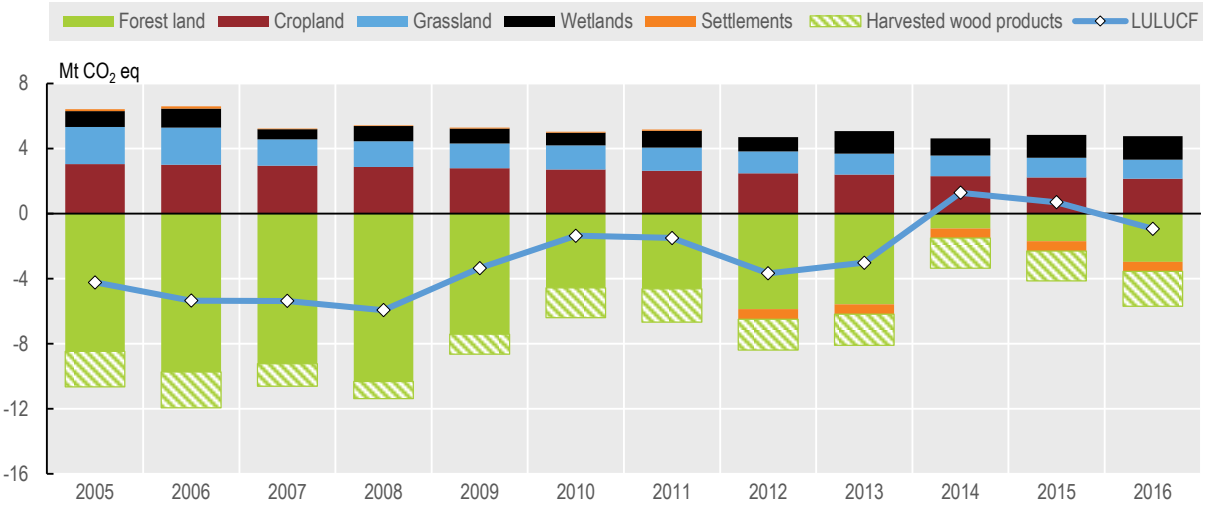
However, according to the same projections, emissions from agriculture are expected to continue rising with expansion of agricultural land, cultivation of organic soil, rising amounts of production and livestock, and increased use of nitrogen fertilisers (LEGMC and MEPRD, 2019). Agriculture is projected to account for 30% of gross GHG emissions in 2030. This growth is projected to partially offset reductions in other non-EU ETS sectors, such as transport and the residential and commercial sectors. Overall, projections show non-EU ETS emissions decreasing by 4.4% by 2030, compared to their 2005 levels. Thus

Latvia is expected to miss the 2030 target of reducing these emissions by 6% from 2005 (Figure 1.8).

With LULUCF, total GHG emissions are projected to more than double from the 2005 level by 2030 (Figure 1.8). The LULUCF sector's carbon sequestration capacity declined markedly, by 78%, over 2005-16. The sector became a net GHG emitter in 2014 for the first time. LULUCF had positive net emissions in 2014-15 (Figure 1.10). Increased logging and forest ageing will continue to reduce GHG removal capacity, as will do conversion of grasslands into croplands (LEGMC and MEPRD, 2019).

Figure 1.10. Increasing forest harvesting reduced net GHG removals

GHG emission and removal from LULUCF, 2005-16



Source: UNFCCC (2018), *Greenhouse gas emissions data* (database).

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Latvia is preparing its National Energy and Climate Change Plan 2021-30, in line with EU requirements, and its Low Carbon Development Strategy 2050, as required by the Paris Agreement under the United Nations Framework Convention on Climate Change.[4] The draft of the strategy, which is expected to be approved by the end of 2019, envisages reducing GHG emissions by 80% by 2050 from the 1990 level. The strategy should be accompanied by a plan that identifies the expected contribution of each economic sector to domestic emission mitigation and lays out gradually stricter targets. Several municipalities have also developed climate change mitigation plans and set mitigation targets (Box 1.2).

There is a need to improve the knowledge base on available mitigation options. Given the key economic and environmental roles of agriculture and forestry in Latvia, any climate change mitigation plan or strategy should include analysis of options for mitigating GHG emissions from these sectors, taking into account economic, social and environmental considerations. The long-term climate mitigation strategy should be based on a quantitative assessment of the climate mitigation and environmental benefits and impact of using domestically produced biofuels, compared with those for other energy sources.

Box 1.2. Climate action at the local level

Twenty municipalities, accounting for about 60% of the Latvian population, have submitted climate change mitigation plans under the Covenant of Mayors for Climate and Energy. Latvia is one of the EU countries with the largest number of people covered by the covenant. All the plans include 2020 CO_2 emission reduction targets, one includes 2030 targets and two also cover adaptation.

Riga has committed to reducing its CO_2 emissions by 55% from the 1990 level by 2020 via increased energy efficiency and renewables. It has also developed a Hydro Climate Strategy to help the city council adopt adequate flood management measures in light of increased flooding risk resulting from climate change.

Source: Covenant of Mayors (2018), *Covenant of Mayors for Climate and Energy* (website); EC (2017), "The EU Environmental Implementation Review Country Report – Latvia".

Climate change impact and adaptation policy

Latvia has experienced a relatively stable increase in mean annual temperature over the past 50 years (1961-2010). The number of summer days has increased and the number of ice days decreased. There has also been an increasing trend in precipitation levels since the 1960s, along with higher intensity and frequency. Long-lasting period of intense rainfall resulted in severe flooding events, such as in August-October 2017, when floods destroyed crops and caused widespread damage to watercourses, the drainage system, water treatment installations and transport infrastructure.

Higher temperatures are expected to affect ecosystems and the health and well-being of Latvians. Half the population lives in an area 5-10 km wide, along the Baltic Sea and Gulf of Riga, which is vulnerable to sea level rise and flood risks. The Latvian Environment, Geology and Meteorology Centre is making efforts to analyse past and projected climate change as a basis for developing adaptation measures. Latvia developed flood risk assessments and flood hazard and risk maps as required by the EU Floods Directive.

Planning for adaptation to climate change is at an early stage. In 2018, the government developed a draft plan for climate change adaptation up to 2030. The plan aims to reduce risk and maximise benefits arising from climate change. It provides information on the past and future impact of climate change, analyses risk and vulnerability in six vulnerable sectors,[5] presents adaptation measures and envisages the establishment of a monitoring system. Latvia should adopt this plan at the earliest opportunity and ensure systematic monitoring and evaluation of its implementation.

The country needs to accelerate implementation of adaptation actions. In 2018, Latvia amended its legislation on environmental impact assessment to require an evaluation of the impact of climate change on development projects. It now needs to ensure that the legislative requirements are thoroughly implemented. Some municipalities have started developing local climate change plans, but most lack the human and financial capacity to integrate climate change adaptation actions in their land-use and development plans and to put adequate adaptation measures in place.

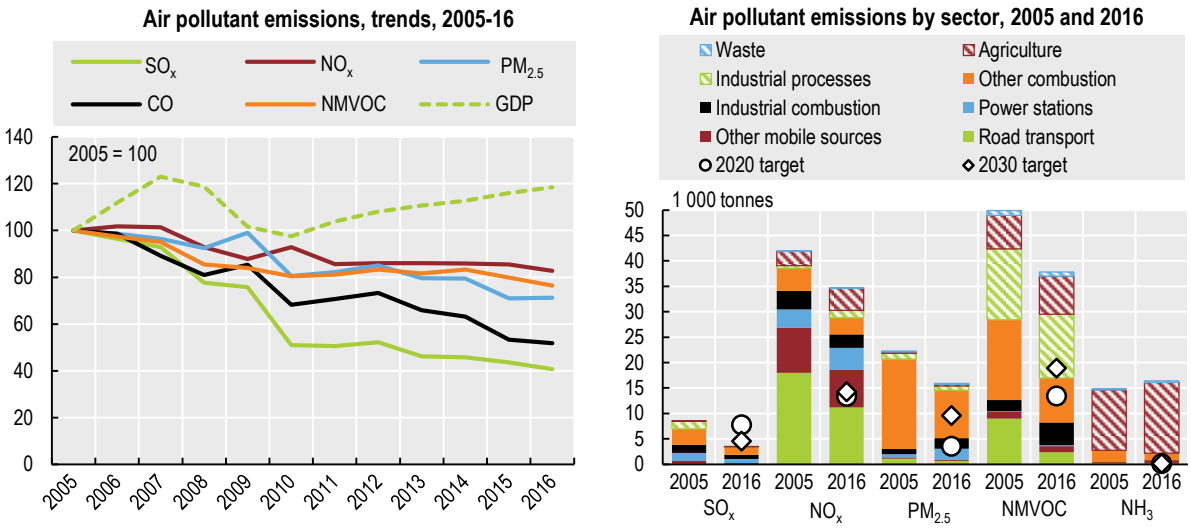
1.4. Improving air quality

Latvia's Environmental Policy Strategy 2014-20 presents objectives and actions for improving air quality. In line with EU requirements, Latvia set emission targets and air quality limit values that polluting activities need to comply with.

1.4.1. Air emissions

As in most OECD countries, air emissions have generally declined since the mid-2000s, despite GDP growth for most of the period (Figure 1.11). The intensity of air pollutant emissions, both per capita and per unit of GDP, is lower than the OECD average. Latvia met its 2010 targets under the EU National Emission Ceilings Directive for sulphur oxides (SO_x), nitrous oxides (NO_x), ammonia and non-methane volatile organic compounds (NMVOCs). However, according to projected emissions, more efforts will be needed to meet the 2020 and 2030 targets for NO_x and ammonia, and the 2030 target for fine particulate matter ($PM_{2.5}$). Thoroughly enforcing compliance with emission standards and promoting adoption of best available techniques in the residential, transport, industry and energy sectors would help reduce the distance to targets.

Figure 1.11. Air emissions have declined



Note: In the left panel GDP is expressed in 2010 USD and purchasing power parities. Right panel: "Other combustion" refers to combustion in sectors other than industry, such as households, agriculture, services and institutions.
Source: OECD (2019), "Air and Climate: Air Emissions by Source", *OECD Environment Statistics* (database); EEA (2018) *National Emission Ceilings Directive Emissions* (database).

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Road transport, fuel combustion in the residential and commercial sectors, and industrial processes are the main air emission sources. Fuel use in the residential and commercial sectors is the main source of $PM_{2.5}$ and NMVOCs, though these emissions have declined since 2005 (Figure 1.11). In particular, emissions of $PM_{2.5}$ from these sectors fell by about 29% over 2005-16 thanks to lower use of fuelwood in individual heating installations. However, $PM_{2.5}$ emissions from industry more than doubled with the switch from natural gas to solid biofuels in industrial facilities.

Road transport is the largest source of NO_x emissions. Total NO_x emissions decreased by 17% over 2005-16, largely due to an emission decline in the transport sector with the implementation of stricter vehicle emission standards. Still, in 2016, road transport was responsible for a third of NO_x emissions. More stringent regulations regarding maximum sulphur content in liquid fuels (in stationary sources and transport) helped reduce SO_X emissions.

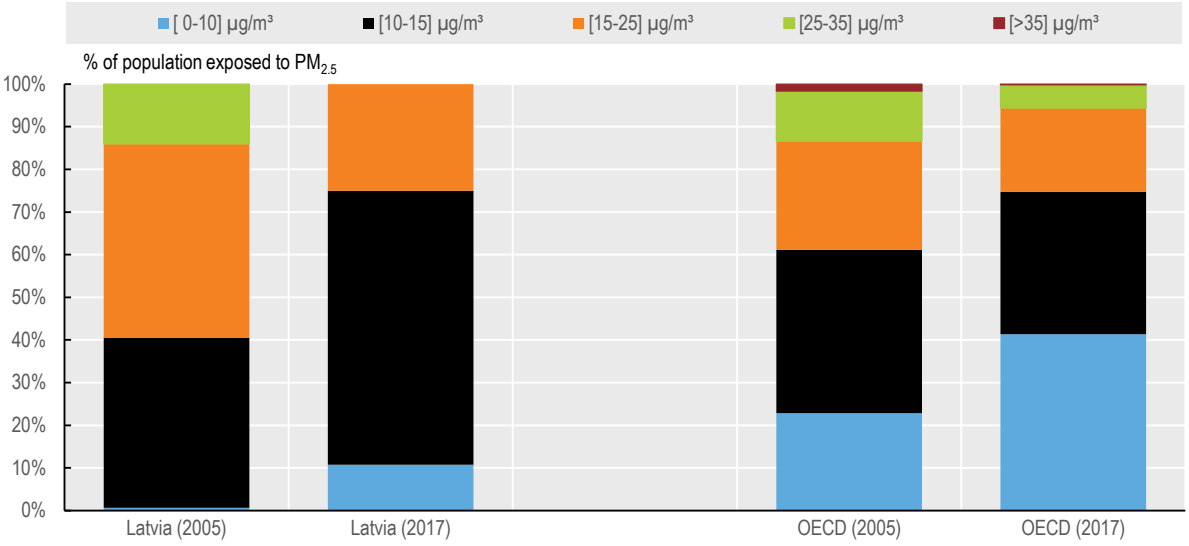
Agriculture is the main source of ammonia emissions, which rose by 10% between 2005 and 2016, mainly due to increased use of mineral fertilisers. NO_x emissions from agriculture increased as well. Latvia should ensure that air quality objectives and measures are taken into account in agriculture and rural development plans with a view to reducing emissions from NO_X and ammonia.

1.4.2. Air quality

Air quality has improved over the past decade. Concentration levels of NO_2 and ozone are lower than in most EU countries (EEA, 2017b).The mean population exposure to $PM_{2.5}$ declined by 21% over 2005-17 to 13.6 micrograms per cubic metre (µg/m³). This is still higher than in most OECD countries, however. People are no longer exposed to very high concentration levels (above 25 µg/m³), but close to 90% of the population is exposed to concentration levels higher than the World Health Organization guideline value of 10 µg/m^3 (Figure 1.12). Concentration levels of PM_{10} and NO_2 increase with more intense heating use and road traffic.

Figure 1.12. Most of Latvia's population is exposed to high $PM_{2.5}$ concentrations

Share of population exposed to $PM_{2.5}$ by annual average exposure levels, Latvia and OECD, 2005 and 2017



Source: OECD (2019), "Air quality and health: Exposure to $PM_{2.5}$ fine particles – countries and regions", *OECD Environment Statistics* (database).

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Riga suffers most from air pollution, with a mean concentration of $PM_{2.5}$ higher than in other parts of the country. Exceedances of the PM_{10} daily limit value and NO_x yearly limit prompted the municipality to implement action programmes in 2004-09, 2011-15 and 2016-20 to address emissions from vehicle use (e.g. infrastructure projects to reduce traffic

on bridges, promotion of biking) and industrial activity. Riga and surrounding municipalities should co-ordinate to accelerate implementation of air quality action programmes, which should reflect Riga's metropolitan scale. The city could consider establishing low-emission zones while providing adequate public transport services.

Latvia's population is vulnerable to the health impact of air pollution due to the compound effect of its relatively poor health status, ageing, the persistence of risk factors (e.g. smoking, alcohol consumption, obesity) and uneven access to good health care (OECD, 2016). This mix of factors explains Latvia's high estimated mortality and welfare costs from exposure to outdoor $PM_{2.5}$, with an estimate of over 600 premature deaths per million inhabitants, more than double the OECD average.[6] The welfare cost of $PM_{2.5}$ pollution has declined, but is still put at 6.9% of GDP, the second highest level in the OECD (OECD, 2019c).

Latvia has 11 state-managed monitoring stations, including 5 in the Riga agglomeration. However, several do not comply with EU requirements concerning reference methods, data validation and location (Directive 2015/1480). The air quality monitoring network needs to be extended and upgraded to provide more detailed information (e.g. hourly PM_{10} and $PM_{2.5}$ measurements). An EU-funded project aims to address these issues.

1.5. Moving towards a circular economy

1.5.1. Material consumption

Biomass dominates material inputs and consumption. It represents 58% of domestic material consumption (DMC) and 70% of the materials exported. The bulk of it is wood that is used as an input by the wood processing industry, and by the energy sector as an energy source. Non-metallic minerals represent about a third of material inputs, largely in construction.

Material inputs and consumption declined significantly with the economic recession between 2007 and 2009. Over 2005-16, material consumption fell by 8%, while the economy grew by 18%. This was partly due to population decline and reduced purchasing power after the crisis. Still, in 2016, every inhabitant consumed, on average, 20 tonnes of materials, much more than the EU average of 13 tonnes and the OECD average of 16 tonnes.

The material productivity of the economy (GDP/DMC) improved by 29% over 2005-16. However, productivity gains were mostly driven by socio-economic developments; improved resource efficiency seems to have played a minor role (Chapter 4). Latvia still generates less than half the OECD average for economic value per tonne of materials consumed (Figure 1.13).

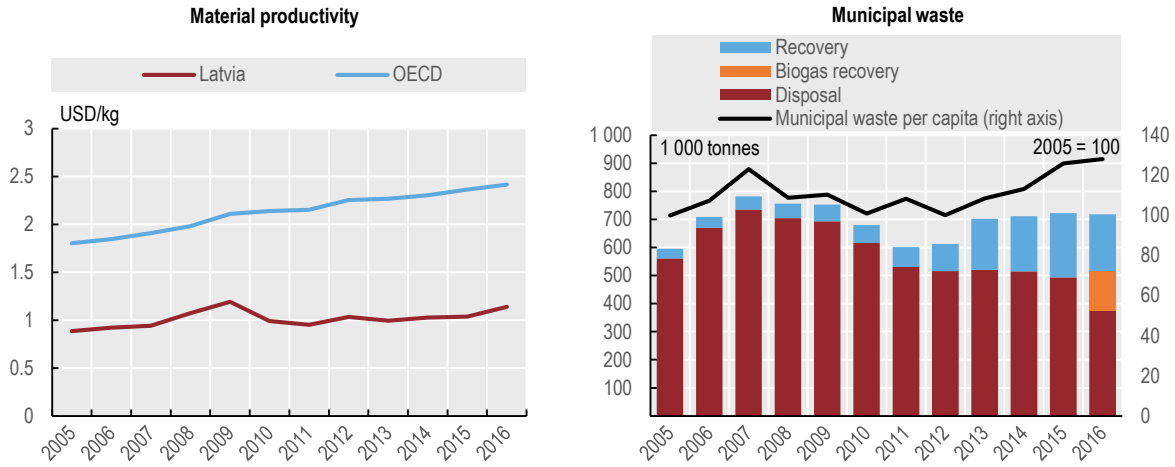
1.5.2. Waste generation and treatment

Total waste generation has more than doubled since 2004, despite a decrease due to the economic crisis. Municipal waste generation grew till 2007; it decreased in the aftermath of the crisis, with reduced household purchasing power, but has picked up again since 2012 (Figure 1.13). In 2017, every Latvian inhabitant generated, on average, 436 kg of municipal waste, less than the OECD average of 524 kg/capita, but 37% more than the Latvian average in 2005.

Latvia has long relied mainly on landfilling. The country has gradually closed more than 500 unregulated landfills and dumps and replaced them with new regional landfills

complying with EU standards. Landfilling, though decreasing, still represents more than 20% of treatment. Alternative waste treatment options are not yet well developed, but are expanding rapidly.

Figure 1.13. Progress on material productivity and waste recovery needs to be consolidated and strengthened



Note: In panel 1, USD are expressed in 2010 prices and purchasing power parities. In panel 2, "Recovery" refers to amount designated for recovery operations; "Biogas recovery" refers to amount of biodegradable waste undergoing anaerobic digestion with biogas recovery.
Source: OECD (2019), "Waste: Municipal waste", *OECD Environment Statistics* (database); OECD (2019), "Material resources", *OECD Environment Statistics* (database).

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In recent years, the focus has been on production of biogas and compost to divert waste from landfill and contribute to renewable energy targets. Since 2016 some biodegradable waste has undergone anaerobic digestion with biogas recovery in specially engineered cells. Expansion of recovery and recycling capacity is planned by 2023 (Chapter 4).

The recovery rate of municipal waste grew significantly after 2011 with the gradual introduction of separate collection, development of extended producer responsibility systems and increased landfill charges (Chapter 4). From basically zero in 2000, the rate had risen to 30% by 2016 (Figure 1.13). This is still lower than the EU and OECD averages, however, and the 2020 EU target of 50% of municipal waste being prepared for reuse, recycling or recovery may be difficult to reach. However, the recovery rate would rise to 45% if the recovery of biodegradable waste through anaerobic digestion with biogas generation is accounted for (Figure 1.13). Still, many recoverable and biodegradable materials are sent to landfills, and Latvia missed the 2013 EU target of reducing the amount of biodegradable waste landfilled to 50% of the 1995 level.

1.6. Protecting biodiversity

Latvia is a lowland country with some hilly elevations and about 500 km of coastline. Forests, grasslands, wetlands and agricultural land are home to abundant biodiversity and ecosystems. Latvia is among the top six OECD countries in terms of forests, which cover about half the territory. The largest are in the northwest, on the Kurzeme Peninsula; along the banks of the Daugava; and in the northeast. Agricultural land is also extensive, covering more than 30% of the land area. As a result of agricultural land expansion over the last five

decades, biodiversity-rich grasslands have shrunk to around 0.3% of the land area (Chapter 5).

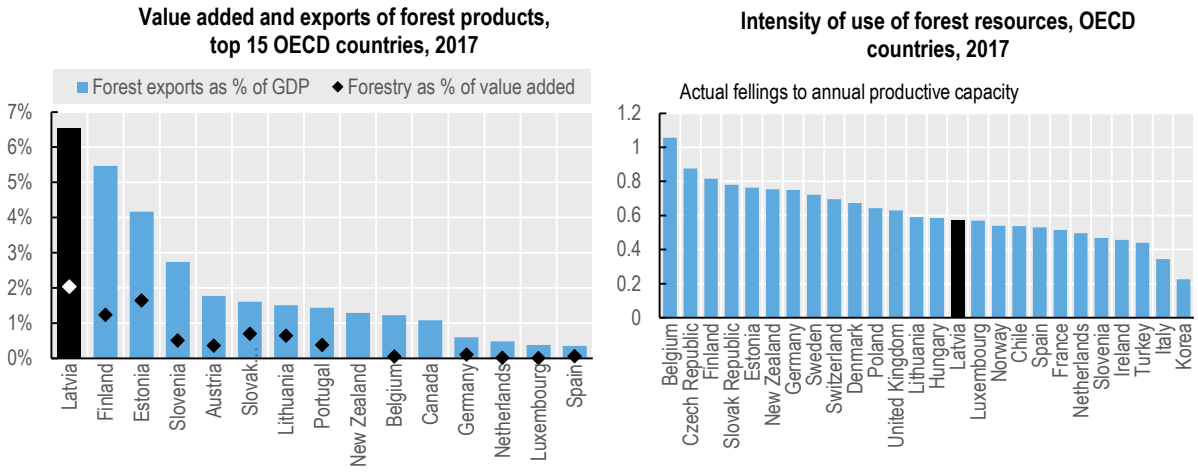
1.6.1. Forest ecosystems

Forest area has slightly increased since 2005 (by 2%), as has the growing stock (Chapter 5).[7] This has been driven by natural regeneration, complemented by seeding and planting on former agricultural land.

Forests provide cultural and recreational benefits and deliver ecosystem services, including habitat provision, carbon sequestration, water regulation and erosion prevention. They are also home to protected fauna species such as wolf, lynx and lesser spotted eagle. Latvian forests are nesting areas for 5% of the world black stork population.

Forests are a significant economic resource for Latvia. More than 70% of the forest area is used for production, mostly of sawnwood, wood-based panels and further processed products, as well as firewood, wood chips and pellets, of which Latvia is a leading exporter (Ministry of Agriculture, 2017). Exports of forestry-related products account for a larger share of GDP than in any other OECD country (Figure 1.14). The sector accounted for 2% of value added in 2017, the highest share in the OECD, and employed about 50 000 people.

Figure 1.14. Forests are a key economic asset



Note: 2017 or latest available year. Right panel: OECD countries for which data are available.
Source: FAO (2019), *FAOSTAT* (database); OECD (2019), "Forest resources", *OECD Environment Statistics* (database); OECD (2019), "Aggregate National Accounts, SNA 2008 (or SNA 1993): Gross domestic product", *OECD National Accounts Statistics* (database); OECD (2019), "PPPs and exchange rates", *OECD National Accounts Statistics* (database).

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The intensity of forest use is lower than in other countries with a large forestry sector, such as Estonia, Finland and the Slovak Republic (Figure 1.14). Productivity of forest stands has dramatically improved in recent decades. Since 1960, the average amount of wood available for harvesting, an indicator of sustainable use, has more than doubled through technological advances and use of scientific information to select and log trees (Pierhuroviča and Grantiņš, 2017). About half of forests are certified (Chapter 5). However, between 2007 and 2013, forest habitats significantly deteriorated, mostly due to increased

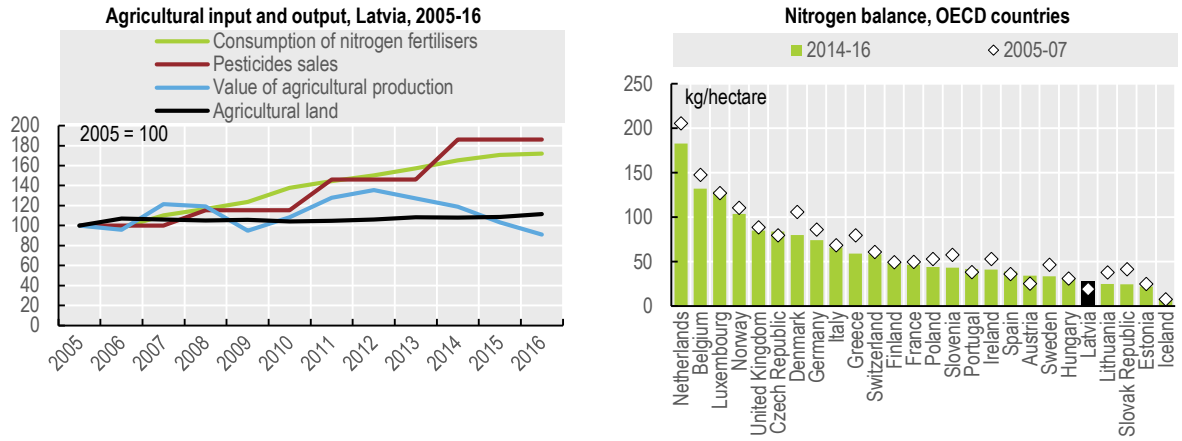
pressures from forestry and agricultural activities (EC, 2017b) (Chapter 5). Increased logging has resulted in decreasing GHG emission removals (Figure 1.10).

1.6.2. Agricultural land

Agricultural land has increased by 11% since 2005. About half is used for intensive production. The other half is used either extensively for pastures and meadows or not used. The Farmland Bird Index has increased in Latvia while it has declined in most other OECD countries, signalling that agricultural land is more favourable to birds and to biodiversity in general than in other countries (Chapter 5). However, environmental pressures have increased with the growth and intensification of agricultural production and livestock density (OECD, 2019d). Pressures include GHG and ammonia emissions associated with increased used of mineral fertilisers (Sections 1.3.2 and 1.4.1).

Between 2006 and 2016, nitrogen fertiliser consumption per hectare of fertilised agricultural area increased by 72%. As a result, the nitrogen surplus has risen by 47% since the mid-2000s, albeit from relatively low levels, and could grow further with the expected intensification of agricultural activity. In most other European countries the nitrogen surplus declined (Figure 1.15). Sales of pesticides have also increased since the mid-2000s.

Figure 1.15. Nitrogen fertiliser consumption and the nitrogen surplus have increased



Note: In the left panel, fertiliser and pesticide use/sales are expressed in tonnes/km^2 of agricultural land; agricultural production is expressed in USD at 2010 prices. Right panel: data are period averages (not all countries have data for 2016).
Source: OECD (2019), "Environmental Performance Indicators", *OECD Environment Statistics* (database); OECD (2019), "Environmental performance of agriculture – nutrients balances", *OECD Agriculture Statistics* (database); FAO (2019), *FAOSTAT* (database).

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In line with the EU Nitrates Directive (91/676/EEC) to prevent nitrate pollution from agricultural sources, more stringent regulations regarding manure and fertiliser use apply in Nitrate Sensitive Areas or Nitrate Vulnerable Zones such as Zemgale, which has rich soil and a large amount of crop farming. The area under organic farming more than doubled between 2005 and 2016, to 13.4% of agricultural land, nearly double the EU average.

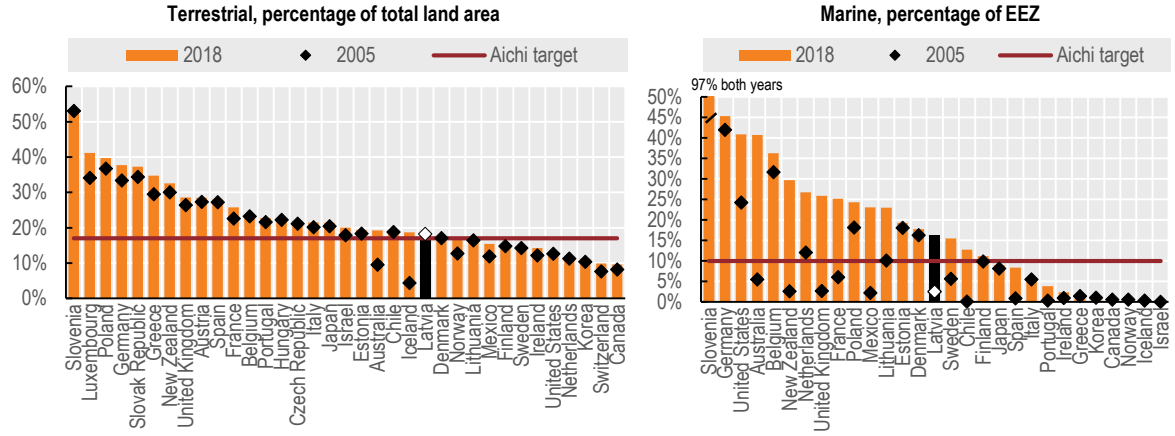
The Rural Development Programme for 2014-20 focuses on "restoring, preserving and enhancing ecosystems related to agriculture and forestry" (EC, 2018). This goal entails assigning 14% of the agricultural area to biodiversity-related objectives, 17% to water management and 17% to soil management. The programme also aims at boosting energy-efficient technology in agriculture and forestry and developing infrastructure in

rural areas. Examples include upgrading the outdated drainage systems on which Latvia largely relies.

1.6.3. Conservation status of habitats and species

Protected areas are the main instrument for protecting biodiversity and cover slightly more than 18% of the land area, of which 12% is Natura 2000 sites. Latvia achieved Aichi target 11 for 2020 on marine and terrestrial areas, which calls for protecting at least 17% of terrestrial and inland water and 10% of coastal and marine areas (Figure 1.16).

Figure 1.16. Protected areas have reached the Aichi targets



Note: Data refer to metropolitan or mainland countries, not including overseas territories. Turkey: Data not available (according to official national sources about 9% of the territory is protected). EEZ = exclusive economic zone.
Source: OECD (2018), "Biodiversity: Protected areas", *OECD Environment Statistics* (database).

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Despite a relatively large share of protected areas, the latest available report on habitat conservation status under the Habitats Directive (92/43/EEC) shows that the condition of natural environments is quite poor (2013 data). A majority (51%) of habitats have unfavourable/bad conservation status, significantly higher than the EU average (30%). Only around 10% of all habitats have favourable conservation status. Forest, grassland and peatland habitats' status are among the worst (EC, 2017b).

Latvian marine waters are affected by nutrient pollution and eutrophication, discharges of hazardous substances, invasive species and marine litter (EC, 2017b), which all put pressure on marine biodiversity. Some commercial fish stocks in the Baltic Sea have declined or are depleted (Chapter 5).

Large shares of species groups also show unfavourable conservation status. Over 400 species are listed as threatened, accounting for 2% of total known species, with amphibians and reptiles being the most vulnerable (OECD, 2019e). Protected species account for less than 3% of total known species (Chapter 5).

1.7. Improving water resource management

As in other policy areas, most of Latvia's water policy requirements, objectives and targets are based on EU policies and legislation.[8] Latvia is also a party to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the

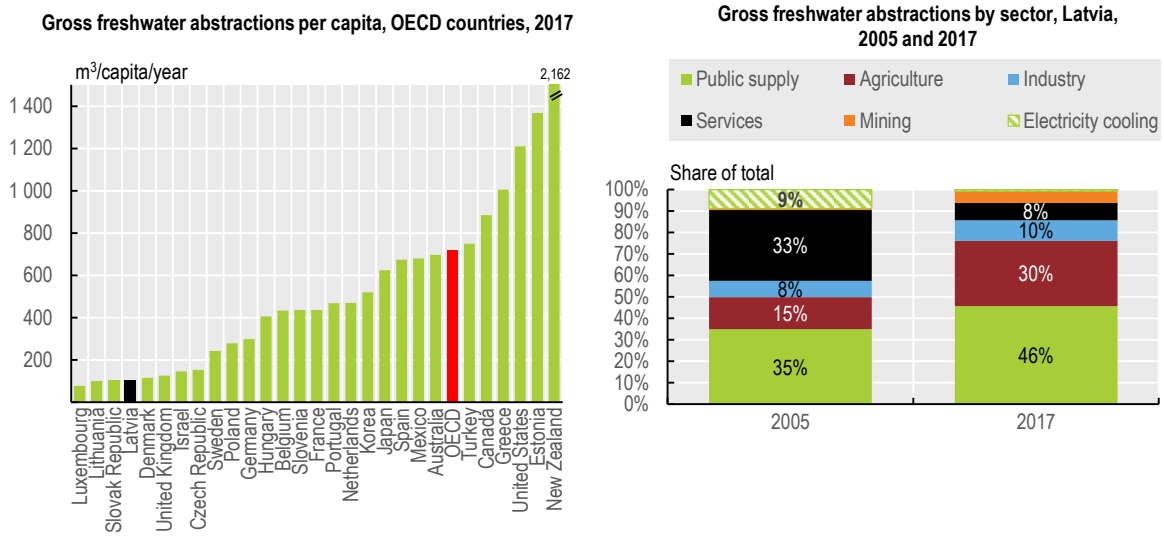
Convention on the Protection of the Marine Environment of the Baltic Sea Area, which aims to achieve good marine environmental status in the Baltic Sea by 2021.

In line with the EU Water Framework Directive, Latvia developed river basin management plans (RBMPs) for the Daugava, Lielupe, Venta and Gauja river basin districts for 2009-15 and 2016-21. The RBMPs provide information on the status of surface water and groundwater, analyse pressures on water quality and quantity, and list measures for improving water management. The four river basin districts are transboundary with Estonia, Lithuania, Belarus and/or the Russian Federation.

1.7.1. Water quantity

Latvia has abundant resources of surface water and groundwater, with about 17 000 m^3 of renewable freshwater resources available per capita. It has more than 2 000 natural lakes and more than 12 000 rivers. Gross freshwater abstractions per capita are comparatively low. Public water supply accounts for about half of freshwater abstractions, higher than in other Baltic states, followed by agriculture, forestry and fishing (Figure 1.17). Projections prepared for the 2016-21 RBMPs show no significant changes in water demand to 2021. Given that Latvia's freshwater resources exceed present and future requirements, water abstraction is not considered a key environmental pressure.

Figure 1.17. Per capita freshwater abstractions are among the lowest in the OECD



Note: Preliminary data. Left panel 1: 2017 or latesta vailable year; data older than 2013 are not taken into account.
Source: OECD (2018), "Water: Freshwater abstractions", *OECD Environment Statistics* (database).

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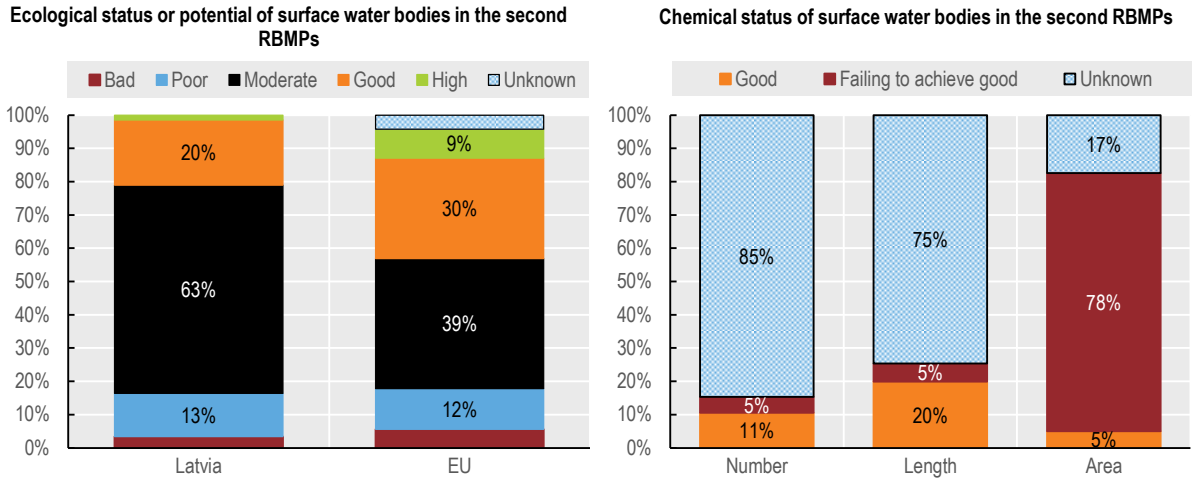
1.7.2. Water quality

The quality of surface water bodies is generally below the EU average, although knowledge gaps make international comparison problematic. The latest RBMPs show that about 20% of identified surface water bodies have high or good ecological status and a large majority have moderate status (Figure 1.18).[9] About 20% of surface water bodies have poor or bad ecological status, mainly due to barriers to migrating fish (e.g. dams). The chemical status of most surface water bodies is unknown (Figure 1.18). About 70% of the water bodies for

which the chemical status is known achieve good chemical status regarding priority pollutants.[10] However, this corresponds to only 6% of water bodies' area. No coastal or transitional (estuarine) water bodies achieve good chemical status (EEA, 2018a). Still, bathing water quality of lakes, rivers and coastal waters has improved with extended wastewater collection and more advanced treatment (Section 1.7.3). In 2017, the quality of 95% of Latvia's bathing waters was excellent or good (EEA, 2018b).

Figure 1.18. The quality of surface water bodies is generally below the EU average



Note: In panel 1, "Ecological status or potential" is an assessment of the quality of the structure and functioning of surface water ecosystems; ecological status is based on biological quality elements and supporting physico-chemical and hydromorphological quality elements. Surface water bodies comprise rivers, lakes, and transitional and coastal waters. Results are based on the WISE-SoW database, including data from the EU28 except Greece, Ireland and Lithuania. Panel 2: Data refer to 2000-15. Good chemical status means no concentrations of priority substances exceed the relevant EQS established in the Environmental Quality Standards Directive 2008/105/EC (as amended by the Priority Substances Directive 2013/39/EU). EQS aim to protect the most sensitive species from direct toxicity, including predators and humans via secondary poisoning. A smaller group of priority hazardous substances were identified in the Priority Substances Directive as uPBT (ubiquitous (present, appearing or found everywhere), persistent, bioaccumulative and toxic. The uPBTs are mercury, brominated diphenyl ethers, tributyltin and certain polyaromatic hydrocarbons.
Source: EEA (2019), *WISE-SoW* (database); EEA (2019), *Chemical Status of Surface Water Bodies* (database).

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Diffuse pollution from agriculture, point-source pollution and morphological alterations are the main pressures on water bodies. Increased nitrogen surplus potentially affects water and soil quality (Section 1.6.2). Latvia needs to address these pressures on water bodies and to improve monitoring and evaluation of water quality. Water monitoring activities are planned as part of the Environmental Monitoring Programme 2015-20.

1.7.3. Public water supply, sanitation and sewage treatment

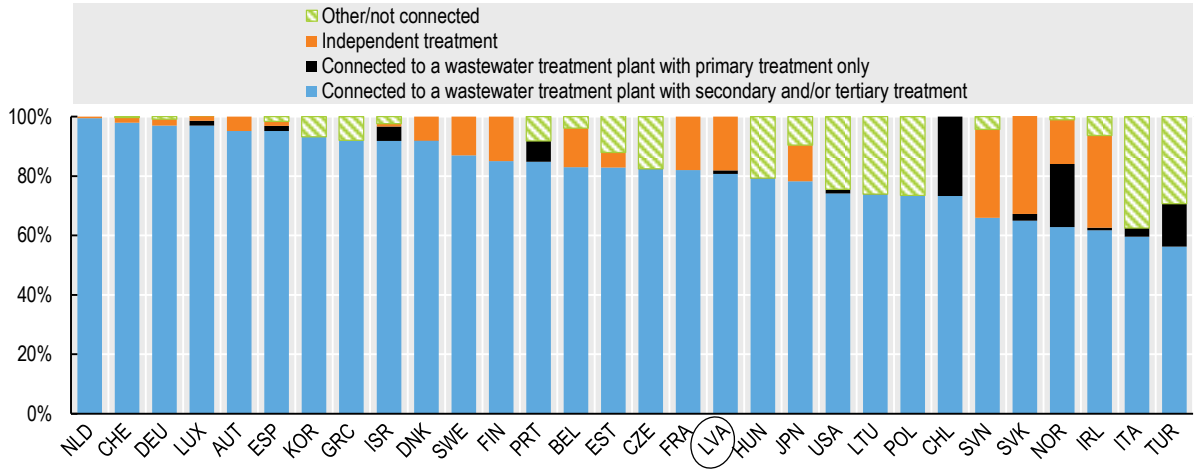
Public investment, largely EU-funded, has helped improve water service infrastructure and widen access to water supply and wastewater management services (Chapter 3). Water losses have declined substantially since 2004, especially in public water supply systems. Drinking water quality has generally improved, but varies depending on whether it is from large or small water supply zones.[11] The 30 large water supply zones, covering about 60% of the population, reached a very high level of compliance (over 99% in 2013) for all parameters (microbiological, chemical, pesticides and indicators) in the EU Drinking Water Directive (EC, 2016). Small water supply zones have lower rates of compliance with chemical parameters. Exceedances are mainly due to naturally high concentrations of iron

and manganese. This, combined with the costs of installing de-ironing systems and upgrading the supply network, results in exceedances for iron concentrations in 17% of small water supply systems.

The share of population connected to public wastewater treatment increased from 70% in 2005 to nearly 82% in 2017. Most people benefit from secondary or tertiary treatment, which puts Latvia close to achieving full compliance with the EU Urban Waste Water Directive. The remaining 18% of the population is connected to independent treatment systems (Figure 1.19). The low network connection rate, compared to many other OECD countries, reflects the high cost of connecting sparsely populated areas to the network, which affects tariff affordability. However, some wastewater in 14 agglomerations is treated in individual systems potentially inappropriate for environmental protection (EC, 2019). National and municipal regulations set the minimum frequency for emptying on-site sanitation systems, as well as procedures for monitoring decentralised sewerage systems and wastewater collectors. Latvia needs to ensure that independent wastewater treatment systems comply with environmental regulations.

Figure 1.19. Most of the population has access to advanced wastewater treatment

Percentage of population connected to public wastewater treatment plants, 2017



Note: Preliminary data. 2017 or latest available year (no earlier than 2013). "Other" includes connected without treatment, not connected or independent treatment (where there are no data for independent treatment).
Source: OECD (2019), "Water: Wastewater treatment", *OECD Environment Statistics* (database).

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There is limited wastewater reuse (EC, 2017c), as water resources are abundant. Production of sludge from urban wastewater treatment plants has grown since 2008, but its use is limited in forestry and agriculture. About half the sludge produced is disposed of in temporary storage sites, and new and improved plants mean larger quantities to manage. The cost-effectiveness of options for sludge reuse or disposal, in light of the socio-economic and environmental impact, remains to be assessed. The problem of treatment and safe disposal of sewage sludge is an issue in many countries. In Korea, for example, sludge is recycled into solid fuel and sold to thermal power plants (OECD, 2017).

Despite improvement, investment needs in the water sector remain high. Access to safe water and sanitation remains an issue in rural areas. Nearly a quarter of the population is

not connected to public water supply. Water service infrastructure is ageing and in generally poor condition. Wastewater collection and water supply systems suffer frequent leaks, infiltration and ruptures. In 2015, water utilities of agglomerations with more than 2 000 inhabitants estimated that over EUR 200 million was needed to renovate and rebuild urban wastewater systems (OECD, 2018b).

Municipalities are in charge of providing water services through municipally owned utilities, but they face significant financial constraints. Water tariffs are set by the state (through the Public Utility Commission) for large wastewater treatment and water supply systems and by local governments for smaller ones. Tariffs are set to cover water utility costs and allow for a profit margin. However, income from tariffs is not sufficient to cover investment costs and ensure a good-quality and sustainable functioning of the water systems in the long term (OECD, 2018b). Affordability issues, especially in rural areas, limit the ability to increase tariffs. Public investment in water infrastructure has heavily relied so far on EU transfers, which are expected to decline over time (Chapter 3). There is a need to complement EU funds with national public and private investment to upgrade wastewater treatment and water supply infrastructure.

Recommendations on climate, air and water management

Mitigating climate change and adapting to its impact

- Ensure that any new climate mitigation strategy is consistent with a cost-effective pathway towards being a net zero GHG emission country by 2050; guide this transition with a plan that identifies the expected contribution of each economic sector to domestic emission mitigation and lays out gradually stricter targets.
- Improve the knowledge base on available mitigation options, especially in the agriculture and forestry sectors, along with their costs and trade-offs, building on sound socio-economic and environmental indicators; assess and quantify the climate mitigation and environmental benefits and impact of using domestically produced biofuels, comparing them with those of other energy sources.
- Adopt the draft national plan for climate change adaptation to 2030 and monitor its implementation; ensure compliance with the legislative requirement of considering climate change impact and resilience in EIA procedures; assist municipalities in integrating climate change adaptation in their land-use and development plans.

Improving air quality

- Improve and extend the air quality monitoring network; promote adoption of best available techniques in the household, transport, industry and energy sectors and thoroughly enforce compliance with emission standards; integrate air quality objectives and measures in climate, energy, transport, agriculture and tax policies and plans, with a view to reducing emissions from $PM_{2.5}$, NO_X and ammonia.
- Strengthen implementation of the current air quality action programme in the Riga metropolitan area to reduce emissions from vehicles, industrial facilities and households; update the programme to introduce additional measures for the post-2020 period; consider establishing low-emission zones while ensuring adequate public transport services.

Ensuring good water quality and services

- Improve monitoring and evaluation of the quality of water bodies; identify environmental pressures and possible risks.
- Reduce diffuse water pollution from agriculture through a combination of measures: regulatory (e.g. technology, performance standards), economic (e.g. taxes on fertilisers and pesticides) and voluntary (e.g. awareness-raising initiatives, training).
- Complement EU funds with national public and private investment to upgrade wastewater treatment and water supply infrastructure; ensure that independent wastewater treatment systems comply with environmental regulations; improve small-scale water supply systems (e.g. wells) to extend access to good quality drinking water.
- Undertake a feasibility study to assess cost-effectiveness of alternative sludge reuse or disposal options and prepare to implement the best solution.

Notes

[1] Latvia's energy independence (production divided by total primary energy supply) increased from 41% in 2005 to 55% in 2017, but this level is still below the OECD average of 78%.

[2] By comparison, heat consumption per square metre was 11.9 kgoe in Denmark, 15.3 kgoe in Estonia, 12.3 kgoe in Finland, 11.3 kgoe in Lithuania and 9 kgoe in Sweden (Odyssee-Mure, 2019).

[3] Denmark, Estonia, Finland, Norway and Sweden all had shares below 3% in 2017.

[4] Latvia ratified the Paris Agreement in 2017.

[5] The six vulnerable sectors are biodiversity and ecosystem services; forestry and agriculture; tourism and landscape planning; health and welfare; building and infrastructure planning; and civil protection and emergency planning.

[6] Indicators on mortality and welfare costs from exposure to air pollution use the mortality estimates produced as part of the Global Burden of Disease 2017 project (https://vizhub.healthdata.org/gbd-compare). The welfare costs are calculated using a methodology adapted from OECD (2017), *The Rising Cost of Ambient Air Pollution thus far in the 21st Century: Results from the BRIICS and the OECD Countries*.

[7] The growing stock is the volume of all living trees in a given area of forest or wooded land that have more than a certain diameter at breast height.

[8] The main EU water-related directives are the Water Framework Directive (2000/60/EC), Drinking Water Directive (98/83/EC), Bathing Water Directive (2006/7/EC), Urban Waste Water Directive (91/271/EEC), Floods Directive (2007/60/EC), Nitrates Directive (91/676/EEC), Marine Strategy Framework Directive (2008/56/EC) and Ground Water Directive (2006/118/EC).

[9] "Ecological status and potential" is an assessment of the quality of the structure and functioning of surface water ecosystems, including rivers, lakes, transitional waters and coastal waters. It shows the influence of both pollution and habitat degradation. Ecological status is based on biological quality elements and supporting physico-chemical and hydromorphological quality elements.

[10] Good chemical status means no concentrations of priority substances exceed the relevant Environmental Quality Standards established in the related Directive 2008/105/EC.

[11] More than half of drinking water comes from groundwater (60%), 19% from surface water and 19% from artificially recharged groundwater.

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Chapter 2. Environmental governance and management

Latvia has a strong regulatory framework for environmental management. However, institutional capacity constraints impede more effective implementation of environmental law and use of good regulatory practices, particularly in compliance assurance. The country has well-developed and effectively used mechanisms of environmental democracy. This chapter analyses the environmental governance system, including horizontal and vertical institutional co-ordination and the setting and enforcement of environmental requirements. It also addresses public participation in decision making and access to environmental information, education and justice.

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

2.1. Introduction

The 2016 World Bank Worldwide Governance Indicators show Latvia having improved most of its scores, including government effectiveness, regulatory quality and rule of law, since 2006 (World Bank, 2017). The stability of the institutional framework is an important factor in this success. Good governance also manifests itself in Latvia's mature environmental democracy: public participation and access to information and justice. At the same time, trust in public authorities, particularly in the national government, is low, as is citizens' engagement in decision making (Seimuskane and Vorslava, 2013).

Since joining the European Union (EU) in 2004, Latvia has made its legal framework consistent with the EU environmental acquis. In 2017, it was among the EU countries with the fewest open infringements against EU environmental directives (EC, 2018). However, Latvia would benefit from more actively pursuing good international practices in ensuring compliance with domestic environmental law.

2.2. Institutional framework for environmental governance

Latvia is a unitary state and has a centralised system of environmental governance, with key environment-related functions concentrated in the Ministry of Environmental Protection and Regional Development (MEPRD). Local governments are responsible for land-use planning and environmental services. Inter-ministerial and vertical collaboration largely occurs in the framework of development policies.

2.2.1. Central government and horizontal co-ordination

The MEPRD develops and implements Latvia's environmental policy. It also implements regional development policy and provides methodological support to local governments for implementation of their development policies. In the environmental domain, the MEPRD relies on four key institutions:

- The State Environmental Service (SES), the main regulatory authority for environmental protection, issues permits and licences and carries out inspections. The SES has eight Regional Environmental Boards (REBs) – based in Riga, Daugavpils, Jelgava, Liepāja, Madona, Rēzekne, Valmiera and Ventspils – to provide easier access to public services. Institutional separation of regulatory powers from policy-making ones (which reside with the ministry) is a good international practice.
- The Environment State Bureau (ESB) co-ordinates environmental impact assessment (EIA) and strategic environmental assessment (SEA) procedures. The ESB also oversees eco-labelling and provides methodological support to integrated permitting. A special agency for environmental assessment is an arrangement used in several OECD countries, including Canada and Chile.
- The Nature Conservation Agency (NCA) manages all specially protected natural areas and controls international trade of endangered species (Chapter 5).
- Latvian Environment, Geology and Meteorology Centre (LEGMC) is responsible for environmental monitoring, assessment of environmental quality and natural resources, development of river basin management plans (RBMPs), collection and evaluation of environmental information, management of environmental data and reporting on the state of environment.

Cost-cutting reform of the public sector was undertaken in 2009 to mitigate the consequences of the financial crisis. This had a considerable impact in the environmental field. Since the merger of the environment and regional development ministries in 2011, the institutional structure has been stable, which helped in developing environmental authorities' human resource capacity. However, financial and staff resources remain below the 2007 levels. REB staff numbers have declined by 40% (EC, 2017), impairing SES compliance monitoring capability: there are only 56 environmental inspector posts across the country, and not all are filled (Section 2.4.1). Furthermore, the MEPRD underwent a 14% staff cut in 2014 (Brizga, 2018).

As is common in other countries, several line ministries have environment-related responsibilities. The Ministry of Economy supervises energy generation and energy efficiency, and plays a key role by overseeing the energy market, including renewables. The Ministry of Agriculture develops policies on agriculture, forestry and fisheries; the State Forest Service, State Plant Protection Service and Food and Veterinary Service operate under its auspices. The Ministry of Transport works with the MEPRD on sustainable transport planning, introduction of cleaner vehicles and management of end-of-life vehicles. The Maritime Administration of Latvia monitors ships' compliance with environmental protection requirements. The Ministry of Health develops regulations on drinking and bathing water quality and chemical safety, which its State Health Inspectorate enforces.

The Cross-Sectoral Coordination Centre (CSCC), a permanent body of civil servants created in 2010 under the Prime Minister's Office, oversees implementation of Latvia's Sustainable Development Strategy until 2030 (Latvia 2030) and the national development plan. Since 2015, the centre has also been the focal point for implementation of the Sustainable Development Goals (SDGs) and 2030 Agenda. The CSCC issues non-binding opinions on draft policies that may be discussed by the Cabinet of Ministers. The National Development Council, set up in 2014 as a political advisory body, also focuses on long-term development priorities. It comprises key ministers but does not meet often. Instead, ministerial state secretaries meet regularly to co-ordinate on key policy issues. There are also development councils in the planning regions (Section 2.3.4).

Several permanent and ad hoc inter-ministerial working groups deal with environmental issues. Data sharing is done through multilateral or bilateral co-operation agreements between public authorities (EC, 2017). The MEPRD emphasises paperless co-ordination and data sharing across the public administration, as well as better data management systems (OECD, 2018b). However, these mechanisms appear insufficient to ensure integration of environmental aspects into sectoral policies (forestry is a particular challenge; Chapter 5) or implementation of cross-sectoral policies such as those concerning transition to a circular economy (Chapter 4).

2.2.2. Municipalities

Latvia has 119 local governments: 9 "republic cities" and 110 municipalities. Municipal governments are responsible for developing and implementing spatial plans (and issuing building permits in line with them), and for delivering water supply, wastewater and waste management, and public transport services. There is a growing number of inter-municipal water and wastewater utilities and joint waste management service providers. Coastal municipalities have established an association to share experiences on coastal zone management and tourism development.

Every municipality has adopted a sustainable development strategy, often as part of a territorial development plan. However, many local strategies are only declarative. Small local governments have low implementation capacity, with priorities determined by availability of EU and central government funding.

Vertical oversight occurs primarily in the framework of spatial and development planning. The MEPRD checks procedural aspects of local land-use plans and compliance of local ordinances with legal requirements, but seldom intervenes on substantive issues. Municipalities rarely co-ordinate their water supply and sanitation investment with RBMPs. National guidelines on land use being developed by the MEPRD will help address the lack of central government guidance to municipalities on environmental issues.

2.3. Setting of regulatory requirements

Article 115 of the Constitution requires the government to protect the environment and provide information about environmental conditions. The Constitutional Court has put these fundamental guarantees into effect (Section 2.5.3). Key environmental laws are the Environmental Protection Law (2006, last amended 2018), Law on Pollution (2001, last amended 2018), Spatial Development Planning Law (2011) and Law on Environmental Impact Assessment (1998, last amended 2018). The Environmental Protection Law requires an environmental policy strategy to be drawn up; the current strategy (2014-20) lays out guidelines for government action in environmental protection, including targets (notably regarding climate change and biodiversity) and performance indicators.

EU integration has resulted in important environmental regulatory reforms, particularly in waste management (Chapter 4) and nature protection (Chapter 5). Regulatory provisions have become much more detailed, and voluntary approaches are being introduced. The ongoing development of electronic permitting will reduce the administrative burden on businesses.

2.3.1. Regulatory and policy evaluation

The obligation to conduct regulatory impact analysis (RIA) is set out in a 2009 government instruction. The RIA procedure was last amended in 2017 to include, among other things, analysis of environmental impact of regulations already in the initial phase (OECD, 2018b). The procedure mentions cost-benefit analysis, but such analysis is done only qualitatively. Assessment quality largely depends on the competence of individual experts. Generally, there is a lack of research capacity to support policy development. Latvia ranks last in the OECD on RIA quality (OECD, 2018a).

SEA is performed for all planning documents in agriculture, forestry, fisheries, energy, industry, transport, waste and water resource management, telecommunications, tourism, mineral resource extraction, and land use and territorial planning. This is in line with the EU SEA Directive (2001/42/EC). The ESB reviews and issues an opinion on SEA documents. SEA conclusions and recommendations must be integrated into the planning document by the competent authority. However, the quality of SEAs is uneven: as many government agencies lack analytical capacity for SEA, the assessments are frequently outsourced.

Ex post assessment of planning documents is mandated by a 2014 government regulation. Such assessment is to be prepared no more than two years after the end of the planning term. For example, in 2017 the CSCC prepared a midterm report on implementation of the 2014-20 national development plan and progress towards goals of Latvia 2030. Policy

assessment is also carried out within the framework of the Environmental Policy Strategy (2014-20); its midterm evaluation was conducted in 2017.

Latvia has not yet introduced systematic *ex post* review of regulations. In 2016, the government adopted a conceptual report on implementation of *ex post* evaluation aimed at improving oversight of regulatory effectiveness and efficiency. The State Chancellery is expected to elaborate a methodology for post-implementation regulatory reviews in 2019 (OECD, 2018b). Few OECD countries have used *ex post* evaluation of regulations systematically. Estonia is one example: it mandates such evaluation of all major new primary laws, although methodology remains a challenge (OECD, 2017).

2.3.2. Environmental impact assessment

EIA is governed by the Law on Environmental Impact Assessment and a 2015 procedural regulation. Projects in certain categories specified in the law must undergo EIA, while a few others require an initial assessment (screening) conducted by the SES. (In 2017, screening responsibility was moved from REBs to the SES central office to avoid possible local conflicts of interest.) As a result of screening, EIA is deemed unnecessary in all but 10% of cases, on average. If the SES determines that no EIA is necessary, it issues technical regulations with environmental requirements for the pre-operation phase of the proposed activity.

The EIA procedure is overseen by the ESB, which provides an opinion on the EIA report developed by the project proponent. On the basis of this opinion, the competent authority (usually the local government) decides whether to issue a consent for the project (e.g. a building permit). Consideration of alternative solutions regarding activity location and types of technology used are expected in the EIA process. There is a special EIA procedure for intended activities in protected Natura 2000 areas, which involves the NCA (Chapter 5). Latvia is a party to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context.

2.3.3. Permitting

The Law on Pollution and its 2010 implementing regulation classify polluting activities into Category A, B or C, depending on the level of their environmental impact. Category A installations, defined in line with the EU Industrial Emissions Directive (IED, 2010/75/EU), are required to use best available techniques (BAT), in accordance with government regulations or BAT reference documents,[1] and receive an integrated permit. As of March 2018, Latvia had 98 Category A installations. Category B installations fall below the IED threshold but still have a significant environmental impact and require a permit. There were almost 2 600 such installations as of June 2018, over 550 of them in the energy sector. Category C installations (numbering about 8 300) do not require a permit, but must submit notification to the REB and monitor and report their emissions.

Following good international practice, the government has adopted general binding rules for several cross-sectoral industrial activities that usually fall into Category B: emissions of volatile organic compounds from paints and varnishes (2007) and from installations using organic solvents (2013), and emissions from petrol stations, oil depots and tank containers (2012) (Pierhuroviča and Grantiņš, 2017). The rules establish uniform environmental conditions and good practices, taking BAT into account.

In addition to integrated environmental permits, there are several issue-specific ones. Greenhouse gas (GHG) emission permits require monitoring and annual reporting of GHG

emissions. The MEPRD allocates GHG emission allowances to permit holders. Water use permits for abstraction of surface water and groundwater as well as for operation of hydro-technical structures (dams, locks, canals, etc.) are issued if the activity does not fall into Category A or B (otherwise, these conditions are covered in the integrated permit). Waste management permits are required for collection, transport, storage, treatment and disposal of hazardous waste and municipal solid waste. There are also permits and licences for various uses of natural resources (extraction, logging, fishing, etc.).

REBs issue integrated permits for Category A and B installations, as well as permits for GHG emissions, water use, waste management and natural resource use. The SES national office issues permits for transboundary movements of waste. In issuing permits to operators that have undergone an EIA, the SES and REBs must consider the EIA report and comply with the ESB opinion on it. Permits have unlimited validity but are reviewed if the activity undergoes significant expansion or other change. The SES is developing an electronic permitting service and information system called TULPE, which will facilitate permitting and reduce the administrative burden on businesses.

Operators of all categories of installations must report self-monitoring results annually to their REB and local government. These reports are available to the public.

2.3.4. Land-use planning

The 2011 Spatial Development Planning Law introduced several types of planning documents at three levels (all these documents are subject to SEA, Section 2.3.1):

- Latvia 2030 (sustainable development strategy), the national development plan (a medium-term instrument linked to EU structural fund appropriation) and a maritime spatial plan (adopted in 2019)
- regional sustainable development strategy and development programme of a planning region (there are five such regions but they are not administrative jurisdictions, so the plans are produced by the central government)
- local sustainable development strategy and development programme, and several types of local spatial plans that specify zoning and regulate land use and public infrastructure.

Spatial (land-use) plans, which are exclusively local, are predominantly influenced by development programmes and very little by sustainable development strategies. A sustainable development strategy is often just a declarative chapter of the development plan. Spatial plans define zones devoted to environmental protection: nature and greenery territory, forest territory, water territory. Some environmental conditions are also attached to other functional zones, such as those dedicated to buildings, industry, transport or agriculture. Spatial plans contain rules on noise protection, wastewater and storm water collection, waste collection, energy supply and landscape protection. These rules are considered in EIA of individual projects.

All levels of spatial and development plans are not sufficiently co-ordinated. National and regional development plans are fairly general and rarely have implications for local ones. Local governments are not obliged to involve the MEPRD in their development and spatial planning. However, the minister has a right to suspend a plan or part thereof if procedural or legal infringements have been identified. Enhanced MEPRD oversight and guidance could ensure better integration of environmental aspects into land-use planning. Spatial plans are available to the public on the Spatial Development Planning Information System

(TAPIS), linked to Latvia's geospatial information portal (Section 2.5.2). They may be, and sometimes are, challenged in the Constitutional Court.

2.4. Compliance assurance

Latvia has been slow to adopt good international practices in compliance assurance, which includes promotion, monitoring and enforcement of compliance, as well as liability for environmental damage. That is particularly true with regard to administrative enforcement and liability, where good international practices co-exist with historic approaches common in East European countries.

2.4.1. Environmental inspections

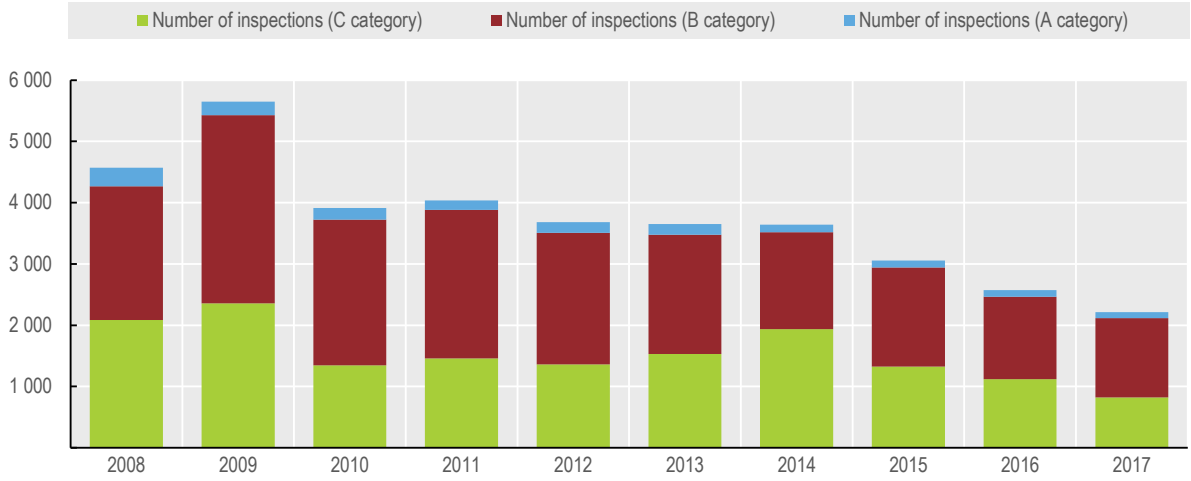
The SES has developed a risk-based planning tool for inspections of industrial installations. It determines inspection frequency for different categories of installations. Factors determining inspection frequency include the installation's level of environmental impact and location, the operator's compliance history, the permit expiration date and the timeliness of self-monitoring reports (IMPEL, 2011). The tool generates a score that determines whether inspections should be at minimum frequency (once every two years for Category A and B installations), increased frequency (two or more inspections per year), or annual.

Inspections are mostly planned, which is generally considered good international practice (proactively planned inspections tend to reduce the number of accidents). However, only 80% of planned inspections were carried out in 2017 due to a high load of unplanned inspections responding to accidents and complaints (Brizga, 2018). The SES wants to increase resources dedicated to unplanned inspections. Indeed, the share of planned inspections (aside from fishery controls) decreased from 85% in 2014 to 65% in 2017. In addition to comprehensive site visits to permitted installations, REBs conduct "thematic inspections" (inspection campaigns), usually focused on compliance with a specific regulation or on small enterprises in a given sector. The annual number of thematic controls consistently exceeds that of integrated inspections of Category A, B and C installations. Inspection campaigns are sometimes used in other OECD countries, such as the UK, but should not take more resources than targeted inspections.

The number of inspections for all categories of installations (excluding thematic inspections) has been declining since 2009 (Figure 2.1). This is likely explained by the shortage of resources (Section 2.2.1) rather than more effective risk-based planning: detection of non-compliance (as evidenced by the number of administrative fines imposed) did not improve over the period.[2] The number of fines imposed as a result of inspections of Category A, B and C installations decreased from 295 in 2008 to 173 in 2015 and only 71 in 2017. The latest drop may be due to a recent SES policy of using fines only for major offences.

Figure 2.1. The number of inspections has steadily declined in recent years

Number of inspections by installation category, 2008-17



Source: The State Environmental Service of Latvia (2018), *Statistics on environmental protection and use of natural resources, fishing, radiation safety and nuclear safety control* (database).

StatLink http://dx.doi.org/10.1787/888933969335

The SES publishes an environmental inspection plan (updated at least every six months) on its website. It also manages an electronic database of inspection reports, but they are available to the public only with regard to Category A installations. There is a need for more meaningful and better-quality statistics on inspection results.

The SES co-operates with state and municipal police in detecting and pursuing criminal offences. The police investigate environmental crimes, then refer cases to the public prosecutor's office. In 2017, about a quarter of criminal proceedings initiated by the SES were referred for prosecution (Brizga, 2018). In addition, about one-third of administrative enforcement cases are based on police protocols.

To better handle environmental complaints from the public, in 2015 the SES introduced an interactive website, Environment SOS (www.videssos.lv), where anyone can submit information on potential environmental offences. It allows tracking of follow-up to the complaint, consistent with good international practices. In 2017, over 1 500 complaints were received through this platform. In addition, a network of "public environmental inspectors", created in 2007 and comprising about 70 citizen volunteers as of 2018, assists SES inspectors in detecting minor offences (e.g. illegal fishing, littering).

2.4.2. Enforcement tools

Administrative fines are too low to deter future environmental offences. Their upper limits are set in the Code of Administrative Offences and reach EUR 1 400 for legal entities. If certain violations recur within a year, the fine can be increased by a factor of five, up to EUR 7 100. However, the average fine for legal entities and natural persons was only EUR 149 in 2017. For comparison, in neighbouring Estonia the average fine was EUR 248 in 2014 – likely still too low to have a deterrence effect – while the upper limit is EUR 400 000 per offence for legal entities (OECD, 2017).

As in most OECD countries, fines do not reflect the economic benefit the offender receives from non-compliance behaviour. That is contrary to the best practice introduced by the United States Environmental Protection Agency over 30 years ago. The SES-issued environmental inspector handbook does not include criteria for determining a proportionate response to various types of non-compliance (aside from fishery-related violations). Fines are determined by the SES legal team without formally established criteria. This is typical of the law enforcement tradition of Latvia's neighbouring countries. The SES indicates that there are problems with non-payment of imposed fines, with operators sometimes closing down the business rather than paying. Only 80% of fines imposed on enterprises are paid voluntarily or after a first warning – a rather low share by international standards; the rest have to be collected coercively. REBs do not collect data to evaluate the effectiveness of enforcement tools (EC, 2017).

Criminal enforcement focuses primarily on nature conservation offences covered by the criminal code, which are easier to prosecute than personal responsibility for pollution. The Criminal Code establishes fines and imprisonment for environmental crimes. Courts received 447 environmental criminal cases in 2017 (about 1% of all criminal cases). However, only 10-12% of the environmental cases resulted in convictions. In addition, 87% of criminal environmental offences in 2017 involved intentional damage to trees, while just 1% were related to pollution. Enforcement of pollution-related crimes should be improved.

2.4.3. Environmental liability

Liability for damage to the environment

The Environmental Protection Law declares strict liability for environmental damage caused by Category A and B installations and several other defined types of hazardous activities. The SES is entitled to recover compensation from the operator of a hazardous activity that has caused environmental damage. However, for other activities, liability is fault-based: the operator does not cover costs of remediation measures if the damage did not result from an intentional or negligent violation of the law.

The 2007 regulation transposing the EU Environmental Liability Directive (ELD, 2004/35/EC) gives precedence to assessing damage based on actual remediation costs. However, it contains an important loophole: if elimination of the damage is judged impossible, it is to be calculated according to fixed rates (in euros per tonne of specific water pollutants or a multiple of minimum monthly wages per unit of protected species). Provisions on liability and compensation for damage to forests and fisheries are specified in respective special laws. The calculated compensation goes to the state budget. Monetary compensation to the state for environmental damage is a regulatory tradition in many East European countries.

The system of fixed rates does not reflect real damage to the environment or encourage remediation. A 2010 State Audit Office report concluded that Latvia's system of liability for environmental damage was insufficiently effective because it did not ensure that monetary compensation paid for damage to the environment was used to remediate the damage (Pierhurovič a and Grantiņš, 2017). Indeed, the remediation-focused regime has rarely been used: over 2007-13, Latvia reported only 16 cases of environmental damage under the ELD. More methodological support may be needed to enable assessment and remediation of environmental damage.

Latvia does not require financial security for potential environmental damage from particularly hazardous activities (waste management, chemical industry, etc.), unlike many

other European countries, including Sweden, the Czech Republic and Hungary. Operators may use financial guarantees, but there is no information on whether they actually do (EC, 2017). The lack of financial security from private operators imposes a significant burden on the state for environmental remediation in case of insolvency of the responsible party.

Contaminated sites

The LEGMC maintains a register of about 3 500 contaminated sites, made public in May 2018. Many are a legacy of the Soviet period, and their cleanup poses a significant challenge in the absence of a responsible party. Due to the lack of budget financing, only 83 old dump sites were decontaminated over 2007-13, using EU and other donor funding.

Aside from military sites, which the Ministry of Defence assesses, potentially contaminated sites must be assessed by a local government in co-operation with the relevant REB, in line with a 2010 regulation. The results are available to the public. Expenses related to investigation and remediation are covered by the operator of the responsible polluting activity or the landowner. If the responsible party cannot be identified or is financially insolvent, the REB or local government may apply to the MEPRD or Ministry of Defence for funds to cover investigation and/or remediation. REBs approve investigation and remediation programmes and supervise remediation, except on military sites.

2.4.4. Promotion of compliance and green practices

Compliance promotion has recently started to get the attention it deserves from the SES. REBs increasingly recognise the need to provide consultation and advisory support to operators. However, guidance on good environmental practices is largely lacking. For example, the Farm Advisory System provided by the Rural Support Service does not offer such information (Brizga, 2018).

Voluntary business initiatives

The Environmental Protection Law provides for voluntary agreements to be concluded between a public authority and enterprises (or their associations) willing to go beyond compliance with legal requirements. This provision has only been used by the Ministry of Economy, which signed five-year agreements on energy efficiency improvement with two district heating companies in 2016. This is a good practice that could be extended.

A sustainability index initiative has been managed since 2010 by the Institute for Corporate Sustainability and Responsibility in collaboration with the Employers' Confederation of Latvia and the Free Trade Union Confederation of Latvia. It allows enterprises to perform a self-assessment and calculate their sustainability index. So far, over 200 enterprises have participated in the initiative.

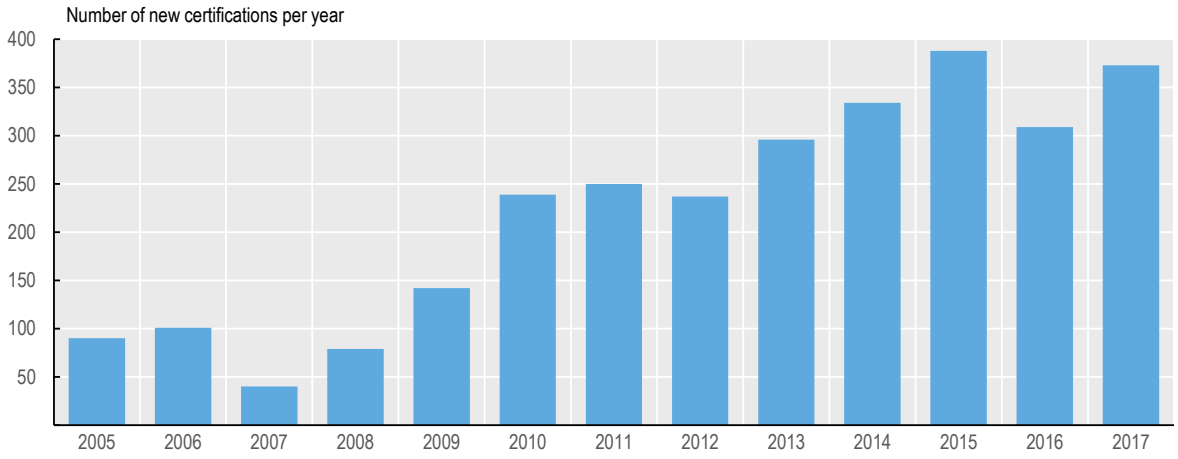
Environmental management system certifications and awards

The number of new environmental management system certifications to the ISO 14001 standard in Latvia grew more than ninefold between 2007 and 2017 (Figure 2.2). That is almost three times faster than in neighbouring Estonia, though the latter had 50% more new certifications in 2017 (ISO, 2018). These certifications are driven entirely by market demand, in the absence of regulatory or economic incentives (such as lower inspection frequency or reduced pollution taxes) from the government. The European Eco-Management and Audit Scheme is, in theory, administered by the ESB. In practice, no

Latvian enterprises have signed up to it due to the high certification costs and absence of market demand for it.

Figure 2.2. The number of ISO 14001 certifications has been rising

Number of ISO 14001 certifications, 2005-17



Source: ISO (2018), *ISO Survey 2017*, International Organization for Standardization, Geneva.

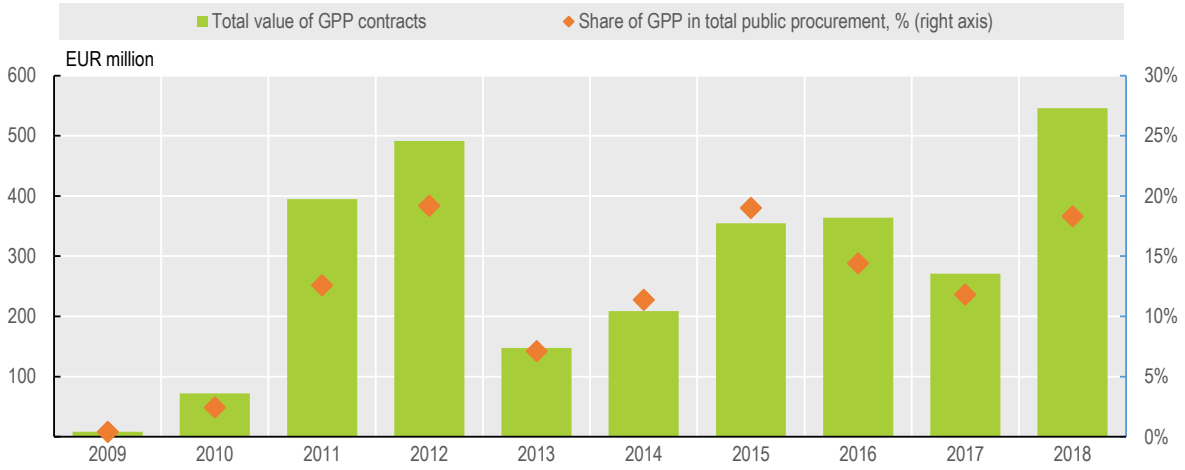
StatLink http://dx.doi.org/10.1787/888933969354

There are a few environmental award programmes in the country. Since 2015, the SES has granted Green Excellence Awards to enterprises and local governments that fully comply with regulatory requirements and implement voluntary environmental protection measures. Since 2000, the Latvian Association of Rural Tourism has awarded green certificates to sustainable rural guest houses. More than 70 establishments have been certified.

Greening public procurement

The Public Procurement Law (2016) defines green public procurement (GPP), while a 2017 government regulation lays out GPP requirements and implementation procedures. The Green Procurement Support Plan (2015-17) set a target of a 30% share of GPP in the total value of procurement contracts for 2017 (EC, 2017), less ambitious than the EC target of 50% of all public tendering procedures following green criteria by 2010. GPP criteria, which were developed for 21 product categories, are mandatory for 7 categories. The GPP share in total procurement in Latvia was 18.3% in 2018 (Figure 2.3),[3] making it feasible to reach the government's target of 20% by 2020.

Figure 2.3. Green public procurement is on track to reach the 20% policy target



Source: Latvian Procurement Monitoring Bureau (2019), *Public Procurement Indicators* (database).

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2.5. Promoting environmental democracy

Latvia ranks second on the 70-country Environmental Democracy Index (WRI, 2018). It has a particularly high score on access to information. It has been party to the Aarhus Convention on access to information, public participation in decision making and access to justice in environmental matters since 2002.

2.4.5. Public participation in environmental decision making

The law provides opportunities for the public to take part at an early stage in most decisions affecting the environment. Environmental authorities have a legal obligation to encourage public participation. The public can participate in the permitting process by submitting written comments to the REB. Development of spatial plans is also open to public participation: a 2013 government regulation allows public involvement at an early drafting stage. In addition, the public can provide input during EIA, SEA and environmental permitting processes. However, the real level of citizen engagement in decision making is low, primarily due to insufficient public environmental awareness (Section 2.5.4).

The MEPRD enjoys a positive and constructive relationship with environmental non-government organisations (NGOs), which is not always the case with other ministries. The MEPRD has established 12 consultative bodies to engage professional associations, NGOs, businesses and academia in various policy areas. One of the most prominent, the Environment Consultative Council, brings together representatives of environmental NGOs to participate in development of policies and legislation. The council has 20 members, rotated annually, and meetings are open to other NGOs as well. NGOs receive project-based funding from the Environmental Protection Fund (Chapter 3). However, NGO funding is a growing challenge, as a new tax regime recently removed incentives for private business donations to NGOs.

2.4.6. Access to environmental information

Every environmental authority has an officer dedicated to providing information to the public. According to the Freedom of Information Law (2003, last amended 2015), failure by a public institution to provide full environmental information may be appealed to the ESB and then to an administrative court. There are clear requirements for immediate release of information in cases of imminent threat to human health or the environment. The Public Administration Services Portal (www.latvija.lv) has a special section on environment-related local government services[4] to keep the public informed and offer opportunities for feedback.

The public has access to permit applications of Category A and some Category B installations, and well as all issued permits and monitoring results related to them. Inspection reports are publicly available only for Category A installations (Section 2.4.1).

Most data held by the LEGMC as part of the State Environmental Information System are free, with unlimited access. However, these data are not always user friendly. The LEGMC publishes a national state of the environment report every four years; the last one was issued in 2016. It has also established a pollutant release and transfer register (PRTR) in accordance with a 2010 government regulation. The PRTR contains pollutant release data for all Category A and B installations.

The NCA maintains the Ozols (Oak) online information system, linked to Latvia's unified geospatial information portal. The geoportal is part of Latvia's implementation of the EU INSPIRE Directive (2007/2/EC). However, not all spatial information needed for implementation of EU environmental law has been made available (EC, 2017).

2.4.7. Access to justice

The Environmental Protection Law entitles any physical or legal person, or an association, to appeal any environment-related action of any public authority, whether or not they have suffered direct damage, to a superior administrative institution and then to an administrative court. The ESB is the body of first instance for appeal of administrative decisions on environmental matters. Over 2005-17, it reviewed 668 appeals and resolved three-quarters of them; the rest were brought to court.

Environmental matters considered by administrative courts include spatial planning documents, building permits issued by local governments, permits issued by environmental authorities, EIA decisions and SEA. The court can verify information on the planned activity, facility characteristics and data on environmental conditions. It cannot decide on the environmental impact of the activity in lieu of the competent environmental authority, but it can look for factual and consideration errors that might have led to a misguided final decision (European e-Justice Portal, 2018). Administrative court judges follow an environmental course offered by the Latvian Judicial Training Centre.

Administrative court appeals are widely used: about 5% of cases in the Supreme Administrative Court are environment-related. Rules for appealing environmental decisions are often more favourable to the public than general administrative appeal procedures. For example, citizens can appeal conditions of an environmental permit during the entire period of its validity, whereas the general procedure would allow appeals only within one month of the decision coming into effect (European e-Justice Portal, 2018). There is only a small fee for administrative court appeals. However, appeal procedures can be quite lengthy.

A constitutional complaint may be submitted by an individual or an environmental NGO in case of infringement of fundamental environmental rights. A 2007 interpretation of environmental rights by the Constitutional Court, the nation's highest, opened the possibility of the public appealing local government land-use planning decisions to this court.

2.4.8. Environmental education

Courses on environmental protection and sustainable development are a mandatory part of the higher education curriculum, which is a common international practice. The secondary education curriculum does not contain separate environmental courses but integrates environmental awareness in a range of natural and social science subjects. However, a unified approach to formal environmental education is lacking, despite the priority given to it by the National Environmental Policy Strategy for 2014-20. It would be advisable to have a government body oversee implementation of environmental education initiatives.

Outside the standard curriculum, the National Centre for Education launched the See, Discover, Conserve project in 2016 to involve students in nature conservation. The project, implemented in co-operation with the NCA, had been joined by 43 schools by the end of 2017. The Eco-school programme, carried out by the Foundation for Environmental Education, has engaged over 200 Latvian schools, 69 of which had an eco-school certificate in 2017. The Children Environmental School, an NGO, runs projects supporting teachers with methodological guidance on environmental and sustainability education.

Partly as a result of these government and NGO efforts, environmental awareness among 15-year-old Latvians increased between 2006 and 2015 at a rate higher than the OECD average (Echazarra, 2018). One example is the Nature Concert Hall initiative, a biodiversity-focused outdoor educational multimedia performance held annually since 2006. It was named best European environmental campaign in 2012 by the EU Green Spider Network.

However, adult environmental education is not well developed, apart from energy efficiency promotion by the state electricity company and good household practice awareness raising by water utilities and waste management companies. To address this gap, the Latvian Environmental Protection Fund, in co-operation with the Natural History Museum, National Botanic Garden of Latvia and Riga National Zoo, plans to set up three information centres to promote environmental education and awareness as part of a four-year project running to late 2021. It is important to ensure that higher awareness of the public translates into better behavioural choices and more active participation in environmental decisions.

Recommendations on environmental governance and management

Strengthening the institutional and regulatory framework

- Reinforce the role of the Cross-Sectoral Co-ordination Centre in inter-ministerial collaboration to promote coherence of sectoral policies with the country's sustainable development objectives; enhance the central government's oversight of municipal land-use planning and environmental service delivery.
- Strengthen environmental aspects of regulatory impact assessment; ensure that environmental and social costs of proposed laws and regulations are appropriately quantified; enhance the use of ex post regulatory and policy evaluation.

Improving enforcement and compliance

- Expand the use of risk-based planning of environmental inspections to improve detection and deterrence of non-compliance.
- Reform the system of enforcement sanctions by adopting sound methodology for determination of administrative fines, based on the gravity of the offence and economic benefit of non-compliance; develop an enforcement policy with clear guidance on proportionate use of administrative and criminal sanctions and evaluate their effectiveness.
- Facilitate full implementation of environmental liability regulations to ensure remediation of damage to the environment at the expense of the responsible party; require financial guarantees for potential environmental damage from hazardous activities.
- Accelerate the clean-up of old contaminated sites by securing adequate financial resources.
- Enhance efforts to promote environmental compliance and green business practices by using information-based tools and regulatory incentives as well as by expanding green public procurement; support voluntary business initiatives.

Enhancing environmental democracy

- Expand environmental awareness raising and adult education, and more actively engage the general public in local environmental decision making.

Notes

[1] The government has adopted regulations with BAT requirements for several industrial sectors: glass and glass fibre production (2013), iron and steel production (2014), cement, lime and magnesium oxide production (2014) and chemical protection of wood (2004). The ESB maintains a BAT information system.

[2] Effective risk-based inspection planning usually manifests itself in a downward trend in the number of inspections combined with an upward trend in detection of non-compliance. If inspections are not

targeted based on risk, the ratio between the numbers of detected violations and inspections can be used as a surrogate indicator for a non-compliance rate.

[3] The drop in the value and share of GPP contracts from 2012 to 2013 is due to tightening of GPP criteria in 2013.

[4] The portal does not cover environmental permitting services of the central government, which have separate electronic systems.

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Chapter 3. Towards green growth

Latvia has managed to decouple several environmental pressures from its sustained economic growth, although challenges remain. It has significant opportunities for accelerating the transition towards a low-carbon, greener and more inclusive economy. This chapter analyses progress in using tax policy to pursue environmental objectives, as well as the steps taken to reform environmentally harmful subsidies. It also discusses public and private investment in low-carbon energy and transport infrastructure and services. The chapter examines the country's eco-innovation performance and opportunities for the green industry. Finally, it briefly reviews progress in mainstreaming environmental considerations into development co-operation.

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

3.1. Introduction

Latvia has a small open economy, with a small industrial base and a large agriculture and forestry sector. The economy has grown strongly since 2010, with annual average growth rates above 3%. However, growth is expected to slow down to 2.7% in 2020 (OECD, 2019a). Convergence with more advanced OECD economies is far from accomplished. Real income and well-being increased over the past decade, but gross domestic product (GDP) per capita is still much lower than the OECD average. Unemployment, poverty and inequality remain high. The population has been declining and ageing, and regional disparities persist with regards to access to public services (Chapter 1).

Progress has been made in decoupling economic growth from environmental pressures such as emissions of greenhouse gases (GHGs) and most air pollutants. Use of renewable energy sources has increased. Access to and quality of water and waste services have improved (Chapter 1). However, some environmental pressures are likely to increase with sustained economic growth and rising income levels. These include emissions of GHGs and air pollutants from transport and agriculture; waste generation (Chapter 4) and use of fertilisers and pesticides; and pressures on biodiversity from changes in land use and intensive farming (Chapter 5).

Latvia is on a good pathway towards reaching many of the Sustainable Development Goals (SDGs) (OECD, 2019b). It has significant opportunities for accelerating the transition towards a low-carbon, greener and more inclusive economy, especially by investing in energy efficiency, renewables, sustainable forestry and sound waste and material management. To seize these opportunities, it should make better use of economic instruments, remove potentially perverse incentives and improve the quality of its environment-related infrastructure and services. Sustaining growth in the long term will also require more investment in education and innovation to further diversify exports towards products and services with higher technological content and value added (OECD, 2019c).

3.2. Framework for sustainable development and green growth

Latvia has a well-developed and comprehensive framework for sustainable development. It is defined by law, and adopts the principle of vertical (hierarchical) and horizontal co-ordination of planning documents.[1] The Sustainable Development Strategy of Latvia until 2030 (Latvia 2030) is the highest-level and longest-term development planning document. The strategy includes long-term priorities, goals and action lines, and is broadly consistent with the SDGs. It is based on a capital approach to sustainable development, which primarily focuses on wealth creation within the planet's ecological limits, with an emphasis on the correlation between environmental and economic systems.

Latvia 2030 has a higher political standing than the previous sustainable development strategy. It is the result of a multi-stakeholder participatory process and was adopted by the parliament in 2010. The broad public participation helped the strategy gain the legitimacy of a social contract and the broad support needed for its implementation. The Cross-Sectoral Coordination Centre under the Prime Minister's Office co-ordinates its implementation, and the Parliamentary Commission on Sustainable Development oversees progress (Chapter 2). All these are welcome changes from the previous strategy, which was approved by the government in 2002 and overseen by the environment ministry.

The seven-year national development plans (NDPs) include the main policy objectives, outcome indicators and indicative financing for most sectors of the economy. The latest NDP covers 2014-20 and is linked to the EU fund planning period. Sectoral policies, guidelines and plans, such as for transport and energy, also address sustainable development objectives.

The Cross-Sectoral Coordination Centre periodically reviews progress towards the objectives set in Latvia 2030 and the NDP 2014-20. The latest assessment of Latvia 2030, conducted in 2017, identifies a few areas where more efforts are needed to meet the goals. These include energy efficiency, waste separate collection, monitoring and inspection capacity, research and innovation, and co-operation among local governments. In addition, in 2018, Latvia submitted its voluntary review on SDG implementation to the UN High-level Political Forum on Sustainable Development (Box 3.1).

Box 3.1. Voluntary national review of SDG implementation

Latvia's 2018 voluntary national review of SDGs was based on a mapping of the SDGs within Latvian policy, the midterm impact assessment of the NDP 2014-20 and a wide array of indicators. According to the review, all SDGs are being integrated into the planning system and Latvia is making progress towards achieving them. The report emphasises that the country needs to seize the economic, environmental and social opportunities of moving towards a circular economy, enhancing innovation and eco-efficiency, reducing inequality and improving access to education and health.

The review identifies several areas for action, including:

- increasing productivity of the economy, including through more efficient use of resources and larger investment in research and innovation
- improving labour market performance
- improving the health care and social welfare systems
- improving service provision to low-density areas, including road infrastructure, public transport and housing
- adapting to climate change, reducing GHG emissions and promoting wider use of renewable energy sources.

Source: Cross-Sectoral Coordination Centre (2018), *Implementation of the Sustainable Development Goals*.

Despite a robust framework, it is not always clear how Latvia 2030 and the NDPs ensure coherence among policies. Integration of environmental considerations in sectoral policies is more advanced in some areas, e.g. energy, than in others. There is scope for enhancing environmental mainstreaming in the post-2020 planning cycle, as well as in sectoral policies such as those on agriculture, forestry, industry and transport.

The law-enshrined 2030 horizon of the development planning framework is too short to allow for the radical economic and societal changes implied by the Paris Agreement. For example, there is no statutory place for the Low Carbon Development Strategy to 2050 (expected to be approved by the end of 2019) within the current development planning framework.

3.3. Greening the system of taxes, charges and prices

Latvia has extended the use of economic instruments to put a price on environmental externalities and encourage efficient use of natural resources. Like many OECD countries, it applies energy and vehicle taxes. It puts a price on carbon dioxide (CO_2) via a carbon tax and participation in the EU Emissions Trading System (EU ETS). It has also long applied a wide range of levies on pollution and resource use. Since the mid-2010s, the government has increased several tax rates, removed or reduced some tax exemptions and reformed vehicle taxation. However, the carbon price signal is weak and tax rates are generally too low to encourage changes in production and consumption behaviour.

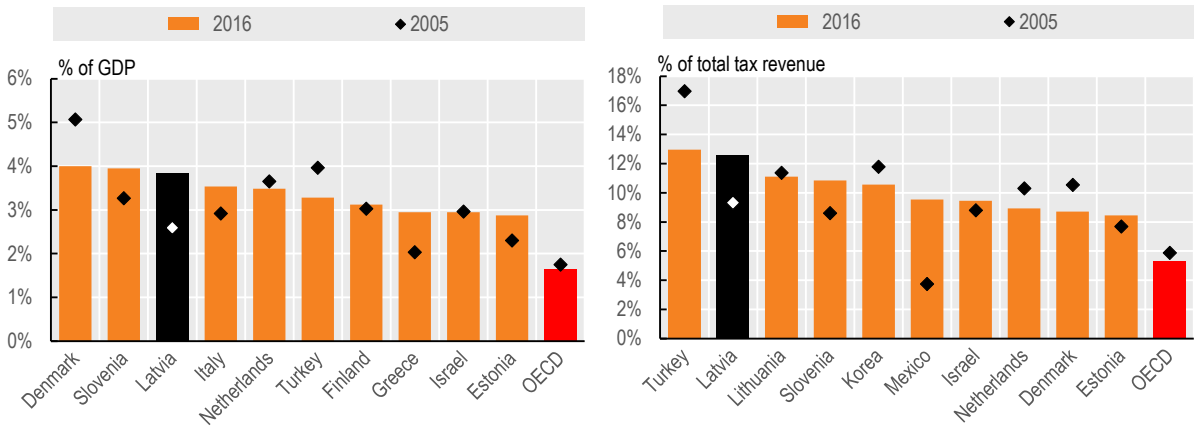
3.3.1. Environmentally related taxes: An overview

Latvia adopted a major tax reform in 2017, aiming at improving competitiveness, reducing income inequality and increasing tax revenue. The tax/GDP ratio was 30% in 2017, below the OECD average of 34% and the government objective of a third of GDP. Widespread informal activity and low tax compliance limit Latvia's tax revenue. The tax system relies on consumption and labour taxes. The system is not progressive enough, with particularly high labour taxes on low-income earners, which exacerbate poverty and inequality. The 2017 tax reform lowered personal and corporate income taxes and raised excise duties, including on energy products. However, it appears to be insufficient to achieve the stated goals (EC, 2018a; OECD, 2019c).

Revenue from environmentally related taxes is high by international comparison.[2] In 2016, it accounted for 12.6% of total tax revenue and 3.8% of GDP, the second and third highest levels in the OECD (Figure 3.1). Like all OECD countries, Latvia collects most environmentally related tax revenue through taxes on energy products (82%) and motor vehicles (14%). Pollution and resource taxes account for the remaining revenue. They are all part of the natural resource tax, in place since 1991. It includes a carbon tax and levies on air emissions, water abstraction, water/soil pollution, waste and packaging materials (Section 3.3.5).

Figure 3.1. Revenue from environmentally related taxes is high by international comparison

Revenue from environmentally related taxes, top OECD countries



Note: 2016 or latest available year.
Source: OECD (2019), "Environmental policy: Environmental policy instruments", *OECD Environment Statistics* (database).

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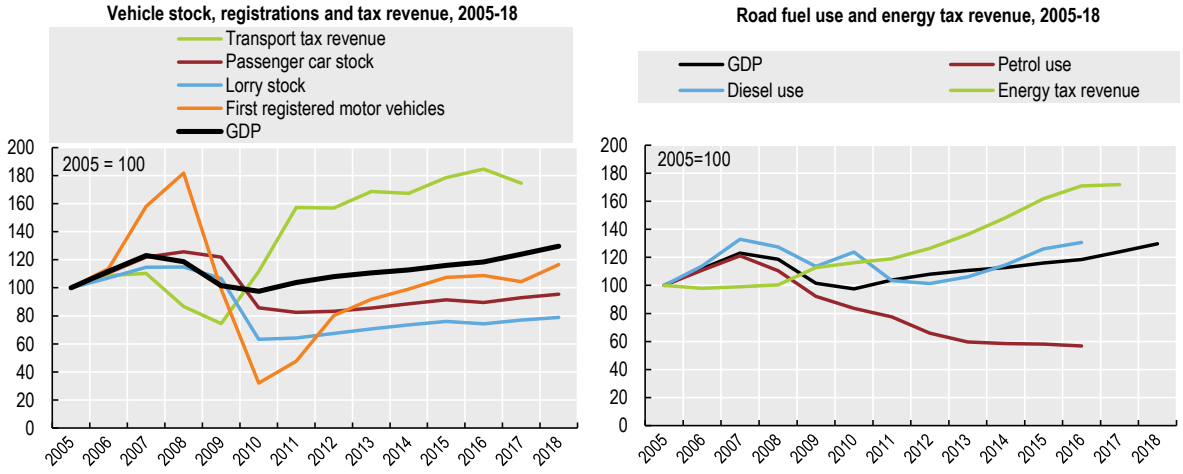
Figure 3.2. Vehicle sales and diesel use have driven environmentally related tax revenue



Note: GDP is expressed in 2010 USD at purchasing power parity; in the left panel, "Lorry stock" includes road tractors; "First registered motor vehicles" includes all vehicles; vehicle tax revenue includes recurrent taxes paid by households and by other institutional sectors; in the right panel, petrol and diesel exclude biofuels.
Source: Eurostat (2019), *Environmental Tax Revenues* (database); IEA (2019), *IEA Energy Balances and Statistics* (database); OECD (2019), *National Accounts Statistics* (database); Latvian Central Statistical Office (2019), *Transport Statistics* (database); Latvian Road Traffic Safety Directorate (2019), *Statistics of Registered Vehicles* (database).

StatLink http://dx.doi.org/10.1787/888933969411

There is room to further increase the rates of environmentally related taxes while reducing the tax burden on labour and providing targeted support to low-income households. A 2016 study suggests that, in a best-case scenario, environmentally related taxes could generate additional revenue equivalent to 1.07% of GDP in 2020 and nearly as much in 2035. At the same time, they could generate environmental benefits equivalent to 0.3% of GDP by 2030. Raising fuel tax rates would add revenue of EUR 100 million in 2030 (at 2015 prices) or 0.25% of GDP (EC, 2016). Additional revenue could also come from further raising the natural resource tax rates (Section 3.3.5), introducing taxes on pesticides and fertilisers, including environmental costs in road tolls for heavy goods vehicles and extending them to passenger vehicles (Section 3.3.4).

Latvia needs to raise more revenue to finance its high spending needs (including for infrastructure investment, education and health) while further reducing the tax burden on low-income households (OECD, 2019c). Expanding the use of environmentally related taxes could help achieve both goals, in addition to their main objective of encouraging more efficient use of energy, materials and natural resources.

3.3.2. Taxes on energy use and carbon pricing

Like many other EU countries, Latvia puts a price on CO_2 emissions via a carbon tax, energy taxes and participation in the EU ETS (Section 3.3.3). However, the carbon price signal is weak. Most CO_2 emissions are priced relatively low or not at all. Increasing the carbon price signal would help Latvia move towards the EU common goal of reducing GHG emissions by between 80% and 95% by 2050 from the 1990 level.

Carbon tax

A carbon tax applies to energy used at stationary facilities outside the scope of the EU ETS, i.e. primarily small heating, industrial and commercial facilities. The carbon tax is part of

the natural resource tax (Section 3.3.5). The rate of the carbon tax increased from EUR 2.85 per tonne of CO_2 (t CO_2) in 2014 to EUR 4.5/t CO_2 in 2017. However, it remains well below a conservative estimate of the social cost of CO_2 emissions, EUR 30/t CO_2 (OECD, 2018a). Emissions from peat combustion are exempt. The exemption is not justified from an environmental point of view and should be removed, as peat is a non-renewable fuel with high carbon content. Emissions from biomass combustion are also exempt; the rationale is that biomass is a carbon-neutral renewable source over its lifecycle, but there is increasing scientific and policy debate on this (OECD, 2018a).

Latvia should gradually raise the rate of the carbon tax on smaller heating, industrial and commercial facilities. It could consider extending the tax to petrol and diesel so that transport fuel taxes explicitly include a carbon component, as in other OECD countries (e.g. France, Ireland and the Nordic countries). It could also consider extending the carbon tax to emissions from biomass combustion after assessing the economic, social and environmental impact of such a move.

Taxes on energy products

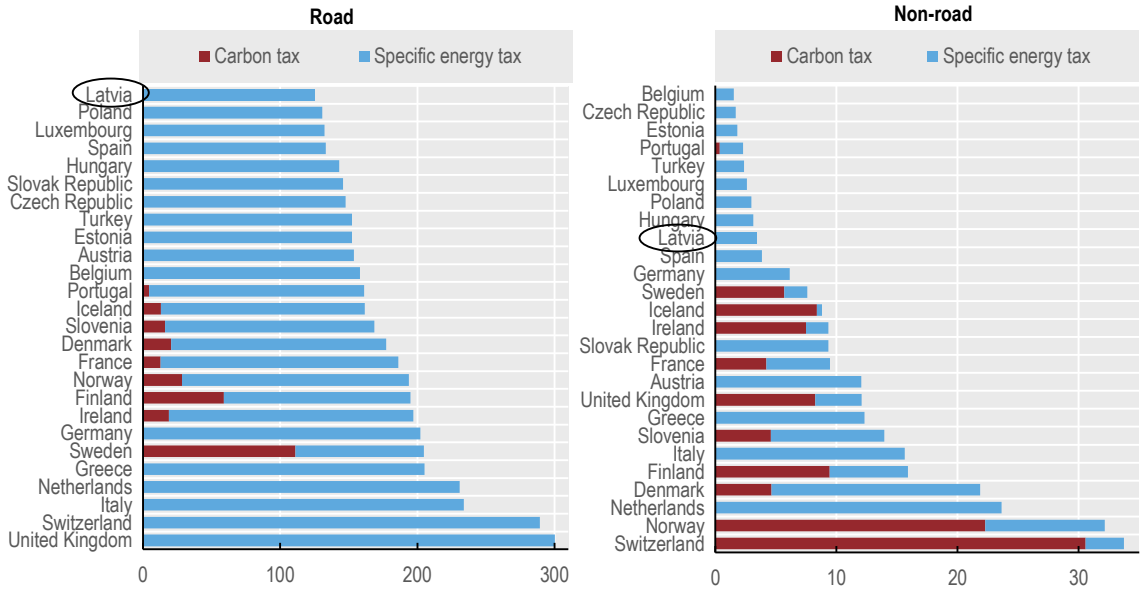
Latvia applies an energy tax on road fuels (petrol, diesel, liquefied petroleum gas) and on fuels used at stationary facilities (e.g. natural gas). All tax rates are above the minimum rates required by the 2003 EU Energy Tax Directive, but rates on electricity and fossil fuels used at stationary facilities are among the lowest in the EU. In terms of energy content of fuels, Latvia applies higher tax rates on transport fuels than on those for heating and process purposes. This is common to all OECD countries, and is justified by the higher environmental and social costs of road transport (OECD, 2018b).

After several years of constant rates, in 2015 the government launched a series of tax rate increases to take effect in 2016, 2018 and 2020. These adjustments are part of a broader tax reform and are in line with the rates recommended by the World Bank's review of Latvia's tax system (World Bank, 2016). However, the rates for heavy fuel oil and marked mineral oils for heating have remained unchanged since at least 2010.

Tax rates on energy products do not fully reflect the estimated environmental cost of energy use, including CO_2 emissions. The excise duty on diesel is still well below that on petrol, despite diesel's higher carbon content and local air pollution cost. Even after increases, the energy and carbon tax rates are relatively low and fossil fuel use in some sectors is partially or fully exempt (Section 3.4.1). Effective tax rates on CO_2 emissions from energy use in road transport are the lowest in OECD Europe, and those on emissions from other energy uses are among the ten lowest in OECD Europe (Figure 3.3). These effective rates, however, do not take into account the effect of the EU ETS on carbon pricing (Section 3.3.3).

Figure 3.3. Effective tax rates on CO_2 emissions are low

Average effective tax rate on CO_2 emissions in the road and non-road sectors, 2015



Note: Data are expressed in EUR/tonne of CO_2. Effective tax rates include carbon emissions from biomass. For countries with a currency other than the euro, changes in effective tax rates can differ when expressed in local currency. All tax rates are expressed in 2012 prices.
Source: OECD (2018), *Taxing Energy Use 2018* (database).

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The carbon price signals delivered by carbon and energy taxes and the EU ETS are weak. OECD (2018a) estimates that, accounting for both energy taxes and the emission allowance price, 55% of CO_2 emissions from energy use face some kind of carbon price signal in Latvia. This share is the fifth lowest in the OECD, after Australia, Chile, Turkey and the USA. One reason is the high share (34%) of energy sourced from biofuels (mainly fuelwood), which are mostly not taxed.[3] In addition, only about a quarter of CO_2 emissions from energy use face a carbon price of EUR 30/t CO_2 or above. They include nearly all emissions from road transport and 1% of emissions in the residential and commercial sectors. All emissions from electricity and heat generation and from industry face a lower carbon price or are not priced at all.

Latvia should consider reducing tax exemptions and further raising the energy tax rates to reflect environmental and climate damage from energy use. A higher price on carbon emissions would help the country increase efficiency of energy use, promote investment in renewables and expand the market opportunities of low-carbon technology, goods and services. It would also bring co-benefits, for example through reduced air pollution from energy use.

Higher tax rates on diesel and petrol would provide an incentive for drivers to reduce fuel consumption and hence CO_2 emissions. To the extent that this happens through reductions in distance travelled, other social costs (e.g. local air pollution, congestion, accidents and noise in transport) could also decrease (Harding, 2014).[4] Raising the cost of diesel would help counteract the progressive dieselisation of the car fleet and the gradual shift of freight from rail to road, with the associated potential increase in GHG emissions.

In raising petrol and diesel tax rates, Latvia needs to assess and address the potential for fuel tourism and smuggling. This is especially true for neighbouring non-EU countries (e.g. Belarus and Russia), which do not have to meet minimum energy tax rates (World Bank, 2016). Latvia should also consider the impact of raising taxes on lower-income households and other vulnerable population groups (Section 3.3.6).

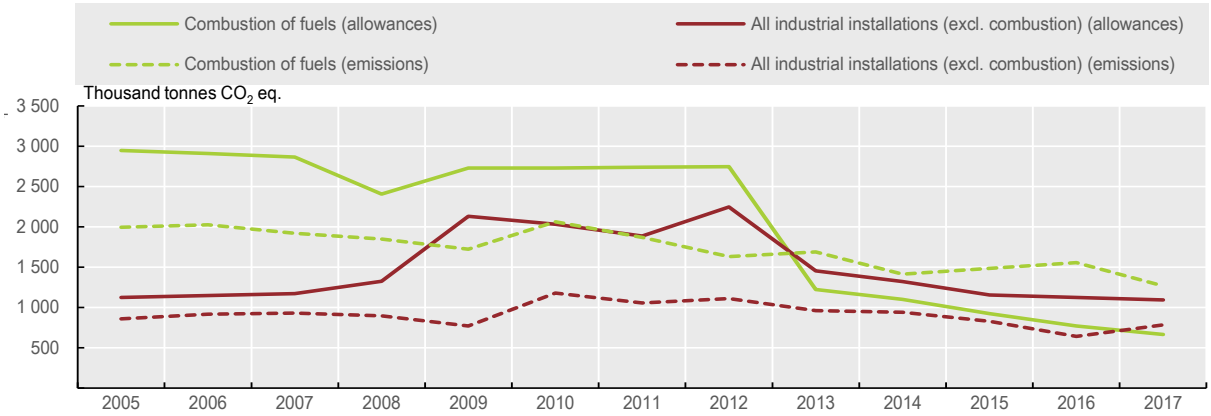
3.3.3. Carbon pricing through the EU Emissions Trading System

The EU ETS covers a small share of Latvia's emissions due to the country's economic structure and biomass-based energy mix. The EU ETS allowance price covers more than a quarter of Latvia's emissions in the industry sector and nearly two-thirds of emissions in the electricity sector. This compares, for example, to 33% of industrial emissions and 88% of electricity generation emissions in Estonia, or 74% of industrial emissions and 94% of electricity emissions in Poland (OECD, 2018a).

In the first two trading periods (2005-12), Latvia was consistently granted more emission allowances than actual emissions (Figure 3.4). The supply of allowances dropped in the third period (2013-20), with the tightening of the EU-wide emission cap, the extension of auctioning and the backloading of allowances. As in most other countries, companies in Latvia have since experienced a deficit of allowances in the energy sector and a surplus in manufacturing (Figure 3.4).

Figure 3.4. The surplus of EU ETS allowances has dropped since 2013

Freely allocated allowances to Latvia's installations and verified emissions



Note: "Combustion of fuels" includes combustion installations exceeding 20 MW (mainly electricity generation). "All industrial installations" includes refineries; iron and steel, coke, and metal ore production; cement, clinker and lime production; other non-metallic minerals (glass, ceramics, mineral wool and gypsum); pulp and paper; and production of chemicals.
Source: EEA (2017), *EU ETS Data Viewer* (database).

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As in all countries, Latvia's manufacturing sector continues to receive a share of allowances for free to address carbon leakage concerns (EEA, 2016). However, the impact of carbon pricing systems on competitiveness is generally limited. It does not substantially differ between firms that benefit from preferential treatment (such as free allocations) and those that do not (Arlinghaus, 2015). In addition, free allocations can create windfall profits for carbon-intensive industries and can skew investment decisions towards carbon-intensive technology (OECD, 2017a). Dechezleprêtre, Nachtigall and Venmans (2018) found that

the effect of the EU ETS had been limited on European installations that received generous allocation of free allowances. These installations had reduced emissions little if at all.

Oversupply of allowances, free allocations and low carbon prices in the market have limited the effects of the EU ETS on low-carbon investment in Latvia's energy and manufacturing sectors. Since 2010, energy use and related CO_2 emissions in industry have been growing faster than prior to the 2008-09 recession. Emissions from power and heat generation have declined since the mid-2000s, with a shift to renewables, namely biomass and waste. However, factors other than the EU ETS have likely played a major role in this fuel switch, notably support to renewables (Section 3.5.3).

Latvia has been a seller of international carbon credits. The government has collected revenue from these sales, as well as those for auctioning EU ETS allowances, in green investment funds. The Climate Change Financial Instrument collected the proceeds of the sales of the assigned amount units (AAUs) under the Kyoto Protocol. Latvia received an excess of more than 40 million AAUs. Revenue from auctioning EU ETS emission allowances feeds Latvia's Emission Allowance Auctioning Instrument (EAAI). Both funds support investment in climate change mitigation and adaptation. In particular, the EAAI focuses on energy efficiency in buildings, a choice common to many countries participating in the EU ETS, such as Estonia, France, Greece and Italy. Earmarking allowance auction revenue for funds devoted to climate mitigation can help build support for stronger carbon pricing and secure reliable, sufficient resources. However, constraints on revenue use should be transparent, broad and flexible to ensure efficiency of revenue allocation in the long term (Marten and van Dender, 2019).

3.3.4. Transport-related taxes and charges

Vehicle taxes

In 2017, Latvia restructured the annual tax on cars and linked it to CO_2 emissions. The tax rate increases with CO_2 emission levels per kilometre.[5] In association with this change, the vehicle registration tax, paid upon registration of a vehicle in the country, was removed. The new system applies to cars registered since 2009. Older cars pay the tax according to the old system, i.e. based on weight, engine volume and power. The tax on heavy goods vehicles increases with their weight and does not consider environmental parameters.

The new car taxation system is a step forward, as it aims to encourage renewal of the car fleet with more fuel-efficient vehicles. The previous system had not been effective in this respect: the vehicle fleet is particularly old and energy intensive. Close to 80% of the passenger vehicle fleet is over ten years old. Newly registered cars in Latvia are the second most carbon-intensive cars in the EU, after those registered in Estonia (Chapter 1).[6]

Road transport is a major source of GHG and air pollutant emissions (Chapter 1). The number of cars per capita is among the lowest in the OECD, but is expected to grow with rising income levels. Vehicle registrations have increased in line with economic recovery since 2010, and are expected to increase further (Figure 3.2). Vehicle taxes and road charges (see below) could foster renewal of the fleet with more fuel-efficient and less emitting vehicles. However, a vehicle tax based exclusively on CO_2 emissions, without consideration of local air pollutants, can stimulate further dieselisation of the fleet, with adverse effects on urban air quality (EEA, 2018), as happened in Ireland (Ryan et al., 2019). Chile and Israel have implemented vehicle tax systems that consider both fuel economy and air pollutant emissions (OECD, 2016; OECD/UN ECLAC, 2016). The taxation of heavy goods vehicles should also take these aspects into account.

Tax treatment of company cars

Latvia is among the few EU countries not taxing benefits from personal use of company cars. This results in an estimated annual subsidy of about 35% of the company car price, the second highest in the EU after Bulgaria (EC, 2017a).[7] Therefore, it is attractive for employees to be paid part of their salary in the form of company cars. In addition, fuel costs paid by the employer do not increase the employee's taxable income. As a result, there is no incentive for employees to limit the use of company cars.

Since 2011, a company car tax based on engine capacity has applied at the company level. Electric vehicles benefit from a reduced rate. This does not provide sufficient incentive to companies to choose less emitting vehicles for their fleets. A tax based on CO_2 emissions, as in Hungary, would provide a better incentive (OECD, 2018c).

In addition to burdening the public budget, the favourable tax treatment of company cars tends to encourage private car use and long-distance commuting. It can result in increased fuel consumption, GHG and local air pollutant emissions, noise, congestion and risk of accidents (Roy, 2014). This adds to problems related to disorganised suburbanisation around Riga and difficult access to public transport in many peripheral areas (Section 3.5.4). The policy runs counter to Latvia's objectives of climate mitigation and air quality improvement in major cities and should be reconsidered.

Road pricing

A system of road pricing has been in place on main roads since 2014. The road user charge (Eurovignette) is paid only by commercial vehicles with gross weight exceeding 3 tonnes. It is partly based on test-cycle engine emission levels (Euro standards), although the differentiation is not very pronounced. The charge is time-based (with daily, weekly, monthly and annual tolls) and does not change with distance travelled. The Eurovignette does not apply to passenger vehicles. The road charge revenue is used for maintenance, upgrade and extension of the road network.

Latvia should adjust road tolls for heavy goods vehicles to take account of distance travelled, in addition to the emission standards applied. It should also extend road tolls to passenger vehicles. In addition, introducing congestion charges in major cities would help put a cost on travel during peak periods and encourage a shift to public transport. A seasonal charge is in place in the seaside resort city of Jūrmala (Box 3.2). Where concerns over equity arise social transfers could be used to partly compensate for road charges.

Box 3.2. Seasonal local charge in Jūrmala

The seaside resort of Jūrmala applies a seasonal local charge of EUR 2 on vehicles entering the so-called special zone from April to September. The special zone includes the city centre, with cultural and historical buildings, as well as recreational and resort infrastructure. The charge aims to limit transit through the city and promote public transport use. The estimated 2018 revenue was nearly EUR 3 million. The revenue is used for a variety of purposes, including tourism promotion and environmental protection.

3.3.5. Taxes and charges on pollution and resource use

Latvia has applied a broad-based tax on pollution and natural resource use, the so-called natural resource tax, since 1991. The tax applies to a wide variety of pollution, goods and activities, including water and natural resource extraction, water and air pollution, CO_2 emissions, waste disposal, packaging materials and environmentally harmful goods such as oil, tyres and electric appliances.[8] Similar wide-ranging pollution taxes have long been in place in other countries in Central and Eastern Europe, such as Estonia and Hungary (OECD, 2017b; OECD 2018c).

Revenue from the natural resource tax has hovered around 3% of environmentally related tax revenue over the last five years. Part of the natural resource tax revenue is redistributed to the municipalities where the resource extraction, landfilling or polluting activity take place, and is allocated to special environmental protection budgets. This may help improve local acceptability of potentially environmentally harmful facilities and help municipalities fund environmental protection expenditure. However, this arrangement can also reinforce regional inequality, and earmarking can create budget rigidity.

Latvia has regularly increased the rates of several components of the natural resource tax, but the rates are still relatively low to encourage change in consumption and production behaviour (Jurušs and Brizga, 2017). The latest major revisions took place in 2014 and 2017, when most rates were raised by between 20% and 25%. However, some tax rates have been stable for several years: for example, those for extraction of several natural resources, including peat, and for water pollution and emissions of most air pollutants. Latvia should consider raising the rates on ammonia and nitrogen oxides, for which the country is not on track to reach the 2020 and 2030 targets (Chapter 1).

Several exemptions have hindered the environmental effectiveness of the natural resource tax and reduced its revenue to about one-tenth of what it could be. An exemption applies to packaging materials and environmentally harmful goods for companies that join extended producer responsibility systems and meet their recycling and recovery targets. The exemption has helped expand participation in such systems to over 90% of regulated companies and improve recycling and recovery (Chapter 4). However, it does not stimulate companies to go beyond the targets, nor does it sufficiently encourage waste prevention. An ongoing review of the natural resource tax legislation aims to link exemptions to stricter performance requirements.

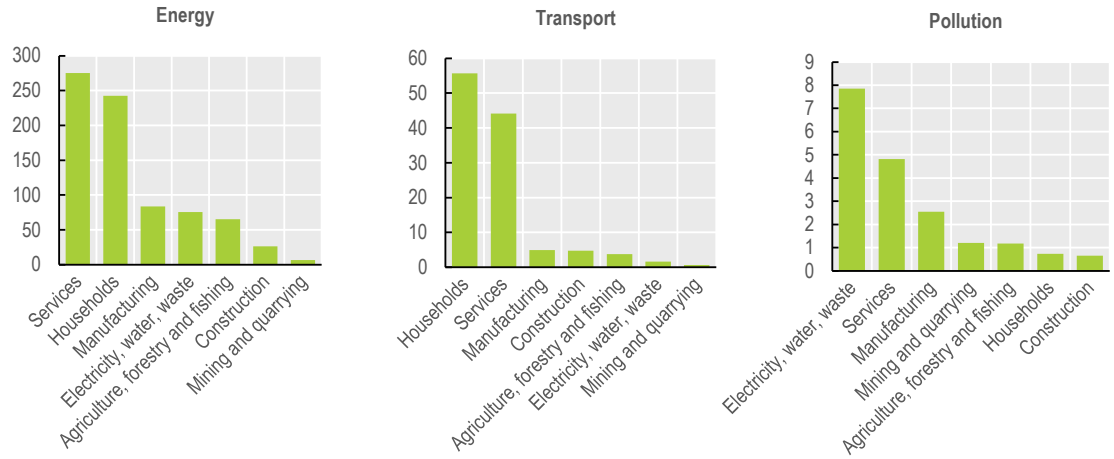
The impact of the natural resource tax has been generally limited (Jurušs and Brizga, 2017). The tax mainly acts as a fine. Standard rates apply where best available techniques are used or operations are in accordance with licensing conditions. Until 2018, rates increased tenfold in cases of non-compliance. Then, however, the penalty was reduced to twice the standard rates, due to persistent monitoring and enforcement problems: operators would go bankrupt rather than pay (Chapter 2). Overall, the natural resource tax has been used mainly as a revenue source rather than an incentive to reduce pollution and use resources more efficiently.

3.3.6. Distributional implications of environmentally related taxes

Particular consideration should be given to the potential adverse impact of tax increases and exemption removals on low-income households and other vulnerable groups. Households bear a third of the burden of environmentally related taxes, contributing 31% of fuel tax revenue and nearly half of vehicle tax revenue, though they are less exposed than businesses to pollution and resource taxes (Figure 3.5).

Figure 3.5. Households bear most of the environmentally related tax burden

Revenue from environmentally related taxes by sector, 2016, EUR million



Note: "Electricity, water, waste" refers to NACE Rev.2 divisions D-E, and "Services" to divisions G-U.
Source: Latvian Central Statistical Office (2019), *Environmental Taxes* (database).

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Affordability of household energy is still an acute issue in Latvia, as in other Central and Eastern European countries. A relatively large share of the population may be vulnerable to energy tax and prices increases. In 2017, 12% of households were in arrears on utility bills (including electricity and heat), more than in the other Baltic states and above the EU average of 7%. In 2018, 7.5% of households were unable to heat their homes adequately. This is in line with the EU average, but more than twice the shares of most other northern European countries.[9] The low thermal efficiency of pre-1990 apartment buildings and lack of metering contribute to energy affordability risks. Often there is no possibility of regulating indoor temperature and heat consumption, and apartments are overheated. Heat supplied to each building is billed to individual apartments in proportion to their size. In addition to being a disincentive for energy savings (Section 3.5.3), the lack of metering leads to unnecessarily high heating bills (Flues and van Dender, 2017).

Retail transport fuel prices are among the lowest in the EU in nominal terms, but among the ten highest when adjusted for purchasing power parity. Nevertheless, increasing transport fuel taxes could help make the tax system more progressive in Latvia, as in other countries with relatively low GDP per capita (Flues and Thomas, 2015). This is because a certain level of income is needed for a household to afford a car, and poorer households are less likely to use a car. In 2018, 17% of Latvia's population could not afford a personal car – one of the highest shares in the EU. In Estonia and Lithuania, the corresponding share is 10%.[10]

Any adverse impact of tax increases on energy prices and vulnerable groups should be addressed through targeted social benefits not linked to energy consumption, such as income-tested cash transfers. Currently, however, reduced electricity tariffs apply to "protected users", such as those at risk of poverty, families with three or more children and people with special needs. The government could use budget savings from removing energy tax exemptions and subsidies (Section 3.4.1), or additional revenue from increased fuel taxes, to address energy affordability risks (Flues and van Dender, 2017).

3.4. Removing potentially perverse incentives

Like other countries, Latvia provides subsidies that could harm the environment. These subsidies, in the form of direct support or preferential tax treatment, exist primarily in the energy, transport, agriculture and fishing sectors. Latvia's support to agriculture and fisheries follows the EU frameworks. As in all EU countries, agricultural support is largely decoupled from production or input use, and 30% of the direct payment envelope under the Common Agricultural Policy is allocated to agricultural practices that are beneficial in terms of climate change and the environment. However, Latvia also provides direct support to some sectors and payments based on production volumes and animal numbers. Such support distorts resource allocation, harms long-term agricultural competitiveness (OECD, 2019d) and can encourage overproduction, with a potentially negative environmental impact (Chapter 5). Agriculture and fishing companies also benefit from fuel tax relief. In the energy and transport sectors, most subsidies are provided implicitly through tax reductions.

In general, such subsidies contravene the polluter-pays and user-pays principles. They distort competition, lock in inefficient technology, lead to inefficient allocation of resources and weigh on public finances. The Ministry of Finance has estimated the fiscal impact (revenue losses) on the state budget from environmental tax exemptions and relief since 2011. Latvia could build on this to establish a process for systematic review of environmentally harmful subsidies. It could consider introducing a mechanism to screen all current subsidies and new subsidy proposals against their potential environmental impact. This would improve the transparency of the tax and public expenditure system. It could be the basis for reforms of subsidies and special tax treatment that are not justified on economic, social and environmental grounds.

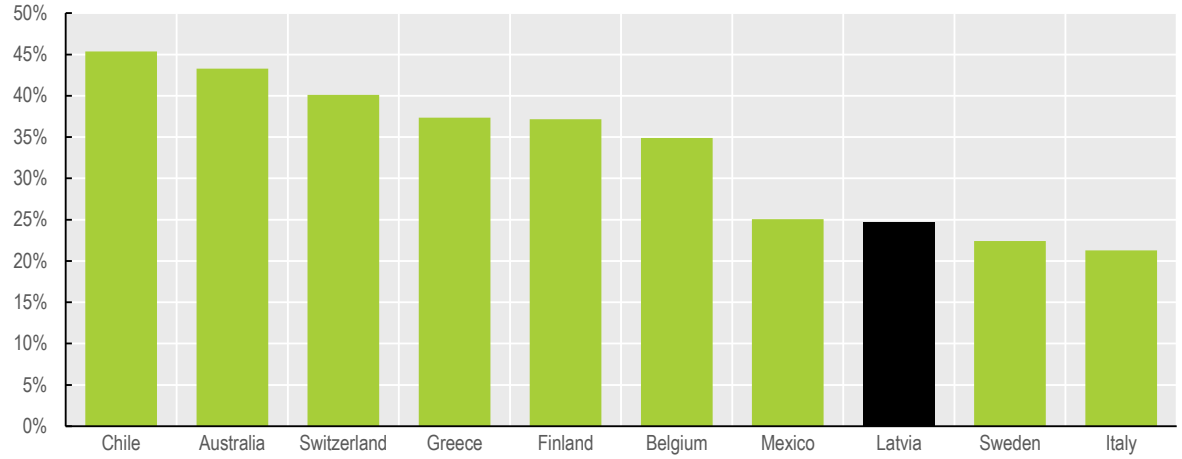
3.4.1. Fossil fuels subsidies and subsidies for energy use

Latvia provides a high level of support to fossil fuel consumption. When measured as a share of energy tax revenue, the level of fossil fuel consumption support is among the ten highest in the OECD (Figure 3.6). It hovered around 25% of energy tax revenue in 2006-16 except in 2011, when it reached 38.5%. The 2011 peak was associated with a one-off total exemption from the excise duty on natural gas for all users from September 2010 to July 2011. Fossil fuel support has increased since 2005, especially in the form of transfers to producers (Figure 3.7).

The government has made some progress in reducing total exemptions from energy taxes. For example, diesel partially blended with biodiesel has been taxed at the standard diesel rate since 2015; the exemptions on natural gas used in industry and fuels used in agriculture and fishing were replaced by reduced rates. The reduced value added tax on natural gas used by households was discontinued in 2011.

Figure 3.6. Fossil fuel consumption support is among the highest in the OECD

Fossil fuel consumption support as a percentage of energy tax revenue, top 10 OECD countries, 2016



Note: Data for Greece refer to 2015. The graph needs to be interpreted with caution because fossil fuel subsidy data may be partial and because data record tax expenditure as an estimate of revenue that is forgone due to a particular feature of the tax system that reduces or postpones tax relative to a jurisdiction's benchmark tax system, to the benefit of fossil fuels. Hence, (i) tax expenditure estimates could increase either because of greater concessions, relative to the benchmark tax treatment, or because of a rise in the benchmark itself; and (ii) international comparison of tax expenditure could be misleading, due to country-specific benchmark tax treatment.
Source: OECD (2019), *Green Growth Indicators* (database).

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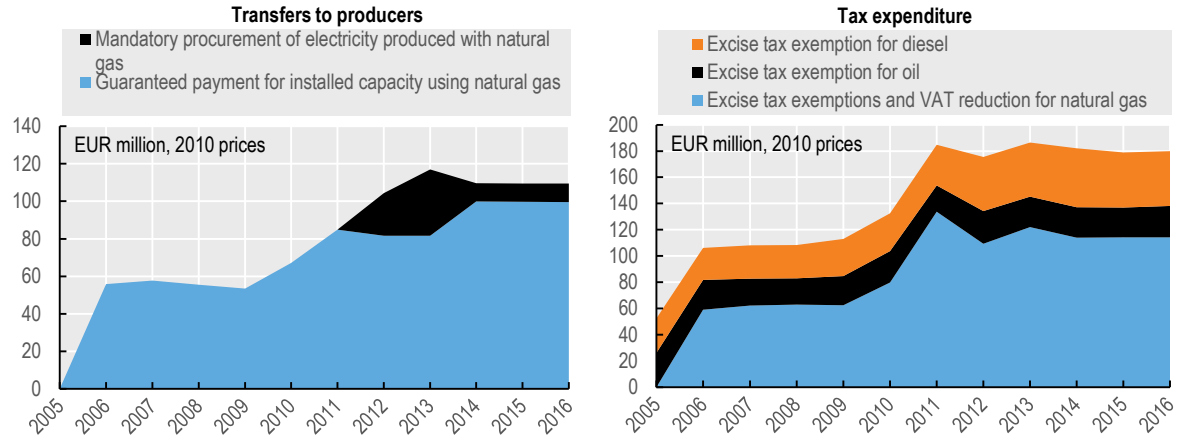
However, many other exemptions and reduced rates remain. They include total exemptions on biodiesel fully obtained from rapeseed oil and on fuels used to generate electricity. Reduced tax rates apply to, among others, petroleum, fuel oil and diesel used for heating, natural gas used in industry and diesel used in agriculture (up to a volume that depends on crop type and cultivated area).[11]

Fuel tourism results in considerable revenue loss (estimated at EUR 23 million in 2016). Oil products that individuals import for their own consumption from non-EU countries are exempt, within the limit of one vehicle standard fuel tank and another 10-litre tank. Since 2012, individuals have been able to benefit from this exemption only weekly instead of daily as before. This is a step towards better controlling fuel tourism, but it needs to be strictly enforced.

Latvia also supports electricity produced using natural gas in energy-efficient combined heat and power (CHP) plants through annual guaranteed payments per megawatt of installed capacity and mandatory procurement of electricity, depending on plant size. The mandatory procurement is financed through electricity bills. The same benefit applies to renewables-based electricity and CHP plants (Section 3.5.5), but natural-gas CHP plants have attracted most of it. Both forms of support have risen sharply over the years (Figure 3.7), raising concerns about the economic sustainability of the support system. The system was put on hold in 2016 and was being revised at the time of writing.

Figure 3.7. Fossil fuel consumption support has increased



Note: This graph needs to be interpreted with caution because fossil fuel subsidy data may be partial and because data record tax expenditure as an estimate of revenue that is forgone due to a particular feature of the tax system that reduces or postpones tax relative to a jurisdiction's benchmark tax system, to the benefit of fossil fuels. Hence, (i) tax expenditure estimates could increase either because of greater concessions, relative to the benchmark tax treatment, or because of a rise in the benchmark itself; and (ii) international comparison of tax expenditure could be misleading, due to country-specific benchmark tax treatment.
Source: OECD (2019), *OECD Inventory of Support Measures for Fossil Fuels* (database).

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3.5. Investing in the environment to promote green growth

Large amounts of investment helped extend and upgrade infrastructure for transport, energy, water supply, wastewater treatment and waste disposal in the last decade. The public sector has been the main driver of environment-related investment, with major contributions from EU funds.

Latvia needs to upgrade ageing infrastructure and extend access to water, waste and transport services, especially in rural areas. At the same time, a steady population decline means some infrastructure and services will need to be downscaled (EC, 2018a). Low population density makes it costly to provide widespread access to public services and infrastructure, thus contributing to persistent regional disparity. Sprawling urban developments in municipalities that are within commuting distance of Riga add inefficiency to local service provision (OECD, 2017c). Enhancing cost-effectiveness of public spending is essential to ensure access to high-quality services for all.

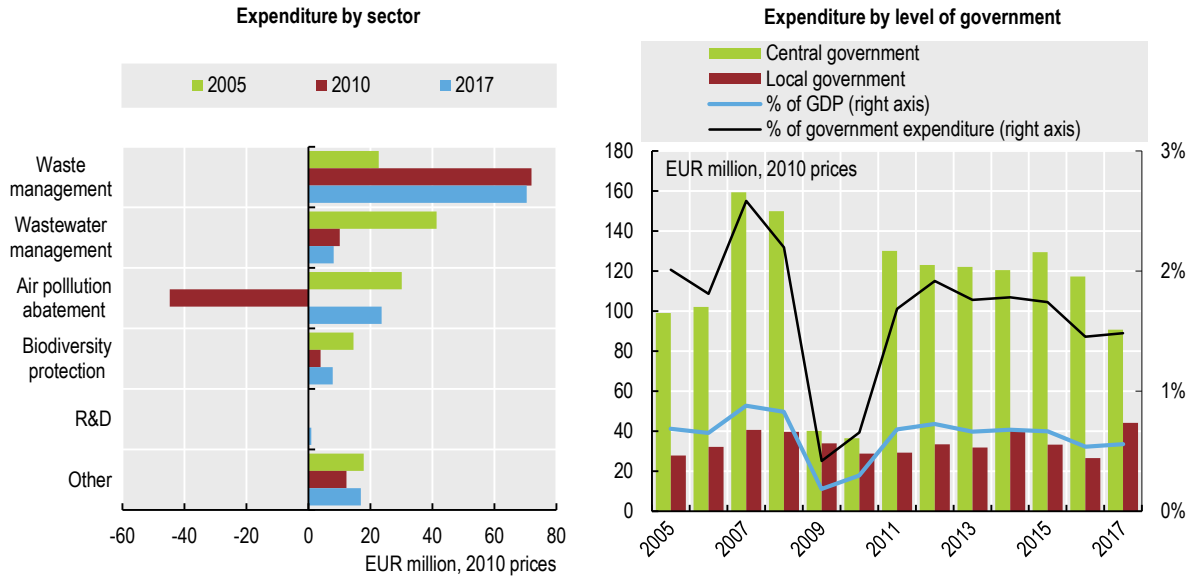
3.5.1. Public expenditure for environmental protection

Public environmental expenditure (current expenditure and investment) decreased over the last decade. In 2017, it was 0.6% of GDP and 1.5% of total government expenditure, about two-thirds of their levels prior to the global financial crisis (Figure 3.8). Central government expenditure dropped sharply in 2009, due partly to the recession and partly to the allocation of EU ETS allowances to new market entrants (which the national account statistics record as asset dismissal or negative expenditure). Disbursement of EU funds drove public expenditure trends.

As in many other countries, the waste and water sectors traditionally absorb most public environmental expenditure. Expenditure on air pollution abatement and biodiversity protection accounts for a minor share and has declined since 2005 (Figure 3.8).[12]

Expenditure on environment-related research and development (R&D) has increased in recent years, although from a very low level (Section 3.6).

Figure 3.8. Public expenditure for environmental protection has decreased



Note: Government expenditure for environmental protection according to the classification of the functions of government (COFOG). In the left panel, "air pollution abatement" includes expenditure related to the EU ETS allowances. The negative bar in the chart is due to the 2010 free allocation of allowances to new entrants in the EU ETS, which is accounted for as dismissal of assets or negative expenditure.
Source: OECD (2019), "General Government Accounts, SNA 2008 (or SNA 1993): Government expenditure by function", *OECD National Accounts Statistics* (database).

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Expenditure in the waste sector has considerably increased (Figure 3.8). It helped upgrade the landfill infrastructure and establish separate collection systems for municipal waste. More recent investment has focused on recycling and biogas recovery infrastructure (Chapter 4).

Investment on wastewater management has helped improve the quality of water services and infrastructure and extend access to wastewater treatment facilities (Chapter 1).[13] It has decreased in recent years, although needs remain high. In 2015, water utilities of agglomerations with more than 2 000 inhabitants estimated that over EUR 200 million was still needed to renovate and rebuild urban wastewater systems. Water service infrastructure is ageing and in generally poor condition. Access to safe water and sanitation is an issue in rural areas (OECD, 2018d).

Local governments have major responsibilities in providing environment-related infrastructure and services, but their expenditure has hovered between a quarter and a half of central government expenditure (Figure 3.8). This masks significant transfers from the central government budget. Local governments' responsibilities far outstrip their financial resources (OECD, 2019c). Municipalities largely rely on EU funds for their capital expenditure, as well as on national financial support mechanisms like the EAAI (Section 3.3.3), the Latvian Environmental Protection Fund (LEPF) and the Environmental Investment Fund (LEIF) (Box 3.3). Despite technical assistance provided by the central government, smaller local authorities continue to lack human resources and adequate skills to plan and manage large, complex infrastructure projects.

Box 3.3. The Environmental Protection and Environmental Investment Funds

The LEPF provides financial support to local governments and non-government organisations for a variety of environment-related projects, especially on environmental awareness and nature conservation. It is funded by the state budget. During the recession, the government cut the LEPF budget by two-thirds, and has not yet restored its pre-recession allocation. The LEPF Administration manages the fund and is accountable to the environment minister. It launches calls for project proposals, assesses and selects them for financing, and monitors implementation of the environmental protection measures and projects funded by the LEPF.

The LEIF operates as a state-owned financial institution. It provides concessional loans for environment-related projects, conditional on the project generating enough income to cover all operating expenses, including repayment of the loan and interest. Projects can target drinking water quality, wastewater treatment, heat production, cleaner production processes, heat insulation of buildings and waste recovery, among other areas. In addition to providing finance, LEIF supports municipalities and companies in project implementation.

European structural and investment funds

Latvia has benefited from considerable financial support from the European Union in the framework of the EU cohesion, rural development and fishery policies. EU funding helped Latvia recover from the recession and comply with EU legislation in the water and waste sectors (Applica, Ismeri Europa and CEA, 2016). Between 2005 and 2017, EU funds financed two-thirds of investment in environmental infrastructure and services (waste, water, nature protection, climate, monitoring, remediation and flood risks).

Over 2007-13, funding allocated to Latvia from the EU Cohesion Fund and European Regional Development Fund averaged 2.6% of annual GDP and 50% of government capital expenditure. Latvia spent all the available funds on time. Investment in transport and environmental infrastructure received the largest shares.[14] Most transport-related investment focused on the road network. Environment-related investment focused on the water sector and, to a lesser extent, waste management, with the aim of ensuring compliance with the related EU directives.

Latvia received EUR 5.6 billion under the European structural and investment (ESI) funds for 2014-20.[15] This is equivalent to 3% of annual average GDP over 2014-18 and 65% of national public investment (EC, 2018a).[16]

For 2014-20, nearly 28% of the ESI funds target environmental protection, resource efficiency and climate-related objectives, including in agriculture and fishing. Investment focuses on energy efficiency, use of renewables in district heating, transport, and investments to ensure fulfilment of the EU environmental requirements. Disbursement of the funds in the water sector is conditional on river basin management plans being in place.

By implementing the 2014-20 EU-funded programmes, Latvia expects to reduce GHG emissions by 62 700 t CO_2 eq per year. As of end 2018, the projects selected for funding allowed it to achieve a little over a third of the planned emission abatement. Latvia has made rapid progress in achieving several environment-related targets, such as those on improving energy performance of residential buildings and extending organic farming.

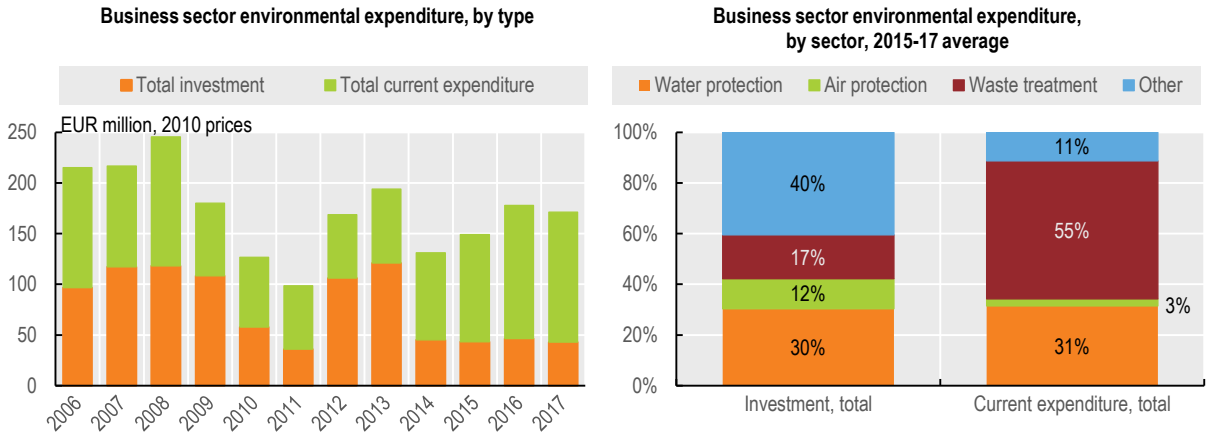
Progress in other areas has been slower, including in increasing waste recycling and renewables capacity, extending connection to wastewater treatment facilities and improving energy savings in public buildings. There is a need to accelerate implementation of EU-funded investment in these areas.

Latvia should increase financing for public infrastructure investment to complement the EU funds, which will eventually diminish. It should use the funds more effectively to improve environmental performance. Large infrastructure investments should systematically undergo cost-benefit analysis, including environmental costs and benefits. Latvia should also improve the governance of state-owned and municipal enterprises, such as those in the energy, public transport, waste and water sectors, to ensure transparent and cost-effective project selection (OECD, 2017c). This would help improve competition and confidence of private investors. The use of private-public partnerships is in its infancy in Latvia and could be expanded, particularly at the local level, where municipalities face high financial constraints (OECD, 2015).

3.5.2. Business expenditure for environmental protection

Environmental expenditure of businesses has declined since the mid-2000s, especially in terms of investment (Figure 3.9). Business investment decreased by 55% over 2006-17. It accounted for a quarter of environmental expenditure in 2017, down from about half in the years prior to the financial crisis. Over 2005-17, private investment accounted for only 11.5% of Latvia's total environmental investment. It mostly targeted water resource protection, waste treatment and air protection (Figure 3.9). Current expenditure has increased with economic recovery, especially for managing waste. This reflects progress in setting up extended producer responsibility systems and firms' increased participation in them (Chapter 4).

Figure 3.9. Business environmental expenditure has declined and focuses on managing waste



Note: Expenditure excludes VAT.
Source: Latvian Central Statistical Office (2019), *Environment Statistics* (database).

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Latvia's small and medium-sized enterprises (SMEs) have a low propensity to invest in improving their environmental performance. According to a 2017 Eurobarometer survey, 70% have invested in resource efficiency, in line with the EU average, but most have invested less than 1% of turnover. Latvian SMEs performed below the EU average in terms

of actions taken to save energy, use renewables, minimise waste, save and reuse materials, and save water. Survey respondents said the main barriers to taking such actions were complexity of administrative procedures and lack of demand for resource-efficient products or services. Still, such actions helped reduce production costs in 46% of Latvia's SMEs (EC, 2018b).

The public sector remains the main driver of businesses' environment-related investment. This indicates that the current policy mix of regulations and market incentives (EU ETS carbon price, carbon tax, fuel taxes, pollution and resource use taxes) has not stimulated business investment effectively. Business investment largely relies on EU funding and national funds (Box 3.3). Businesses have an incentive to postpone investment and wait for funding opportunities. Hence there is a risk of national and EU funds being used for investment that would have been made without public financial support, rather than for financing additional, more productive growth-inducing investment. There is a need to reduce dependence on EU funds and to streamline the multiple fragmented financial support mechanisms available to encourage environment-related investment.

3.5.3. Investment in energy

Investment in renewable energy sources and energy efficiency improvement is at the core of Latvia's strategy to reduce GHG emissions (Chapter 1). There are several forms of financial assistance for capital investment in renewables and energy efficiency, including through national funds such as the EAAI, LEPF and LEIF (Section 3.3.3 and Box 3.3) and the EU funds.

Renewables

Investment in renewables has increased in the last decade. Latvia is on track to meet its EU target of 40% renewables in gross final energy consumption by 2020.[17] In 2017, renewables accounted for 39% of gross final energy consumption (Chapter 1). More use of biomass for heat and power production has been the main driver of growth.

However, Latvia needs to expand the use of renewables other than solid biofuels, especially solar and wind, to attain its 2020 target of nearly 60% of renewables in gross final electricity consumption, set in the National Renewable Energy Action Plan. Solar accounts for a negligible share of energy use. The country's wind potential, which is considerable, has remained largely unexploited in comparison to other Baltic states, mainly due to public opposition to onshore wind farms and high installation costs of offshore capacity. The Baltic countries could invest in joint projects, including additional interconnectors through offshore wind power sites (Lindroos, T. et al., 2018).

In addition to financial assistance for capital investment, Latvia promoted investment in renewables and high-efficiency CHP plants through a mix of feed-in tariffs (mandatory procurement component or MPC) and guaranteed capacity payments, depending on the size of the plant and the fuel used.[18] The difference between the price of electricity produced under the MPC programme and the market price is compensated by electricity users through a component of the electricity tariff.[19] The support level depends on the type of energy source used, the installed capacity of the plant, the number of working hours and the natural gas price.

However, the support system was poorly designed, overly generous and not transparent. It resulted in high costs and windfall profits in some cases, mostly because of excess issuance of MPC licences and overcompensation of some beneficiaries (Dreblow et al., 2013;

Rubins and Pilvere, 2017). In 2017, its cost totalled nearly 1% of GDP (The Baltic Course, 2018), weighing on business competitiveness and household income. In addition, energy-efficient natural-gas CHP plants were eligible for support and attracted much of it. This resulted in a perverse incentive to further expand fossil fuel use (Section 3.4.1).

These issues led to changes in the calculation of the support amount, the introduction of a tax on subsidised companies' profits (the so-called Subsidised Energy Tax) and, finally, a moratorium on the support system until 2020. The system was being revised at the time of writing. Latvia needs to quickly restore investor confidence and launch a renewed support system. It should consider more cost-effective and transparent measures to support renewables-based generation, such as competitive tenders and procurement auctions (OECD, 2019c).

Energy efficiency

Latvia has made progress in reducing the energy intensity of the economy. However, final energy consumption per unit of GDP is still above the OECD average. Energy consumption in agriculture, industry and transport has increased, and that of buildings is persistently high. More work is needed to achieve the 2020 energy intensity and energy savings targets of the National Energy Efficiency Action Plan (Chapter 1).

The residential sector is the major energy user, accounting for 30% of total final energy consumption. Most of the building stock is over 25 years old and consists of multi-owner buildings with poor energy performance. Latvia has introduced minimum energy performance requirements for existing buildings and minimum thermal insulation standards. All new apartment buildings and public buildings should be nearly zero energy from 2021.

Since 2007, Latvia has used EU and national funds effectively to upgrade district heating networks and improve buildings' thermal efficiency. This has contributed to remarkable energy savings, above the EU average (Odyssee-Mure, 2018). Heat consumption per square metre declined by 33% over 2005-16 in the residential sector.

However, investment is needed to expand and renovate district heating networks in some municipalities (PWC, 2016) (Box 3.4). Heat consumption per square metre is among the highest in Europe, well above that of most other northern European countries.[20] Heat consumption in apartment buildings is generally metered at building level and allocated and charged to households based on apartment size. Charging for heat based on energy use is essential for achieving energy savings, as the experience of the Czech Republic shows (Flues and van Dender, 2017).[21]

There is a need to accelerate investment in residential energy efficiency and differentiate the financing sources. The government estimates it would cost EUR 6 billion (more than 20% of GDP) to thermally renovate all apartment building stock. Barriers to private investment include the large numbers of owners per building, the fact that many have low income and limited access to bank credit, the long payback and complexity of energy efficiency projects and a lack of energy efficiency specialists and energy service companies. Instruments such as subsidised loans, credit guarantees and energy performance contracts can help overcome some of these barriers and should be expanded.[22] The Development Finance Institution ALTUM has provided these forms of financial support, as well as technical assistance, since 2014.

Box 3.4. Energy efficiency of district heating

Centralised district heating networks cover nine of the largest Latvian cities. They deliver heat to residential and, to a lesser extent, commercial buildings. Solid biofuels (mostly woody biomass) have been progressively replacing natural gas in CHP plants that supply heat to the district heating networks (Chapter 1). This fuel switch has helped reduce the carbon intensity of heat generation.

Increased efficiency of CHP plants and investment in upgrading district heating networks helped reduce heat losses by 15% between 2010 and 2016, to below 12% of heat generation. This is lower than in neighbouring Estonia and Lithuania, but above the OECD Europe average of 9% and far from best performers such as Sweden (4%). The EU funds for 2014-20 have supported additional upgrade and extension of district heating networks.

Source: CBS (2019), *Energy Statistics* (database); IEA (2018), "Extended world energy balances (Edition 2018)", *IEA World Energy Statistics and Balances* (database).

More work is also needed to improve energy efficiency in industry. The energy intensity of manufacturing industry is well above the EU average and has increased since the end of the economic recession, in contrast with the trends observed in the EU as a whole (Odyssee-Mure, 2019). Energy use in wood processing more than tripled between 2005 and 2016, to reach 60% of total industry use. The 2016 Energy Efficiency Law introduced an energy savings obligation and laid the groundwork for industrial energy efficiency measures, including industrial energy audits and voluntary agreements. Manufacturing companies have access to a wide range of financial assistance through national and EU funds. However, there is a generally low propensity to invest in improving environmental performance, including energy efficiency (Section 3.5.2). Pricing incentives are not strong enough. Industrial firms benefit from free allocation of EU ETS allowances (Section 3.3.3) and a reduced excise rate on natural gas (Section 3.4.1).

3.5.4. Investment in low-carbon transport

Transport accounts for more than a quarter of energy use and GHG emissions. It has traditionally played a large role in Latvia's economy, thanks to the country's position at the west-east and north-south crossroads. Transport and logistics account for about 10% of GDP and more than 40% of service exports. However, Latvia ranks last among the countries on the Baltic Sea in terms of perceived quality of transport infrastructure (Table 3.1).

Most transport-related investment in the last decade has focused on the road network. However, the quality of road infrastructure remains particularly poor, with Latvia ranking last among the Baltic and OECD countries (Table 3.1) (WEF, 2017). Most roads are single lane and many are unsafe. Road mortality is among the highest in the OECD.

Table 3.1. Quality of transport and electricity infrastructure

Ranking of 137 countries, 2017.

	Transport	Roads	Railways	Ports
Latvia	61	107	29	29
Denmark	20	13	22	10
Estonia	44	38	33	11
Finland	16	21	8	5
Germany	10	15	9	18
Lithuania	50	37	27	39
Poland	59	65	45	64
Sweden	22	18	21	15

Source: WEF (2017), *The Global Competitiveness Report* 2017-2018.

Latvia has the longest railway network in the Baltic states. It is largely not electrified and most trains run on diesel. In 2018, the government launched the electrification of the main east-west corridor, to be completed by 2030. Rail accounts for more than three-quarters of freight transport, the largest market share in the EU. However, the share has declined in the 2010s to the benefit of road. The role of rail in passenger traffic is low and declining, accounting for less than 5% of passenger travel (Chapter 1).

Latvia has been slow in implementing the recommendation of the 2017 OECD Economic Survey to invest more in upgrading existing roads to make them safer and improve their quality. While this is certainly needed, Latvia should ensure that transport investment priorities are consistent with long-term climate and environmental objectives, and systematically consider environmental costs and benefits in cost-benefit analysis of transport projects. It should accelerate investment in public transport, cycling lanes and pedestrian-friendly infrastructure in urban areas, as envisaged in Latvia 2030 and the Transport Development Guidelines 2014-20.

Public transport

Public transport, including trains and buses, accounted for 18.5% of passenger traffic in 2016. While the share is slightly above the EU average, it has decreased since 2005 in favour of private cars (Chapter 1).

The public transport network is dense in the Riga city centre, thinning out towards the city borders (Yatskiv and Budilovich, 2017). About 15% of the population of Riga proper has no easy access to public transport. In surrounding municipalities, the share can be much higher (OECD, 2017c). There is no integrated public transport system linking Riga to the sprawling municipalities in the surrounding region, where more than half the country's population lives. People living in newly developed areas around Riga rely on work opportunities in the city. This leads to increasing congestion and pollution around the capital.

Transport planning between Riga and its surroundings is fragmented and does not reflect the metropolitan scale (OECD, 2019c). Latvia 2030 highlights the need for co-ordinated planning of transport infrastructure, public transport and urban development. Integrated route planning, pricing and ticketing across providers and municipalities would help increase public transport use and improve environmental outcomes.

Bus and rail services incur high costs serving sparsely populated areas, especially outside urban areas. Costs are expected to rise with a population that is declining and ageing, and

thus has more limited mobility (OECD, 2017c). The state subsidises public transport by covering providers' operational losses, including those due to reduced tariffs (e.g. for people with disabilities). The experience of some rural regions in other countries (e.g. France, Germany, Spain) shows that transport-on-demand systems could be an effective way to provide transport services in sparsely populated rural areas.[23]

Use of renewables in transport and electric mobility

Latvia is far from reaching the EU-wide target of covering 10% of energy used in transport with renewables by 2020 (Chapter 1). It exports most of its rapeseed-based biodiesel production. Domestic use is low, partly due to the old vehicle fleet and low mandatory blending requirement (4.5% by volume), which covers biodiesel sales during the warmer months (from mid-April to end-October). An in-depth assessment of the impact of biofuel production and use on the country's net GHG emissions, biodiversity, water and soil is needed. No sustainability criteria are in place beyond those required by the EU. Latvia has not started to produce second-generation biofuels (e.g. from waste and residues).

There are opportunities to use electric vehicles (EVs) in Latvia, given the high share of renewables (especially hydro) in the electricity generation mix (Chapter 1). However, the impact on the electricity system and tariffs would need to be carefully assessed. The Electromobility Development Plan (EMDP) for 2014-16 and the Alternative Fuels Development Plan for 2017-20 envisage investing EUR 8.3 million (including EUR 7 million in EU funds) to install a network of 150 charging stations along main roads by 2020.[24] The number of charging stations grew from just 13 in 2014 to 74 in 2018.

Incentives have encouraged EV sales. They include free parking and bus lane use, as well as economic incentives (EVs are subject to the lowest fee for the annual technical inspection and the lowest company car tax rate). The introduction of an annual vehicle tax based on CO_2 emissions in 2017 also helped increase EV sales (Section 3.3.4). In early 2019, about 550 EVs were registered in Latvia, up from fewer than 200 when the EMDP was launched. However, this is still just 0.1% of the vehicle fleet, compared with the EU-wide rate of 1.5%.

EV costs are prohibitively high for much of the population, but the government should refrain from providing direct purchasing subsidies, a measure included in the Alternative Fuels Development Plan 2017–20. Such subsidies would likely benefit well-off people who could afford to buy an EV without public support. Rather, Latvia should continue to invest in extending the charging facility network to increase charging possibilities at night, as most people live in apartment buildings, and alleviate "range anxiety".[25]

3.6. Promoting eco-innovation and environmental markets

3.6.1. Innovation policy framework and performance

The innovation framework for 2014-20 comprises several policy documents and strategies, such as the National Industrial Policy Guidelines 2014-20 and the Guidelines for Science, Technology Development and Innovation 2014-20. Measures to foster innovation include grants, financial instruments (e.g. seed and venture capital) and non-financial incentives. Latvia established the Single Technology Transfer Centre as part of the Investment and Development Agency to foster industry-science co-operation and commercialisation of public research.

Despite an increased policy focus and gradual improvement, Latvia's innovation system and performance are weak. The country has a low rate of public and private R&D investment. Gross domestic expenditure on R&D hovered around 0.5% of GDP in the last decade, about a fifth of the OECD average (2.4%). Government and business R&D expenditure levels have decreased since 2010 and are among the lowest in the OECD.[26] The patenting performance is also low. The proportion of tertiary-educated people in the working-age population is below the OECD average (Basic statistics). This, along with workforce ageing and brain drain, limits innovation capacity.

The knowledge intensity of exports is lower than in many advanced OECD economies (OECD, 2017c). Exports are concentrated in industries and activities with relatively little room for quality improvement: largely raw materials and wood and food products, as well as transport services. Business innovation capacity is concentrated in a small number of firms. Latvia should further promote co-operation between firms and research institutions and devote more resources to higher education to improve the skill base (OECD, 2019c). This would help the country further diversify exports towards products and services with higher technology content and value added.

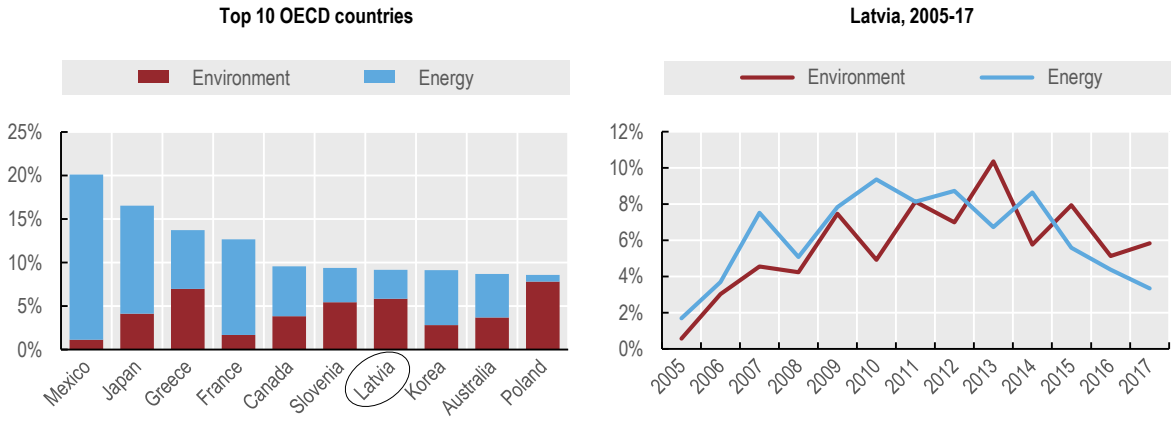
3.6.2. Promoting eco-innovation and green industries

Environment-related R&D, technology and innovation

As in other research fields, the state budget and EU funds are the main sources of funding for environment-related research. Latvia spends 9.5% of its government R&D budget on environment- and energy-related research. This puts it among the top ten OECD countries (Figure 3.10), although in the context of a low overall R&D budget. The share of government R&D outlays for environment- and energy-related R&D grew in the last decade, reaching 5.8% and 3.3%, respectively, in 2017, although the trends are volatile (Figure 3.10).

Figure 3.10. A large share of public R&D spending goes to environmental and energy research

Government budget allocations for environment and energy R&D, percentage of total



Source: OECD (2019), "Research and Development Statistics: Government budget appropriations or outlays for RD", *OECD Science, Technology and R&D Statistics* (database).

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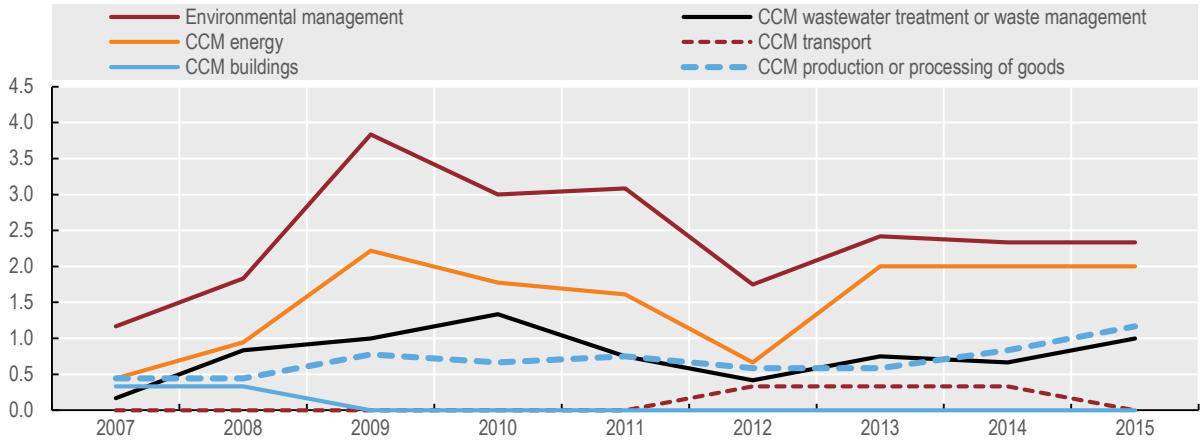
With increased public R&D funding, Latvia has developed a specialisation in environmental technology in recent years. Patent applications for environment-related technology increased from 9% of all applications in 2000-02 to 13% in 2013-15. This is among the highest shares in the OECD, although the absolute number remains extremely modest. Applications related to environmental management and some climate change mitigation technology have increased since the mid-2000s, although not consistently (Figure 3.11).

Figure 3.11. Green patent applications have grown since the mid-2010s, but the numbers are modest

Patent applications by environmental domain, 2007-15



Note: Data refer to applications by inventor residence (i.e. inventors residing in Latvia even if they applied for protection elsewhere) and patent family size of two or more (i.e. filed for protection in at least two jurisdictions). Data are expressed as three-year moving averages. CCM = climate change mitigation.
Source: OECD (2019), "Patents in environment-related technologies: Technology development by inventor country", *OECD Environment Statistics* (database).

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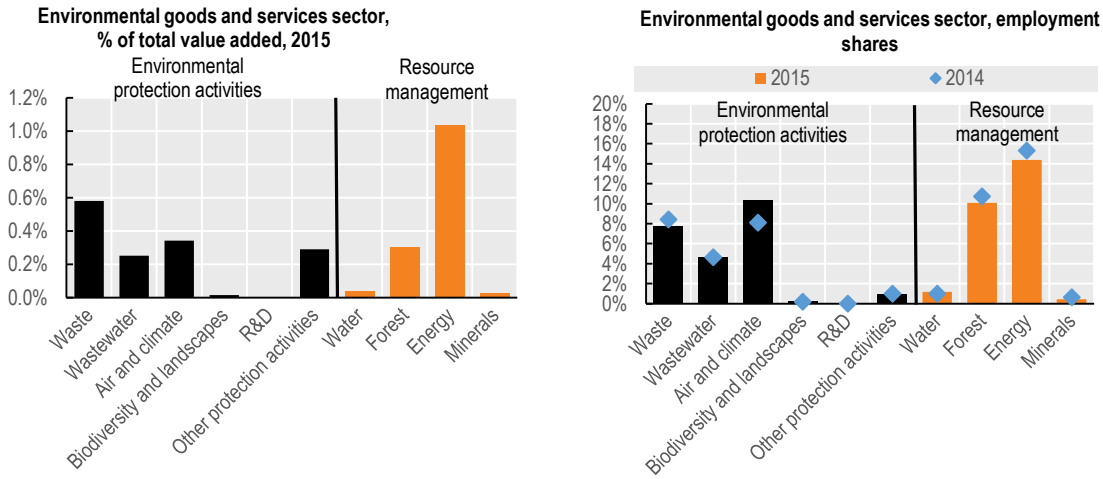
Markets for environment-related products and services

The environmental goods and services (EGS) sector has grown moderately in Latvia, and seems less developed than in most EU countries. In 2015, environment-related products accounted for some 6% of total exports, about double the level in 2002. The EGS sector accounted for nearly 3% of total value added in 2015. Energy resource management (which includes renewables and energy efficiency) accounted for most EGS value added, followed by waste management, air and climate protection, and forest management (Figure 3.12). In 2015, businesses providing environmental products and services employed about 29 700 people, a 4% increase from 2014. Employment increased in environmental protection activities, particularly those related to air and climate, but declined in resource management sectors, except water management (Figure 3.12). Sectors continuing to develop include renewables, energy efficiency in buildings, forest-based industry, eco-cosmetics, and waste and water management (EC, 2017b).

Compared to the EU average, fewer SMEs design and produce greener products in Latvia. According to a 2017 Eurobarometer survey, 20% of the country's SMEs offer green products and services, compared to the EU average of 24%. Only 16% of SMEs have taken steps to design products that are easier to maintain, repair or reuse (the EU average is 28%)

(EC, 2018b). Only 13 products (all cleaning products) made in Latvia have been awarded the EU eco-label.

Figure 3.12. The energy sector dominates green industry value added and employment



Source: Latvian Central Statistical Office (2019), *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933969601

The policy mix for promoting eco-innovation

The main drivers of eco-innovation in Latvia are the energy and resource efficiency targets of the EU's Europe 2020 strategy and the availability of natural resources such as forests, water and soil (EC, 2017c). Bioeconomy, "smart materials" and "smart energy solutions" are among the focus areas of the Smart Specialisation Strategy. The Bioeconomy Strategy 2030 aims to develop the production and use of bio-resources (such as forest-based products), including by fostering knowledge and innovation (Chapter 4). Some 8% of the EU funds allocated to Latvia in 2014-20 target R&D and innovation, including eco-innovation. The Rural Development Programme 2014-20 supports knowledge transfer and commercialisation in agriculture, forestry and wood processing.

As in most OECD countries, supply-side measures dominate the policy mix for innovation and eco-innovation. They include various forms of financial support to R&D and commercialisation of research results. EU-funded research projects and other donor-funded innovation programmes have helped stimulate production of new environmental technology.

However, innovation capacity of businesses remains generally low. The shortage of highly skilled workers and the small number and size of innovative companies hinder eco-innovation. The multiplicity of financial assistance mechanisms entails relatively high administration and transaction costs. Over-reliance on EU and other foreign financial assistance instruments holds back long-term national policy development (EIO, 2018). Latvia would benefit from streamlining and better targeting financial support for business environmental investment and innovation. It should systematically evaluate the cost-effectiveness of its eco-innovation policy and its contribution to improved environmental performance, resource productivity and energy efficiency.

Low public awareness of sustainable consumption and production results in low demand for cleaner products and services (EIO, 2018). Product price is the dominant driver of consumer choice (EC, 2017b), due to the population's relatively low income. Thus more work is needed to stimulate demand for greener products and services, for example through green public procurement, eco-labelling, market incentives, awareness raising and better enforcement. Green public procurement amounted to 18% of total public procurement value in 2018. This is not far from the government's target of 20% by 2020, but the target could be more ambitious (Chapter 2).

3.7. Strengthening international environmental co-operation

3.7.1. Regional co-operation with the Baltic states and Baltic Sea states

Latvia has a long tradition of co-operating with the neighbouring Baltic states of Estonia and Lithuania. For example, an agreement signed in 2010 promotes co-operation in several environmental domains. Environment ministers and senior experts meet periodically. Within the framework of the Council of the Baltic Sea States, Latvia participates in regional activities devoted to SDG implementation under Realizing the Vision: The Baltic 2030 Action Plan. It has also actively participated in EU-funded territorial co-operation programmes, enhancing co-operation with neighbouring EU and non-EU countries.

3.7.2. Mainstreaming environmental considerations into development co-operation

Since 2004, when it joined the European Union, Latvia has substantially increased the volume of its official development assistance (ODA) to 0.11% of gross national income (GNI) in 2017. This puts Latvia at the lower end of OECD countries (second to last, before Israel). Its ODA/GNI ratio falls below the target of 0.33% of GNI by 2030 common to countries that have joined the European Union since 2002. Latvia should consider increasing its ODA volume in line with international goals, notably the 2030 EU target.

Latvia provides most of its ODA via multilateral channels, particularly the European Union (through contributions to the EU budget and the European Development Fund). Its bilateral assistance is concentrated in Eastern European and Central Asian countries (especially Georgia, Kyrgyzstan, Moldova, Tajikistan, Ukraine and Uzbekistan). Latvia's projects focus on exchange of experiences and know-how.

Bilateral ODA commitments for general environmental protection, renewables and water represented 0.2% of ODA (sectoral allocable aid) in 2016, the lowest share in the OECD. By comparison, the share of committed bilateral aid for these sectors was 3.8% in Estonia and 3.5% in Lithuania. The environment ministry has its own bilateral co-operation agreements, which focus on exchange of best practices and experience on environmental policy and financial mechanisms, waste management, water management, green technology and energy efficiency. Latvia should increase the share of bilateral ODA devoted to environment, taking into account its areas of expertise.

Environmental sustainability, democracy, good governance and gender equality are the horizontal principles of Latvia's development co-operation. These principles are required to be integrated in all activities financed from the Latvian bilateral development co-operation budget, regardless of sector. The level of integration of the horizontal principles is required to be evaluated in every project proposal.

Latvia is not a member of the OECD Development Assistance Committee (DAC). However, it reports ODA data to the DAC, and its Development Co-operation Policy Guidelines 2016-20 were designed on the basis of DAC recommendations and guidelines. Joining the DAC would help Latvia improve the effectiveness, visibility and coherence of its development assistance activities.

Recommendations on green growth

Strengthening the strategic framework for sustainable development and green growth

- Better align the post-2020 NDP, and sectoral policies at large, with environmental and green growth objectives; consider extending the 2030 horizon of development planning to 2050.

Greening the system of taxes, charges and subsidies

- Implement a green tax reform to provide stronger incentives for sustainable resource use, increase overall tax revenue and reduce the tax burden on low-income households:
  - Continue to reduce tax exemptions and discounts (e.g. on rapeseed biodiesel, as well as on fuels used for agriculture, fishing, electricity, heating and industry production).
  - Further raise energy tax rates and close the petrol/diesel tax gap to adequately reflect environmental damage from energy use, while providing targeted support to vulnerable groups through social benefits not linked to energy consumption.
  - Consider raising the natural resource tax rates on air pollutants on the basis of a cost-effectiveness assessment.
  - Gradually raise the carbon tax rate; remove its exemption on emissions from peat combustion; consider extending the carbon tax to transport fuels and biomass.
  - Revise the vehicle tax to take into account air pollutants in addition to CO_2; reform the tax treatment of personal use of company cars and link the company car tax to vehicle emission standards and fuel economy; link taxation of heavy goods vehicles to their environmental performance.
  - Link road tolls for commercial vehicles to distance travelled, in addition to vehicle emission standards; introduce similar road charges for passenger cars.
- Build on the annual review of the tax exemptions' fiscal impact to establish a systematic review process on environmentally harmful subsidies.

Investing in low-carbon infrastructure

- Increase and enhance cost-effectiveness of public spending on environment-related infrastructure; streamline and better target financial support for business environmental investment.
- Continue to improve residential energy efficiency by i) further scaling up public finance for energy efficiency renovation of buildings; ii) encouraging the use of

energy performance contracts, subsidised loans and credit guarantees to foster private investment; iii) investing in training energy efficiency specialists; iv) assisting homeowner associations in the design and management of energy efficiency projects; v) accelerating retrofitting investment on the public building stock; vi) upgrading district heating networks; and vii) extending heat metering and charging heat based on actual use.

- Review the design of the renewables support system at the earliest opportunity and consider introducing competitive tendering to improve cost-effectiveness.
- Establish an integrated public transport system, with comprehensive route planning, pricing and ticketing, linking Riga to surrounding municipalities; promote transport-on-demand systems to provide public transport services in low populated rural areas; continue to extend the charging facility network for electric vehicles.

Promoting eco-innovation and green markets

- Further increase public R&D funding for environment-related innovation and monitor the efficiency and effectiveness of its allocation; strengthen measures to stimulate demand for energy efficient and cleaner products, technologies and services, including green public procurement, eco-labelling, market incentives, awareness raising and better enforcement.

Notes

[1] The 2008 Development Planning System Law requires national-level policy initiatives to be in line with hierarchically higher goals and coherent with goals in other plans. Local development planning documents are subordinated to regional documents, and regional documents to national ones.

[2] Environmentally related taxes are defined as any compulsory, unrequited payment to general government levied on tax bases deemed to be of environmental relevance. Taxes are unrequited in the sense that benefits provided by government to taxpayers are normally not in proportion to their payments.

[3] Estimates in OECD (2018a) include emissions from biomass combustion in the emission base. This means CO_2 emissions from biomass combustion are treated like CO_2 emissions from fossil fuel combustion.

[4] Fuel taxes can help account for local air pollution and other social costs directly or indirectly linked to energy use in transport (e.g. congestion, accident and noise costs). However, other instruments are theoretically more appropriate. Congestion, noise and accident costs are a function of the amount, location and timing of vehicle traffic. Thus they are only indirectly linked to fuel use, as greater fuel use generally reflects increased distance driven. The impact on local air pollution also partly depends on location of vehicle use or emitting facility. In remote or rural areas, for example, higher pollution may have lower health effects than in more populated or urban ones but a higher impact on natural resources and vegetation (Harding, 2014). Countrywide, time- and location-specific road pricing would generally be more cost-effective in addressing congestion, accidents and noise.

[5] The rates range from zero, for cars with CO_2 emissions per kilometre of up to 50 grams, to EUR 756, for cars with CO_2/km above 351 grams.

[6] In 2016, the average emissions of newly registered passenger cars in Latvia amounted to 128.9 grams of CO_2/km, compared to the EU average of 118 g CO_2/km (EEA, 2018).

[7] The annual subsidy is calculated as the difference between the cost to the employer of providing a car and the benefit in kind on which the employee is taxed.

[8] The natural resource tax applies to emissions of polluting substances into the air, including CO_2, solid particles, carbon monoxide, heavy metals, volatile organic compounds, ammonia, hydrogen sulphide and other non-organic compounds, sulphur dioxide and nitrogen oxides; extraction of natural resources (e.g. peat, sand, clay, limestone, dolomite, quartz); water extraction, on the basis of the value (low, medium or high) of water; water pollution from non-hazardous and hazardous substances and phosphorus, with rates increasing with the hazard level; waste disposal, including municipal and hazardous waste and production, construction and demolition waste; goods harmful to the environment (e.g. tyres, batteries, electronic equipment); packaging of goods and products and disposable tableware and accessories, including plastic bags (with rates differentiated according to harmfulness of plastic type); radioactive substances; and coal, coke and lignite.

[9] Denmark, Estonia, Finland, Norway and Sweden had shares below 3% in 2017.

[10] Only Bulgaria, Hungary and Romania have higher shares of the population unable to afford a car.

[11] Other total exemptions from excise duties include fuels used for domestic navigation and aviation, LPG used for residential and commercial heating, and electricity used for freight transport and public passenger transport. Other reduced tax rates apply to bio-gasoline, LPG for transport, and diesel, kerosene and fuel oil with at least 5% biofuel content.

[12] The air pollution abatement category includes expenditure related to the EU ETS allowances. In 2009 and 2010, the government freely allocated emission allowances to new entrants in the EU ETS. The national account statistics recorded these operations as dismissal of assets or negative expenditure, which explains the negative bar in Figure 3.8.

[13] About a third of the population was connected to clean drinking water supply and 90 000 people to new or upgraded wastewater treatment facilities as a result of EU-funded investment in 2007-13.

[14] Investment in environmental infrastructure accounted for 20% of allocated funds, transport for 28.5% (roads 12%, rail 6.5% and other transport 10%) and energy for 3.5%.

[15] For 2014-20, the EU structural and investment funds are the European Regional Development Fund, Cohesion Fund, European Social Fund, European Agricultural Fund for Rural Development, European Maritime and Fisheries Fund and Youth Employment Initiative.

[16] When national co-financing is included, the 2014-20 regional development budget totals EUR 6.9 billion. There is one main operational programme (OP), the Growth and Employment OP, with an allocation of EUR 5.2 billion, of which EUR 4.4 billion is EU funds. In addition, there are three cross-border programmes (with Estonia, Lithuania, Finland and Sweden), one transnational programme for the Baltic Sea region, and two programmes for rural development and fisheries funded by the EU funds dedicated to these sectors.

[17] Gross final electricity consumption includes total gross national electricity generation from all fuels, plus electricity imports, minus exports.

[18] The MPC is granted to electricity generated from onshore wind turbines, biomass and biogas plants, small hydropower plants (installed capacity lower than 5 MW), high-efficiency natural-gas CHP plants and high-efficiency CHP plants using renewables as fuel. Guaranteed capacity payments are available to large CHP plants (installed capacity greater than 20 MW) fuelled by natural gas or renewables, as well as biomass and biogas plants.

[19] The public electricity trader must purchase electricity from CHP plants under mandatory procurement, even if it is more expensive than the prevailing market price.

[20] Latvian households used 14.12 kilograms of oil equivalent (kgoe) of heat per square metre in 2016. By comparison, heat consumption per square metre was 11.9 kgoe in Denmark, 15.3 kgoe in Estonia, 12.3 kgoe in Finland, 11.3 kgoe in Lithuania and 9 kgoe in Sweden (Odyssee-Mure, 2018).

[21] After the introduction of consumption-based billing in 2015, average indoor temperatures dropped and heat consumption fell by between 10% and 20%.

[22] Under an energy performance contract, an energy service company implements energy efficiency measures (e.g. thermal renovation of a building) and uses the income stream from the energy savings to repay the cost of the project.

[23] With transport-on-demand systems, scheduled bus services are replaced by minibuses covering flexible routes depending on real-time demand.

[24] Roads included in the Tran-European Transport Network (TEN-T) and regional roads connecting TEN-T roads and larger cities.

[25] Range anxiety is the fear that an EV cannot drive the distance to destination on one charge.

[26] In 2017, government R&D expenditure was 0.13% of GDP and business R&D expenditure 0.14% of GDP.

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Part II. Progress towards selected environmental objectives

Chapter 4. Waste, material management and circular economy

Latvia has progressed with recovery and recycling, and the use of economic instruments to divert waste from landfilling. However, waste and materials are not yet managed cost-effectively and policy implementation is not sufficiently co-ordinated. Moving towards a circular economy will require further improving basic waste management, strengthening the use of economic instruments and improving performance in extended producer responsibility systems. This chapter gives an overview of trends in material use and waste generation and of related policies. It reviews the effectiveness of the instruments used to encourage waste reduction and recycling and to reduce landfilling. It identifies implementation gaps and opportunities in moving towards a circular economy.

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

4.1. Introduction and overview

Latvia has one of the lowest population densities in Europe and, since 2010, a declining population. Most people live in urban areas, more than a third of them in Riga. Average household income levels are low, with wide regional disparity. The economy is characterised by strong growth in gross domestic product (GDP). Services account for 70% of GDP, and small and medium-sized enterprises (SMEs) provide almost 80% of employment. Informal economic activity is widespread. With few non-renewable natural assets, Latvia relies heavily on external markets for imports and exports of raw materials and products. These characteristics shape the country's material consumption patterns and waste management.

In the 2000s, Latvia completely reconstructed its waste management systems. It has fairly complete policy and legal frameworks for waste management, supported by quantitative targets and economic instruments. As in other environmental policy areas, most developments are driven by EU requirements and benefit from EU funding. The country has made progress, including with separate collection and recovery of municipal waste, recycling capacity and the use of economic instruments to encourage recovery and divert waste from landfill.

However, waste and materials are not yet managed cost-effectively, and related policy implementation is not sufficiently co-ordinated or monitored. The economic instruments used do not yet provide sufficient incentive for moving towards a circular economy; some targets will be difficult to meet. Waste reduction and prevention and the management of specific waste streams, such as construction and demolition waste, have received little attention.

To lay the groundwork for circular economy approaches, essential steps are needed to improve basic waste management, strengthen the use of economic instruments and improve performance and transparency in extended producer responsibility systems. The potential for progress is good, with encouraging recent developments. To be successful, Latvia needs to better use synergies with eco-innovation and public procurement programmes, increase co-operation with neighbouring countries to strengthen recycling markets, and efficiently use treatment and recycling capacities in the region. It also needs to plan to progressively reduce its reliance on EU funding, expand co-operation across ministries and with stakeholders, and strengthen policy integration at all levels.

4.2. Trends in material consumption and waste management

4.2.1. The material basis of the economy

Latvia's natural asset base mainly consists of domestic forest resources, peat, dolomite, limestone and other construction minerals. Most other resources and materials, mainly metals and fossil fuels, are imported.

The materials mix

Material inputs and consumption are dominated by biomass, with shares much higher than in other countries. Biomass represents 68% of the materials extracted in the country, 61% of direct material input, 58% of domestic material consumption (DMC) and 70% of materials exported. The bulk of it is wood. Domestic demand for wood comes from the wood processing industry, which is Latvia's main export sector, and the energy production sector. Wood has long been the most important domestic energy source for residential heating, especially in rural areas. Biomass use for energy production is encouraged so as to decrease dependence on imported fossil fuels. Thus, in the past ten years, the use of woodchips as fuel in combined heat and power plants has been growing, as have woodchip exports.

Non-metallic minerals represent about a third of material inputs, largely in construction, including road construction, which peaks periodically depending on EU funding availability. Fossil fuels hold a rather small share (around 7% of inputs), reflecting changes in energy efficiency and the development of renewable energy sources (Chapter 1).

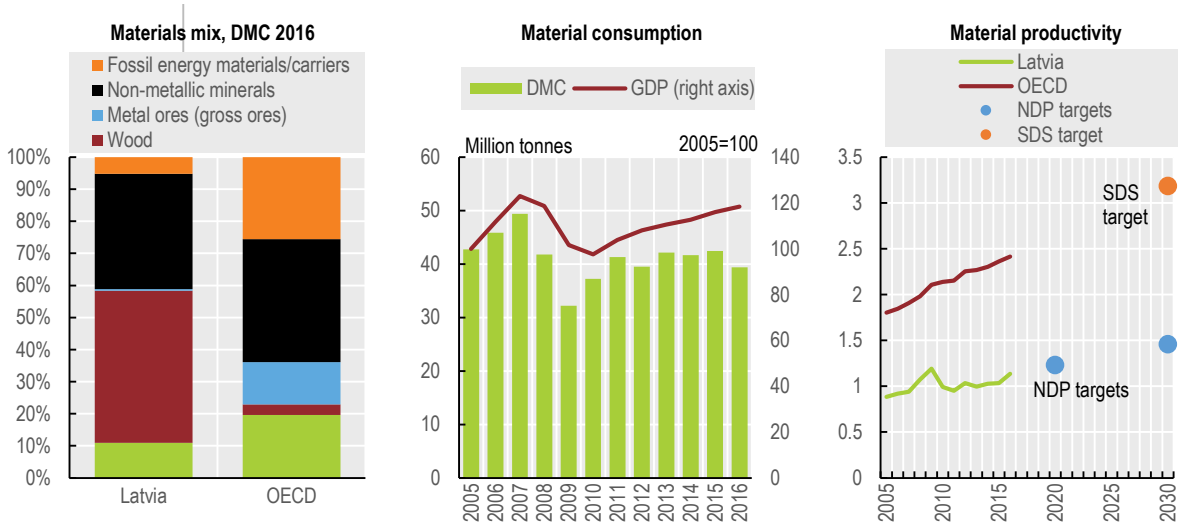
Main trends

The country was severely affected by the 2008-09 economic crisis, which led to reduced productivity growth and output, especially in construction but also in other sectors. SMEs, which often have limited capacity to absorb new technology and innovate, were particularly affected. Material inputs and consumption thus declined significantly from their pre-crisis level, dropping by 27% and 35%, respectively, between 2007 and 2009. Over 2005-16, material inputs rose by a modest 6%, while material consumption fell by 8%, partly due to population decline and reduced purchasing power after the crisis. Material intensity per capita, meanwhile, grew slightly (+5%), with fluctuations. In 2016, every inhabitant consumed, on average, 20 tonnes of materials, much more than the EU average of 13 tonnes and OECD average of 16 tonnes.

The material productivity of the economy (GDP/DMC) improved by 29% over 2005-16, revealing a decoupling between material consumption (DMC fell by 8%) and economic growth (GDP rose by 18%). But productivity gains were mostly driven by socio-economic developments; improved resource efficiency seems to have played a minor role. Productivity remains lower than in other OECD and EU countries. Latvia generates less than half the OECD average for economic value per tonne of materials consumed: about USD 1 100 per tonne, compared to USD 2 400 per tonne for the OECD.

Non-binding national targets for improving material productivity by 2020 and 2030 are set in the 2014-20 national development plan (NDP) and the Sustainable Development Strategy (SDS). The NDP's 2020 target of EUR 0.6/kg of materials consumed was nearly achieved by 2016 at EUR 0.55/kg (Figure 4.1), and its 2030 target of EUR 0.71/kg is within reach. The SDS target of EUR 1.55/kg (USD 3.18/kg) by 2030 reflects Latvia's political will but will be difficult to reach.

Figure 4.1. Material use is driven by socio-economic developments and is dominated by biomass



Note: In panel 3 the targets have been converted to USD at 2010 prices and purchasing power parity.
Source: OECD (2018), "Material resources", *OECD Environment Statistics* (database); Eurostat (2018), *Material flow accounts* (database).

StatLink http://dx.doi.org/10.1787/888933969620

4.2.2. Trends in waste generation and treatment

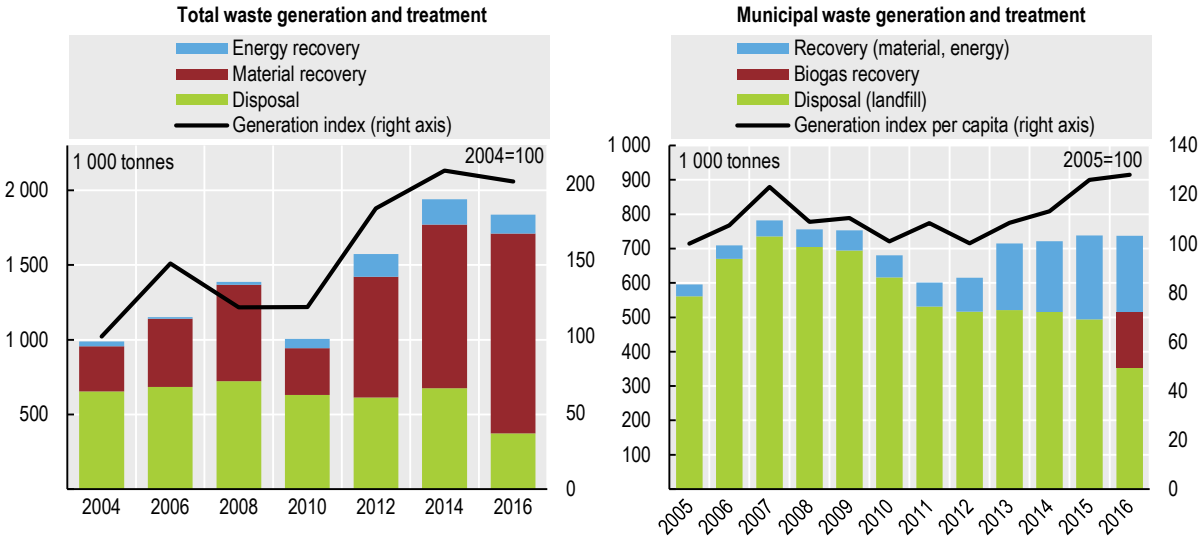
Waste generation has more than doubled since 2004, despite a decrease due to the economic crisis (Figure 4.2). In 2016, Latvia managed about 2.5 million tonnes of municipal and industrial waste, including 300 000 to 400 000 tonnes of inert mineral waste and 65 000 to 80 000 tonnes of hazardous waste. About 70% of the waste was recovered. Landfilling, though decreasing, still represents more than 20% of treatment. Official data show that waste from households and other municipal sources amounts to more than 30% of all waste generated, a much higher share than in most other countries. This could be explained in part by the rather broad national definition of municipal waste.

Non-hazardous waste exports rose sevenfold between 2006 and 2013, then decreased till 2016 (Figure 4.3). Most are scrap metal, mainly iron and steel, exports of which spiked between 2009 and 2011 when Latvia's smelting capacity declined. Exports to non-EU countries have been rising and now represent more than 70%. Imports are also dominated by metal, but include plastic as well, for further recycling in domestic polymer processing.

Municipal waste

Municipal waste generation grew till 2007, then decreased (with some fluctuations) as the crisis reduced household purchasing power. But, contrary to forecasts in the State Waste Management Plan for 2013-20 based on a declining population, the past five years have again seen a rise in amounts generated. In 2017, every Latvian inhabitant generated, on average, 436 kg of household waste, less than the OECD average of 524 kg/capita, but 37% more than the Latvian average in 2005 (318 kg/cap).

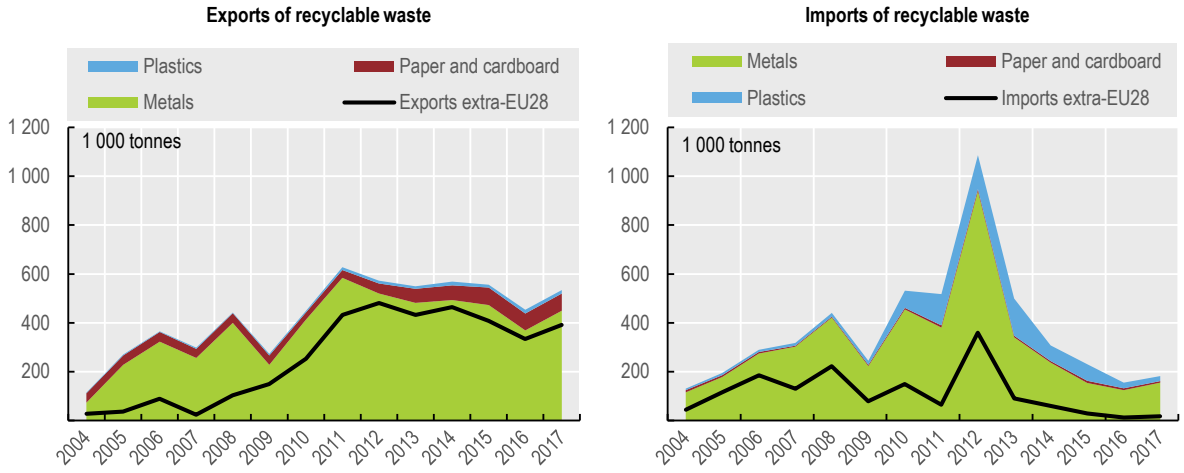
Figure 4.2. Progress with waste recovery needs to be consolidated



Note: In the left panel generation may include imported amounts. In the right panel recovery refers to "Amount designated for recovery operations"; 2016 data for biogas recovery refer to amounts of biodegradable waste undergoing anaerobic digestion with biogas recovery in specially engineered landfill cells.
Source: OECD (2019), "Waste: Municipal waste", *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933969639

Figure 4.3. Markets for recyclable waste depend on external demand



Source: Eurostat (2019), *Trade in Recyclable Raw Materials by Waste* (database).

StatLink http://dx.doi.org/10.1787/888933969658

The recovery rate grew significantly after 2011 with the gradual introduction of separate collection, development of extended producer responsibility systems and increases in the natural resource tax on landfilling. From basically zero in 2000, the rate had risen to 5% by 2005, 9% by 2010 and 30% by 2016. This is still lower than the EU and OECD averages, and the 2020 target of 50% of municipal waste being prepared for reuse, recycling or

recovery, set in line with EU requirements, may be difficult to reach. However, some biodegradable municipal waste, not accounted for in these figures, undergoes anaerobic digestion with biogas recovery in specially engineered cells operating since 2016 at the Riga Getlini landfill site. Accounting for this waste would raise the recovery rate to close to 50% (Figure 4.2).

Landfilling, though decreasing, still accounted for 45% of municipal waste in 2016 after deduction of the amounts used in biogas recovery, and many recoverable and biodegradable materials are sent to landfills. Despite an extension, Latvia missed the 2013 EU target of reducing the amount of biodegradable waste landfilled to 50% of the 1995 level, and the 35% target for 2020 does not seem to be within reach.

Hazardous waste

Latvia manages 65 000 to 80 000 tonnes of hazardous waste from industrial and municipal sources. Domestic capacity for recovering hazardous waste is limited to fluorescent light bulbs, some medical waste, and waste oil used as fuel in cement kilns. Other hazardous waste is exported for processing in other EU countries, in conformity with the Basel Convention and national law. Quantities of exported hazardous waste have been decreasing over the past ten years, and now represent about 13% of the hazardous waste generated (down from 56% in 2006).

Including exports for recycling, the overall recovery rate was 80% in 2016, little changed from 2005. The rest is either permanently stored or landfilled at two sites meeting EU standards.

4.2.3. Waste treatment and disposal infrastructure

Latvia has sufficient capacity for disposal of municipal and other waste. It has long relied mainly on landfilling, and has no waste incineration infrastructure except for hazardous waste, mainly oil, and some plastic residue incinerated as fuel in cement kilns.

Until the 1990s, Latvia had more than 500 unregulated landfills and dumps with little to no monitoring of waste flows; some were close to rivers. Since 2000, they have gradually been closed and recultivated. They were replaced by new regional landfills complying with EU standards. The country now has 1 regulated landfill for hazardous waste, 1 for waste containing asbestos and 11 for non-hazardous waste of municipal and industrial origin, with total capacity of 16.2 million tonnes. Some landfills for non-hazardous waste also accept inert construction and demolition waste (CDW). Many landfills have sorting facilities to redirect recoverable materials to other treatment. Biogas recovery is common. Since 2002, Latvia has banned landfilling of liquid waste, wastewater treatment sludge with more than 80% water content, and waste from the food and timber industries that is not used for composting or biogas generation.

Alternative waste treatment options are not yet well developed, but are expanding rapidly. In the past 10 to 15 years, Latvia has invested in the development of its recycling infrastructure, with EU co-funding. Its recycling facilities specialise in paper and cardboard packaging, with a well-developed infrastructure whose capacity exceeds the available waste paper in Latvia, and polymers, of which Latvia is the Baltic region's leading recycler. Many materials are prepared for recycling then exported.

Latvia's total recycling capacity for paper, cardboard, plastics and glass is about 120 000 tonnes per year, including 71 220 tonnes of plastics, 6.2 tonnes of which is composite

material. Nine companies generate plastic granulates or flakes that can be used as secondary raw materials in plastic production (Box 4.1).

Box 4.1. Recycling of waste polymers: a success story

Latvia has become a leader in the recycling of plastic polymers in the Baltic Sea Region. Two companies are active in this area: Nordic Plast specialised in recycling high and low density polyethylene (HDPE, LDPE), and PET Baltija specialised in recycling polyethylene terephthalate (PET). The plastic waste for recycling comes from separate collection in Latvia and from other EU countries such as Estonia and Lithuania. It includes light plastic bags and films, hard plastic cans and containers, polypropylene bags, plastic bottles and bottle caps. Most of the recycled feedstock, plastic pellets (natural, grey, black, mixed) and PET flakes (clear, dark mix, light mix), is exported for re-processing.

The 7 000 tonnes of recycled plastic pellets produced annually are sold to producers of plastic products (e.g. plastic films, plastic tableware). The 21 000 tonnes of PET flakes produced annually are sold to food packaging producers (60%) and fibre and plastic strap *producers* (40%).

Source: Nordic Plast Ltd. (2019), http://www.nordicplast.lv/en/ (website); PET Baltija Jsc. (2019), http://www.petbaltija.lv/en/ (website).

In recent years, the focus has been on production of biogas and compost to divert waste from landfill and contribute to renewable energy targets. Latvia has several plants to treat and recycle biodegradable waste, including 5 large scale composting facilities and 59 small biogas plants with estimated production of 64 MW. Many landfills have their own composting facilities and biogas recovery equipment.

Further expansion of recovery and recycling capacity is planned by 2023. Proposed projects include four plastic recycling plants, a glass recycling plant, a lead battery plant and at least one biodegradable waste plant.

Developing domestic waste-to-energy (WtE) capacity is being considered as a further way to achieve the EU landfill reduction and recovery targets, and reduce Latvia's energy dependence and consumption of primary fossil fuels. The closest WtE plant is in Estonia, too far from the main waste generating centres in Latvia, according to the government. An installation with a treatment capacity of 11 000 tonnes of refuse-derived fuel (RDF) per year is thus planned. The government is also considering supporting projects that would use RDF to produce heat in some municipalities and thus reduce Latvia's energy dependence and consumption of primary fossil fuels. Given the size of investment involved in WtE infrastructure and risk of creating a lock-in effect, it is important for the long-term costs and benefits of alternative waste technology and infrastructure to be carefully assessed, along with neighbouring countries' recycling capacities. Such an assessment also needs to take into account expected developments in the availability of domestic waste as feedstocks for the operation of a WtE plant, and carefully consider the trade-offs between waste management objectives and renewable energy objectives.

4.3. Objectives and policies for waste and materials management

Latvia has fairly complete policy and legal frameworks for waste and materials management, supported with quantitative targets and economic instruments. Strategic

objectives are largely determined by the objectives and requirements of EU law and policies, and defined in line with international commitments (e.g. the Basel Convention) and OECD Council Decisions.

4.3.1. Policy framework and objectives

Waste management rests upon on a range of policies addressing issues related to waste, energy supply and bio-resource management. The main objectives are preventing waste generation, minimising negative effects on human health and the environment, maximising recovery and reuse and ensuring supply security, including by replacing primary natural resources with secondary raw materials, and fossil energy sources with renewable biological resources.

The main policy documents are the State Waste Management Plan 2013-20 (SWMP) and associated State Waste Prevention Programme (SWPP), both mandatory under EU law. Resource efficiency and the principles of a sustainable material economy are further enshrined in the 2014 Environmental Policy Guidelines for 2014-20, the 2010 Sustainable Development Strategy of Latvia until 2030 and the 2012 NDP for 2014–20.

The State Waste Management Plan

The SWMP aims at preventing and minimising waste generation and ensuring more efficient resource use. It includes the SWPP, which specifies prevention objectives and measures needed for their achievement. The SWMP includes measures on (i) cleaner technology, product eco-design, eco-labelling, green purchasing and environmental management systems; (ii) education and information; and (iii) development of separate collection and recycling capacity. Recent developments in EU policy (amended EU Waste Framework Directive, Packaging and Packaging Waste Directive, Landfill Directive and related targets) are not yet reflected. They will be included in the next version of the SWMP.

Regional waste management plans (WMPs) can be established for the waste management regions (WMRs) in co-operation with the Ministry of Environmental Protection and Regional Development (MEPRD). In addition, municipalities can develop local WMPs in line with the regional plans. The establishment of regional plans was mandatory until 2013 and has since been voluntary. The three regional plans developed thus far cover 32 of Latvia's 119 municipalities.[1]

Other relevant policies and documents

Latvia has no raw material policy, but it is the first Baltic country with a bioeconomy strategy[2] to foster knowledge and innovation. The strategy includes incentives for replacing non-renewable resources with biological resources in public procurement and production. Examples include biomass use in energy production and the use of biological materials in construction. Other relevant documents are:

- the 2015 Rural Development Programme 2014-20, with measures on resource efficiency in agriculture, food production and forestry and on the processing of waste and residues from these sectors
- the 2015 Development Guidelines for Forestry and Related Sectors for 2015-20, promoting improved planning and management practices and encouraging sustainable agriculture and forestry

- the 2013 Smart Specialisation Strategy, promoting innovation and technological progress, supported by the Industry Policy Guidelines and Science and Technology Guidelines.

4.3.2. Legal framework

Latvia has an extensive regulatory framework, driven by EU legislation. The main laws are:

- Waste Management Law (2010), last amended in late 2017, which supports implementation of the SWMP and applies a comprehensive approach to waste management
- Pollution Law (2001), which regulates polluting activities, such as waste recovery, disposal and storage facilities, according to their potential environmental risk
- Natural Resource Tax Law (2005), which applies the polluters-pays principle to natural resource management (materials, waste) and specifies related exemptions
- Environmental Protection Law (2006), which requests waste managers to monitor their environmental performance and inform the public.

Related legislation includes the 2005 Packaging Law and 2004 End-of-life Vehicles Management Law. Implementation is supported by more than 40 Cabinet regulations specifying legal and technical requirements for waste management operations, management and recycling of particular waste streams and reporting on performance.

4.3.3. Institutional framework and governance

The central authority for waste management is the MEPRD, which has a general supervisory and monitoring role. The ministry is responsible for developing and implementing waste management policies and regulations, co-ordinating the development and implementation of waste policies at the local level, and organising and co-ordinating hazardous waste management. It is also responsible for green public procurement.

Compliance controls and enforcement are the responsibility of the State Environmental Service (SES) and its eight regional boards. They control compliance with legal requirements, issue technical norms and permits for waste management activities and authorise transboundary movements. Since 2017, the SES has also co-ordinated and controlled extended producer responsibility systems, a function previously carried out by Latvian Environmental Protection Fund Administration.

Environmental impact assessment of waste management facilities is the responsibility of the Environment State Bureau. It also keeps a register of enterprises dealing with packaging waste and a register of enterprises participating in the EU Eco-management and Audit Scheme (EMAS).

The Latvian Environment, Geology and Meteorology Centre (LEGMC) handles hazardous waste management, e.g. establishing and managing landfills and incinerators. As the body responsible for environmental monitoring, it also collects, manages and reports waste data.

The Public Utilities Commission approves regulations on authorisation of municipal waste disposal in landfills, registers public service providers and determines how to calculate landfill tariffs. The Health Inspectorate monitors hazardous medical waste management.

Ministries involved in policies supporting resource efficiency, eco-innovation and circular economy objectives include the Ministry of Education and Science, regarding research on environmental innovation; the Ministry of Agriculture, on the bioeconomy strategy; and the Ministry of Economy, in charge of industry and innovation policies.

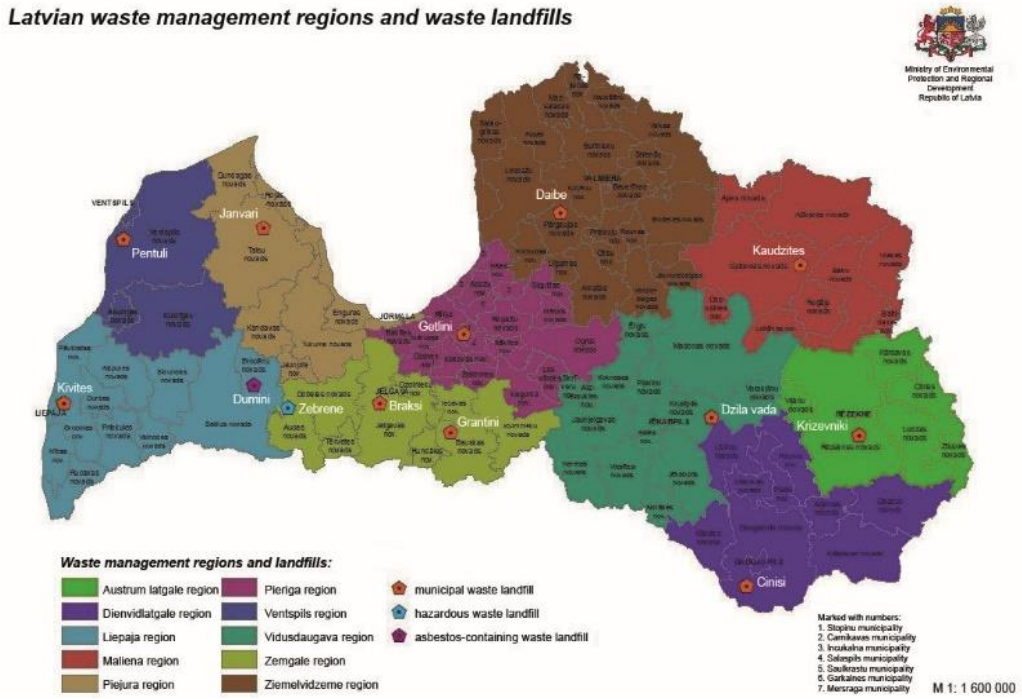
Practical implementation is the responsibility of the municipalities. Local governments organise the management of municipal waste, including hazardous waste, on their territory according to the SWMP and regional plans (if any). They issue local regulations, finance the necessary infrastructure, select providers for waste services and apply green procurement rules.

Inter-municipal co-ordination

Municipalities co-operate within the territories of ten WMRs:[3] Austrumlatgales, Dienvidlatgales, Liepājas, Malienas, Piejūras, Pierīgas, Ventspils, Vidusdaugavas, Zemgales and Ziemeļvidzemes (Figure 4.4). A further possibility for co-operation, albeit one rarely used, is that local governments are authorised to set up joint municipal waste management zones within their WMRs, upon mutual agreement, for joint public procurement for waste collection.

Figure 4.4. Municipalities co-operate within ten waste management regions

Waste management regions and landfills, 2018



Source: Ministry for Environmental Protection and Regional Development (2018).

The organisations that manage regional landfills and waste collection are inter-municipal limited liability companies. Shares belong to municipalities in proportion to their size. About half of municipalities have established waste management companies that they own wholly or partly. The Latvian Competition Council has criticised this as hindering competition, particular as regards separate collection and sorting markets.

Other co-ordination mechanisms

The highest national authority for policy co-ordination is the Cross-Sectoral Coordination Centre, under the Prime Minister's Office. It is responsible for drafting, supervising and monitoring implementation of the long-term SDS and medium-term NDP.

Horizontal co-ordination on waste management and related issues is ensured, when needed, through weekly state secretary meetings, a permanent co-ordination mechanism, and regular meetings of the MEPDR and SES to discuss operational issues, new EU requirements and the results of compliance control. The ministry participates in inter-ministerial working groups set up to co-ordinate the development of cross-cutting policy documents (e.g. on the bioeconomy strategy).

Vertical co-ordination is ensured through annual meetings of the MEPDR and the Latvian Association of Local Governments, and through ministry verification that local regulations on waste management comply with national legislation.

Role of the private sector and stakeholder involvement

The private sector plays an important role in municipal waste management. Privately owned waste management companies serve more than 50% of the population, mainly in the bigger cities where the country's population is concentrated. Municipally owned waste management companies serve the rest of the population.

Key stakeholders, including business associations and non-government organisations, are consulted during policy planning and legislative drafting through participation in consultative boards or working groups. The MEPRD has several boards dealing with issues related to material resources, including on packaging management and technology management. Working groups have been set up to discuss issues related to food waste and the development of a deposit-refund system for beverage containers. A permanent working group deals with waste management issues. Recycling and waste management companies[4] use lobbying as a participatory mechanism.

4.4. Information and policy instruments for waste and material management

4.4.1. The information base

Monitoring and reporting mechanisms

Monitoring and reporting on waste generation and movements are the responsibility of the LEGMC, which collects data from waste managers,[5] reviews and analyses them and reports regularly to the Basel Convention, EU institutions, including Eurostat, and the OECD. Reporting is mandatory for hazardous waste managers, for all enterprises with A and B category polluting permits and for enterprises with permits for waste management operations. Companies under contract to municipalities have to report waste management data to them annually. Companies involved in extended producer responsibility systems have to report to the SES annually on the amounts placed on the market, collected, recycled and recovered. The SES checks the data, verifying them with the provider when needed.

The LEGMC administers the Hazardous Waste Transportation Registration System, which monitors domestic and transboundary movements of municipal and hazardous waste to recycling or recovery facilities. It ensures the operation of the system, registers system users and provides customer support. The main users include waste management

companies and control institutions. Use of the system is subject to a contract with the LEGMC.

BRAPUS, an electronic system tracking CDW movements, was established in 2014 to better control CDW management, improve traceability of CDW flows and increase data availability. CDW operators have to report amounts produced to their regional government each year via an online survey. After approval by the region, the data are transferred to the LEGMC for synthesis and submission to EU institutions and the OECD. Over 90 companies use this system. Ongoing work aims at linking BRAPUS to the electronic documentation system for building processes.

Information on material flows and other data

The Central Statistical Bureau (CSB) has compiled economy-wide material flow accounts since 2009 and regularly reports to Eurostat in accordance with EU Regulation 691/2011 on environmental accounting. The accounts are compiled using CSB data on foreign trade, energy and agriculture, state forest data on timber extraction and hunting, and LEGMC data on mineral resource extraction and waste. Covering all years since 1995, they are publicly available on the CSB website and are published annually in *Environmental Indicators in Latvia*. For mineral resource accounting, the LEGMC prepares an annual balance of mineral reserves and registers the amount of extracted resources for each extracting site each year.

Data quality and gaps

Reporting obligations cover the main aspects of waste management but do not provide all information needed for effective policy planning. Data on food waste and repair and reuse activities, for example, are not covered and have no clear statistical definition. Hence the MEPRD collects additional data from companies when needed. Companies' willingness to provide these data is low, however, hampering the ministry's capacity to plan policies and to react to developments in the business sector.

Data quality varies. Data availability and time series length are limited for waste streams that are hard to track or where reporting lacks transparency. For several streams the treatment and disposal routes are not well known. For example, the final destination of waste imported for recycling but of insufficient quality is difficult to know. Little information exists on food waste and other biowaste. Data on CDW are available only from 2013 and on WEEE from 2009.

Little is known, moreover, about local authorities' management performance and their contribution to the achievement of national recycling targets. The situation could be improved by establishing a regular process for collecting and publishing municipal waste statistics, including on recovery and recycling performance and related costs and revenue.

To support decision making and policy evaluation effectively, additional effort is needed to improve and expand national waste management information and statistics on waste and materials. More complete and coherent data are particularly needed on the collection, treatment and disposal of waste up to final destination. Priority could be given to waste streams that are subject to producer responsibility and for which recycling targets have been set, to streams that raise particular management concerns, such as food waste and biowaste, and to further development of the CDW information system. Consideration should also be given to further development of data on material flows and their integration with waste statistics for better understanding of material pathways in the economy.

Ultimately, waste and material management information could be consolidated in an integrated system that would serve as a central registry and support the development, implementation and monitoring of national policies, as well as international reporting. It could build on the existing information systems for monitoring CDW and transboundary movements, and other databases managed by the LEGMC.

4.4.2. Policy instruments

Latvia employs a range of policy instruments to encourage waste recovery and recycling. They include separate collection requirements and mandatory targets for recoverable materials, in line with EU law; economic instruments, such as taxes on waste disposal and recyclable goods; a deposit-refund system for glass bottles (currently voluntary); and extended producer responsibility and take-back systems for selected products. Most of these instruments apply to the end-of-life stage. They are complemented by demand-based instruments, such as green public procurement (GPP), and information instruments, such as eco-labels, awareness-raising campaigns and training.

Other instruments include information tools, such as communication activities by extended producer responsibility organisations (PROs), eco-labelling, awareness raising and educational activities (e.g. training, experience sharing).

Targets

The main objectives and quantitative targets are set to comply with EU legislation and are mandatory (Table 4.1). The main recovery and recycling targets include those for:

- preparation for reuse, recycling or recovery of municipal waste, by 2020;
- collection, recovery and recycling of packaging waste, CDW, WEEE and waste from environmentally harmful goods.

A few additional non-binding targets are set as part of the NDP and SDS, including resource productivity targets (Section 4.2.1) and a minimum 80% recycling target for all waste collected by 2030 (SDS). Nationally determined targets have also been set for used tyres.

Economic instruments

The use of economic instruments, in line with the polluter-pays principle, is well established. The main instruments are a differentiated natural resource tax (NRT) that applies to material extraction (mineral resources), landfilling, and products for which special end-of-life management objectives have been set; extended producer responsibility (for packaging, disposable tableware and accessories, WEEE, and other goods harmful to the environment, such as batteries and end-of-life vehicles); landfill tariffs; and municipal waste management fees. There is also a voluntary deposit-refund system for certain types of beverage packaging, whose use will become compulsory under current plans.

Table 4.1. Selected waste-related targets in Latvia

Waste type	Targets		Status according to official data
All waste	Achieve a minimum 80% recycling target for all waste collected (SDS target, non-binding).	By 2030	Unclear; the overall recovery rate was 78% in 2016. Amounts actually recycled are not well monitored.
Municipal waste	Increase to at least 50% the share of waste materials prepared for reuse and recycling.	By 2020	Could be difficult to meet. The recovery rate in 2016 was 30%, not accounting for anaerobic digestion of biodegradable waste with biogas recovery (Riga region) since 2016.
Biodegradable municipal waste	Reduce the amount of landfilled biodegradable municipal waste: • to 75% of the amount of biodegradable waste landfilled in 1995 • to 50% of the amount of biodegradable waste landfilled in 1995 • to 35% of the amount of biodegradable waste landfilled in 1995.	 2010 As of 16.07.2013 As of 16.07.2020	 • met (72% in 2010) • missed • could be difficult to meet
Construction and demolition waste	Increase to at least 70% the share of CDW prepared for reuse, recycling and other material recovery, including backfilling.	By 2020	Met (88% in 2015).
Packaging waste	Recycling and recovery rates: • 60% for all packaging waste (overall rate) • at least 65% for glass, 83% for paper and cardboard, 50% for metal, 41% for plastic, 29% for wood.	By end 2015	 • met (62% in 2015; 60% in 2016) • met (glass 65%; paper 84%; metal 60%; plastics 42%; wood 43% in 2016)
	Recycling rates: • 55% for packaging waste (overall rate) • at least 60% for glass, 60% for paper and cardboard, 50% for metal, 22.5% for plastics, 15% for wood.		 • met (58% in 2016) • met (glass 64%; paper 81%; metal 60%; plastics 37%; wood 40% in 2016)
End-of-life vehicles (ELVs)	• reuse and recovery rate of at least 95% for all ELVs (average weight per vehicle and year). • reuse and recycling rate of at least 85% for all ELVs (average weight per vehicle and year).	By 2015	Met
Waste electrical and electronic equipment	• collection rate from households of 4 kg per inhabitant per year. • collection rate of 40-45% of the equipment placed on the market in the last three years (average weight per appliance). • collection rate of 65% of the equipment placed on the market in the last three years or 85% of all WEEE produced in Latvia (average weight per appliance).	By 13.08.2016 By 14.08.2016 By 14.08.2021	Missed (2.5 kg/inh. in 2016) Missed (26% in 2016)
Batteries, accumulators	Collection rate of 45% of the average amount sold on the Latvian market in the last three years (by average weight).	By 26.09.2016	Met

* Expressed in terms of weight.
Source: Country submission and calculations based on Eurostat and OECD data.

The NRT[6] plays a particularly important role in government policies aiming at improving resource efficiency and is also thought to encourage recycling markets. It is revised every two to three years and has undergone significant changes since 1991, most notably that of 2014:

- The rates were increased between 20% and 25% for extraction of mineral resources (peat, quartz sand and sandstone), packaging materials, and goods harmful to the environment.
- They were also increased by similar amounts for landfilling of municipal, construction and industrial waste, with continued rises set to 2020, representing a cumulated tenfold increase since the mid-1990s.

Until 2006, the NRT revenue was earmarked for environmental protection activities, including co-funding of EU environmental infrastructure projects via the Environmental Protection Fund. Revenue from extraction or use of natural resources and from the landfill tax is now allocated to municipalities and earmarked for environmental protection (60%) and the state budget (40%). Revenue from the tax on packaging, disposable tableware and accessories, goods harmful to the environment, and illegal

extraction or use of natural resources is allocated to the state budget. The revenue allocated to the state budget is no longer earmarked, but can be used to co-fund projects receiving EU support.

Waste management companies and extended producer responsibility systems have to provide a financial guarantee, bank guarantee or insurance for the aftercare of disposal sites and management of recyclable waste streams. Part of the landfill tax collected by the State Treasury from landfill managers constitutes a financial guarantee for potential remediation of current landfill sites.

Relief measures are in place to encourage environmentally sound waste management. They include measures to alleviate the administrative burden related to permitting processes, and tax reductions or exemptions for businesses that have an environmental management system (e.g. EMAS). Exemptions from payment of the NRT are granted for products whose producers, retailers or importers have contracted an end-of-life management agreement with an institution or waste manager recognised by the MEPRD, such as a PRO.

The existing instruments, however, do not yet provide sufficient incentive to comply with the waste hierarchy and move towards a more circular economy:

- Studies on the NRT's effectiveness indicate the tax and exemptions from it have encouraged businesses to join extended producer responsibility systems, achieve several related EU targets and stimulate the use of reusable packaging. But the tax has been less effective in stimulating waste prevention, except regarding plastic bags (Jurušs and Brizga, 2017), and has not reduced the cost gap between primary and secondary raw materials.
- Despite recent and planned increases, until 2020 landfill tariffs will remain lower than the EU average, too low to incentivise recycling and spur investment in alternative waste technology. Municipal waste fees remain too low to cover the cost of service provision and encourage households to reduce unsorted mixed waste.
- Little use is made of pay-as-you-throw (PAYT) systems for collection of mixed household waste, aside from a pilot in the city of Jūrmala. The use of PAYT in major cities, associated with well-functioning free separate collection of recyclable waste, could become an important tool for reducing waste going to final disposal.

Most instruments in place target the extraction and post-consumption phases of the value chain. More attention to instruments that influence consumer behaviour is needed.

4.4.3. Expenditure and financing

EU funding and co-financing

Since 2000, financial support for developing the Latvian waste management system has mainly come from EU funds. They have helped carry out feasibility studies for each WMR and construct landfills in compliance with EU regulations (since 2004). More recently, EU funding has helped upgrade landfill infrastructure and establish separate collection for municipal waste. Since 2005, more than EUR 166 million has been invested. Between 2005 and 2017, 71.3% of waste management investment stemmed from EU funds, 23.4% from private sources and 5.3% from the national budget (Table 4.2).

Table 4.2. Sources of waste management investment, 2005-17, thousand euros

Funding sources	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total 2005-17
EU sources (co-financing)	3 931	5 904	12 508	13 773	20 857	10 118	11 271	8 241	7 863	5 422	16 920	1 844	8	118 659 (71.3%)
National sources (state budget)	63	1 244	2 818	2 873	1 734	-	-	-	-	-	-	-	-	8 732 (5.2%)
Private sources	435	2 193	2 443	4 680	418	2 574	4 412	2 951	3 566	1 762	11 680	1 844	-	38 958 (23.4%)
Total	4 429	9 341	17 769	21 325	23 009	12 692	15 682	11 192	11 429	7 184	28 600	3 688	8	166 348

Note: The totals cover provision of waste management services and the construction, upgrading and aftercare of EU co-financed waste-related infrastructure projects. State budget: landfilling only. Separate collection is financed from municipal budgets.
Source: Country submission, based on the national EU project database (restricted access).

In the 2014-20 programme period, a further EUR 49.9 million is being invested in separate collection, recycling and energy recovery infrastructure to help the country meet the latest EU requirements and implement circular economy principles.

EU funds also serve as a catalyst for private sector investment. To benefit from EU support, national co-financing (by state and/or private sources) of 15% to 65% of the total project cost has to be ensured. The co-financing rates depend on the results of cost-benefit analyses on the project's financial sustainability (planned revenue and total expenses) and on state aid rules determined by EU regional aid regulations, which specify that:

- The share of EU support to private companies cannot exceed 35% and companies have to co-finance projects exclusively from private sources.
- The share of EU support to providers of public services can reach up to 85%.

Funding planning and priorities

National funding is planned according to the priorities and time frames of EU funding programmes and national legislation. The planning process is closely co-ordinated between the MEPRD and the Ministry of Finance and directly linked to the national budgeting process.

The funding of projects co-financed by the EU and implemented by public institutions under the MEPRD is integrated into the ministry's annual and long-term budgets. The MEPRD may request additional funding from the state budget for these projects. Requests for earmarked funding from the state budget for projects implemented by entities not subordinate to the MEPRD, including local governments and businesses, are managed by the Central Financing and Contracting Agency, together with the Ministry of Finance. Payments are made through the State Treasury. EU funding is subject to conditions, including *ex ante* assessment of the status and investment needs in the waste sector.

EU funds will continue to be needed for further development of Latvia's waste and material management system, but beyond the next planning period, Latvia will have to plan to reduce its reliance on EU funding and shift to domestic resources.

4.5. Promoting recycling and improving management effectiveness

The SWMP 2013-20 includes economic, regulatory or information instruments for reducing waste throughout the production-consumption-disposal chain and using resources

more efficiently. The measures proposed are comprehensive, but their implementation is not sufficiently co-ordinated with measures by ministries other than the MRDEP, nor with measures by local authorities, and has not yet shown full results.

Recycling and recovery, and the diversion of waste from final disposal, are promoted through separate collection of municipal waste, extended producer responsibility take-back obligations and a voluntary deposit-refund system for beverage containers. Incentives are provided by taxes on packaging materials, environmentally harmful goods and mineral resource extraction. Binding targets, in line with EU requirements, have been set for collection of municipal waste and its preparation for reuse, recycling and recovery, and for reducing amounts of biodegradable waste going to landfill. Compost production and digestion of biodegradable waste for biogas recovery are encouraged. Public investment and EU co-financing in waste collection, sorting and recycling infrastructure and technology play an important role. Waste reduction has received less attention, but is anchored in recent plans and programmes (e.g. SWMP, SWPP). It is encouraged through taxes on single-use plastics, eco-innovation and the use of best available techniques (BAT) in the business sector.

Despite these positive developments, landfilling plays an important role. Recovery and recycling are developing, but not yet well advanced. Most waste is being prepared for reuse, recycling or recovery but little is known about the amounts actually recycled into new products. The lack of a complete information system, tracking waste streams from generation and collection to treatment and final disposal, hampers assessment. Other challenges include the weakness of recycling markets, the rather high domestic recycling costs and insufficient financial incentives for recycling and recovery.

4.5.1. Recovery and disposal of municipal waste

Latvia has long relied on landfilling for waste disposal, including municipal waste. When it joined the EU in 2004, it negotiated a transition period for achievement of EU targets. The targets include an overall recovery rate of 50% by 2020 and reduction of landfilled biodegradable waste (expressed in percent of 1995 levels),[7] i.e. 75% by 2010, 50% by 2013 and 35% by 2020. Latvia met the 2010 target for biodegradable waste but missed the 2013 target (EC, 2018a). The 2020 target may be difficult to achieve unless amounts undergoing anaerobic digestion are included.

In 2015, 62% of municipal waste was landfilled; only 29% was sent to recycling and recovery, indicating a risk of missing the 2020 EU target of 50% being prepared for reuse and recycling (EC, 2018). Since then, new equipment at the Getlini landfill near Riga has begun diverting about 160 000 tonnes of biodegradable municipal waste from traditional landfilling for anaerobic digestion in bioenergetic cells to produce biogas, methane and compost (Box 4.2). Whether the amount diverted is eligible to be counted as "recovered" in EU terms remains to be seen, as the installation could be qualified as a specially engineered landfill. This would increase the country's municipal waste recovery rate by almost 20 percentage points, and increase the chances of the EU 2020 target being met.

Box 4.2. From waste to resources: the Getlini ecological landfill complex

The Greater Riga ecological landfill complex "Getlini" treats 40% of all municipal waste generated in Latvia. It has evolved from a traditional landfill to a modern waste treatment and recovery complex that is open to the public.

After sorting, recyclable materials are sent to further processing. Biodegradable materials are stored, together with separately collected bio-waste, in specially engineered sealed cells where they are digested under anaerobic conditions with accelerated biogas production. The biogas is used in an on-site power plant to produce electricity, delivered to the power network, and heat used on-site for office heating, hot water, wastewater treatment and the production of vegetables (tomatoes, cucumbers), strawberries and flowers in a greenhouse complex. Getlini produces about 20 GWh per year of heat, more than 30 GWh of electricity, and about 500 tonnes of tomatoes sold on-site and in grocery stores. It contributes to the Riga Smart City Sustainable Energy Plan and its carbon reduction targets; the estimated CO_2 savings are about 16 000 tonnes per year.

Source: SIA Getliņi EKO (2019), http://www.getlini.lv/en/ (website).

Separate collection

Separate collection of municipal waste became mandatory in 2015 for paper, metal, plastic and glass, and will become mandatory for biodegradable waste in 2021. Between 2007 and 2013, more than EUR 15 million was invested to improve separate waste collection, on top of investment for sorting facilities.

Municipalities ensure separate collection in their jurisdiction in co-operation with waste management companies under public procurement or public-private partnerships. Collection may be organised as door to door, by deposit at dedicated collection points (the most common) or at civic amenity sites. Latvia has more than 3 200 collection points (about 1 per 620 inhabitants) and 80 civic amenity sites that also accept deposits of hazardous household waste, WEEE and other types of municipal waste. Out of 119 municipalities, 115 carry out separate collection, and 100% of the population is expected to be served by 2020. A 2016 survey carried out for the government found that service was adequate for about half the population (i.e. in 76% of municipalities) and needed improvement for the other half. Collection performance and post-collection sorting quality are key areas where improvement is needed.

As sorted materials are not always of sufficient quality to be recycled, recycling companies must often sort them a second time, with lower-quality materials being directed to landfills or (e.g. for plastics) incinerated in cement kilns.

PROs run their own collection points for packing materials, WEEE and environmentally harmful goods, usually on top of the municipal systems. The existence of two parallel systems leads to duplication of efforts and is not cost-effective. The co-ordination and possible merger of the two systems should be a matter of priority.

At the same time, greater financial incentives, including volume-based fees, are needed to encourage households to separate recyclable materials and reduce amounts of mixed waste. Progress has so far been hampered by the low population density and related high collection and transport costs, along with households' low income levels, which make it difficult to raise fees to fully cover the costs (Section 4.5.2).

Vertical co-ordination

The vertical co-ordination of the waste management policies that contribute to achievement of recycling and recovery targets is a challenge. The flexibility given to WMRs and municipalities in managing waste leads to gaps in implementation and incomplete monitoring at the local level.

The MRDEP has a co-ordinating role on SWMP implementation and is consulted to check compliance of local waste management regulations with the national WMP and regulations. But regional and local WMPs are no longer mandatory, and there is no mechanism for cascading national targets down to WMRs and municipalities or for monitoring local performance and related costs and revenue. Many municipalities further lack capacity for implementing new policies and targets. They need more government support and harmonised guidance to carry out their responsibilities.

To strengthen policy implementation and assessment, regular reporting on the results of municipal waste management and municipalities' performance in contributing to national recycling targets is indispensable, as is a return to systematic regional and local WMPs. These plans should include regional and local targets, in line with national commitments, and related reporting requirements, including on financial aspects.

4.5.2. Economic incentives

Municipal waste fees and charges

Households and other municipal waste generators have to pay fees for unsorted mixed waste. The fees, set by local government, are composed of:

- A fee for collection, transport and sorting of municipal waste and other operations, such as preparing waste for reuse, recycling, recovery and disposal. It is calculated on the basis of contracts between local government and waste managers (under public procurement or public-private partnerships). Since 2016, it has also covered the cost of composting biodegradable waste in dedicated facilities. This fee ranged from EUR 4.52/m^3 to EUR 20/m^3, excluding VAT, in 2016.
- A tariff for municipal waste disposal at landfills, set by the Public Utilities Commission. Since 2016, the tariff has also covered the cost of composting biodegradable waste at municipal landfills and a financial guarantee for landfill aftercare.
- The NRT on landfilling. Since 2018, it is included in the landfill tariff set by the Public Utilities Commission.

Local authorities submit proposed municipal waste fees to the Public Utilities Commission along with documentation and a justification of the costs to be covered. Though the fees have been increasing over time, this has not been sufficient to induce households to reduce their unsorted mixed waste and participate more actively in separate collection. Additional increases are not planned because of the low average household income levels in Latvia.

Pay-as-you-throw systems

PAYT systems are little used. A notable exception is Jūrmala, the fifth largest city in Latvia, which is pilot-testing a volume-based fee system for mixed municipal waste collection. Jūrmala has low population density, significant natural areas (forests and beaches) and a tourism- and service-based economy. Since January 2018, it has equipped waste bins with

electronic chips holding client information and waste collection trucks with weighing equipment and an automatic data storage and client registration system.

Landfill tariffs and taxes

The Public Utilities Commission sets tariffs for landfilling municipal waste, using a methodology[8] that ensures full cost recovery and profitability. The calculation takes into account the gate fees proposed by landfill companies to cover their services, which are approved by the commission, and the transport distance to the landfill site. Following an amendment of the Waste Management Law in 2015, landfill tariffs increased in 2016 to take into account costs related to:

- Aftercare of landfills and their monitoring for at least 30 years after closure. Related revenue is transferred to the State Treasury as a financial guarantee. After closure of the site, it is transferred back to the landfill owner or the public authority.
- Minimisation and recovery of biodegradable waste.

The tariffs vary across the WMRs, ranging from EUR 22.47/tonne to EUR 59.52/tonne, excluding VAT and NRT (Table 4.3).

Table 4.3. Landfill tariffs for municipal waste vary by region

Waste management region	Tariff (EUR/tonne)
Ventspils	42.85
Dienvidlatgales	45.43
Malienas	59.52
Vidusdaugavas	32.16
Ziemeļvidzemes	52.53
Zemgales	53.63
(2 landfills)	22.47
Liepājas	52.29
Piejūras	28.44
Riga un Pierīgas	58.12
Austrumlatgales	54.25

Note: Tariffs as of March 2019. Excluding VAT and the natural resource tax on landfilled waste.
Source: Country submission, based on information from the Public Utilities Commission.

Added to these tariffs is the NRT on landfilling, introduced in 1995. Since 2005, its rates have been differentiated according to type of waste and degree of hazardousness (Table 4.4). They increased significantly between 2014 and 2017, and will continue to increase until 2020. The main increase applies to disposal of mixed municipal waste, whose rate more than doubled between 2014 and 2017 (from EUR 12/tonne to EUR 25/tonne) and will reach EUR 50/tonne in 2020. In 2017 the rate for hazardous waste was increased by 15% to EUR 45/tonne and that for production waste by 21% to EUR 25/tonne. No distinction is made between non-recoverable waste and recoverable or biodegradable materials.

Table 4.4. Tax rates on landfilling are being increased

(EUR/ tonne)

Type of waste	2006-08	2009	2010	2011	2012-13	2014- 16	2017	2018	2019	2020
Municipal waste	1.42	1.78	4.27	7.11	10.00	12.00				
Construction/demolition waste (including untreated soil from polluted sites)		1.78	7.11	14.23	21.34	21.34				
Asbestos fibres and dust	14.23	14.23	35.57	35.57	35.57	35.57				
Hazardous waste	35.57	35.57	35.57	35.57	35.57	35.57				
Production waste		1.78	4.27	14.23	21.34	21.34				
Municipal waste and non-hazardous production waste							25.00	35.00	43.00	50.00
Hazardous waste and hazardous production waste							45.00	50.00	55.00	60.00

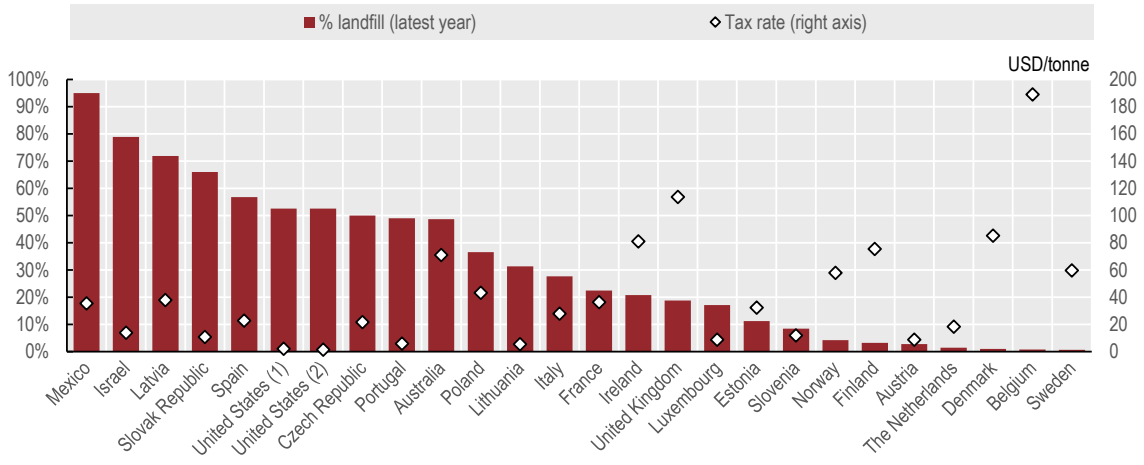
Note: Tax rates for waste disposal at landfills as included in the natural resource tax. NB: The euro was introduced in Latvia on 1 January 2014.
Source: Country submission and Annex 3 of the Natural Resource Tax Law.

The increased NRT and landfill tariff rates are expected to help reduce the amounts of waste being landfilled while incentivising waste management companies to invest in alternative waste treatment options, including recycling.

Whether the rates are high enough to create the expected incentives for households and businesses to separate waste and reduce the amount of mixed unsorted waste will need to be reassessed in few years. Despite the increases, overall tariffs will remain low compared to the EU average (about EUR 80/tonne), though comparable to some other EU countries (Figure 4.5). The incentive effect would be much stronger if coupled with implementation of PAYT systems, building on experience in Jūrmala and in other countries. This would be particularly useful in more densely populated areas with apartment buildings, and in future also in less densely populated rural areas.

Figure 4.5. Low landfill taxes encourage landfilling

Percentage of landfilled municipal waste and landfill tax rates, selected OECD countries, 2016



Note: Subnational data (local taxes) are used for: Mexico (Mexico City), Spain (Catalonia), United States (1) (North Carolina) and (2) (California), Australia (Western Australia) and Belgium (Flanders). Caution must be exercised in interpreting these data due to (a) the lag between application of a tax rate and its effects on the landfill rate, and (b) the relationship between local tax rates and nationwide landfill rates.
Source: OECD (2019), "Environmental policy: Environmental policy instruments", *OECD Environment Statistics* (database); CEWEP (2017), *Landfill Taxes and Bans Overview*.

StatLink http://dx.doi.org/10.1787/888933969696

Extended producer responsibility

Extended producer responsibility, introduced in 2000, applies to packaging, disposable tableware and accessories, passenger cars and environmentally harmful goods, including lubricating oil, batteries and accumulators, ozone-depleting substances, tyres, oil filters and WEEE. The Waste Management Law describes responsibilities of producers, importers and retailers for collection, recycling, recovery and disposal; the Natural Resource Tax Law sets out financial responsibilities; and Cabinet regulations provide detailed specifications.

Businesses that produce, retail or import relevant products can be granted an exemption from the NRT on the products if they fulfil obligations concerning collection and recycling of the waste from their end-of-life products and cover related costs. To do so, they can join one of the PROs, which fulfil the obligations on behalf of their members, or establish their own system. Extended producer responsibility systems can be set up as any type of commercial enterprise. More than 90% of all eligible businesses have joined a PRO. There are 8 such organisations in Latvia and 16 extended producer responsibility systems. In 2018, they covered 7 296 legal entities, up from 4 457 in 2013.

Since 2016, the SES has co-ordinated and controlled the extended producer responsibility systems. It also administers NRT exemptions and imposes fines when targets are not met. PROs have to sign a contract with the SES and prepare a management plan for achieving recycling and recovery targets in line with their obligations. They have to set up collection networks throughout the country, put information about collection and sorting options on their website, organise public information and communication events, and submit an annual implementation report to the SES. As of 2018, they are also required to provide a financial guarantee (insurance or bank guarantee).

Financing of extended producer responsibility systems

Extended producer responsibility systems are financed by the membership fees paid by participating businesses. The fees must cover collection and recycling costs. PROs have to spend part of their income on information and awareness-raising activities. Waste minimisation and eco-design receive less attention.

PROs set membership fees in agreement with each member company. As they are negotiated case by case, they differ by company. No information on fee levels and calculation methods or on revenue expenditure is shared with the public or the relevant authorities. Some PROs keep fees low to attract companies, even to the point of disregarding the cost-recovery principle. This can encourage companies to switch PROs, thus complicating longer-term planning and investments.

Performance of extended producer responsibility systems

Extended producer responsibility systems have generally reached their recycling and recovery targets. But several systems are insufficiently transparent and their activities are not well co-ordinated. Strengthened controls by the SES in 2017 revealed deficiencies in the systems' operation and compliance with recycling targets. The controls, which covered all civic amenity sites, found deficiencies regarding compliance with technical standards and data reporting. The controls also covered one-third of the systems' recovery facilities and found deficiencies regarding compliance with recycling targets (e.g. for rubber from tyres). As a result, six systems were closed (Table 4.5) and fines equivalent to ten times the relevant NRT were imposed, totalling EUR 35.5 million. The fines were not paid, however:

one PRO went bankrupt, and the other organisations' member companies left and joined other systems before the fines came due.

Table 4.5. Extended producer responsibility systems in Latvia

Company	2017[a]						2018[a]					
	Packaging		Electrical & electronic equipment		Environmentally harmful goods		Packaging		Electrical & electronic equipment		Environmentally harmful goods	
	Members (number)	Market share (%)	Members (number)	Market share (%)	Members (number)	Market share (%)	Members (number)	Market share (%)	Members (number)	Market share (%)	Members (number)	Market share (%)
Green Centre	144	2.8			35	3.6	166	3.3			39	4.0
Green Belt	2116	41.7	313	26.0	263	27.2	2334	46.0	444	36.9	335	33.9
Latvian Green Dot	2467	48.6	541	44.9	464	47.9	2539	50.0	605	50.3	543	55.0
Eko Rija	4	0.1					35	0.7				
Tyres Blocks					-[b]	-[b]					— [b,c]	— [b,c]
Latvian Green Electron	258	5.1	328	27.2	126	13.0	— [b]	— [b]	— [b]	— [b]	— [b]	— [b]
Nordic Recycling[b]	88	1.7	24	2.0	80	8.3	— [b]	— [b]	— [b]	— [b]	3	0.3
Latvian Green Fund							2	0.04			64	6.5
Eco Point							2	0.04	153	12.7	3	0.3
Total	5077	100	1206	100	968	100	5078	100	1202	100	987	100
Number of systems	6		4		6		6		3		6	

Notes:
(a) An extended producer responsibility system for end-of-life vehicles also exists; it has 29 member companies and covers 100% of the market.
(b) Several systems closed in 2017-18: Tyres Blocks (goods harmful to environment) closed on 1 October 2017, Latvian Green Electron (packaging, electrical and electronic equipment, goods harmful to environment) over the course of 2018; and Nordic Recycling (packaging, electrical and electronic equipment) on 1 January 2018.
(c) The Latvian Tire Management Association, founded in 2018, brings together six companies engaged in tyre distribution, collection and recycling.
Source: Country submission.

This led to the adoption of new standards to better regulate and monitor the market, including the development of end-of-waste criteria for rubber from tyres and the introduction in July 2018 of a mandatory financial guarantee (bank guarantee or insurance) for extended producer responsibility systems. The guarantee applies retroactively and is controlled by the SES. The purpose is to avoid free riders and mobilise resources for managing the waste when a company fails to fulfil its obligations. In addition, the government reconsidered the level of fines applied in case of non-compliance, which used to be equivalent to a tenfold NRT rate for the non-recycled amount. A proposed amendment to the Natural Resource Tax Law would cap the level of fines at double the relevant NRT.

The overall performance of extended producer responsibility systems is not easy to assess. The absence of information on how membership fees are calculated and revenue is spent complicates any review of the costs and benefits of the systems. Whether the fees collected cover the costs incurred is unclear. The data that operators report annually are often incomplete and of insufficient quality. For example, it is often impossible to distinguish among the sources of waste the systems handle or how the recycling performance for the various sources differs among them. Paper packaging waste from households and other waste paper from elsewhere can be mixed and all included in the reported recycling rate for municipal packaging waste.[9] This generally masks a weak performance by the system operators. It also hampers quality assurance on the reported data and raises questions as to

the reliability of the calculated recovery rates, in addition to impeding comparative assessments and monitoring of compliance with recycling targets.

To improve the cost-effectiveness, co-ordination and transparency of extended producer responsibility systems, public control over the systems needs to be strengthened. Considerable efficiency gains could be obtained in the separate collection and sorting of end-of-life products to which extended producer responsibility applies. The municipal and private systems need to be fully co-ordinated, ideally as joint or shared collection programmes, with an obligation for operators of extended producer responsibility systems and municipalities to co-operate, and with proper arrangements for service provision, cost sharing and reporting. Establishing reference costs for municipal services could facilitate such arrangements (OECD, 2016a).

For oversight to be effective, the resources available for compliance monitoring and quality assurance need to be increased. The SES works with rather limited resources and is obliged to proceed in steps. In 2017, its focus was on control of recycling targets and technical standards; in 2018 on reporting requirements, data quality assurance and methodological guidance.

A clearinghouse mechanism would be useful to establish a level playing field in which all extended producer responsibility operators can work. It would help in specifying the requirements and accountability rules for each system regarding fee calculation, eco-design, recycling objectives, co-operation with and reporting to local authorities, and the like. Reporting obligations should include information on the system's financial status (fees, budgets, expenditure) and should be made public, at least in part. This would also help further streamline and consolidate extended producer responsibility for products for which existing systems are scattered or do not yet reach recycling targets (e.g. WEEE).

4.5.3. Packaging waste

Particular attention is given to the recycling of waste paper and cardboard from packaging, to comply with the EU Packaging and Packaging Waste Directive (94/62/EC). Recycling is encouraged by exempting producers of packaging waste who join an extended producer responsibility system from the packaging part of the NRT. Measures to improve packaging design include awards from the Latvian packaging association for the most ecological packaging. The awards are aimed at use of natural materials (e.g. wood) and avoidance of double packaging (e.g. glass bottle in a paper box).

Latvia was given the longest derogation period among EU countries for meeting the recycling targets for packaging: it had to reach them by 2015.[10] The recovery and recycling rate is fairly high. A national target of 78% for 2011 was missed by only a few percentage points (75%). The EU target for 2015 was met (84%).

Tax on packaging materials and producer responsibility

Latvia and Hungary were the first Eastern European countries to introduce a tax to minimise packaging waste and encourage recycling. Latvia's packaging tax, introduced in 1996 as part of the NRT, applies to paper, glass, plastic and metal packaging.[11] It was originally calculated in four ways (per piece, per weight of packaging, per weight of product, according to the customs tax) with no differentiation for the environmental impact of the packaging or the recycling costs. An important driver of the packaging tax design was the government's will to support the national recycling industry as part of overall

industrialisation in the 2000s. In 2002, the tax rate was increased temporarily for PET packaging to support the recycling industry (a PET recycling plant was built in 2003).

Since 2005,[12] the tax rates have been based solely on packaging weight (on a per-kilogram basis) and differentiated by type of material and its recycling costs, the rate being two to three times the recycling cost (Table 4.6). No differentiation is made between recycled and virgin materials. Since 2010, a higher tax rate has been applied to polystyrene, which cannot be recycled in Latvia (EUR 1.56/kg, compared to EUR 1.22/kg for other plastics). In 2014, the rates were increased by 25%.

Table 4.6. Tax rates for packaging materials and disposable tableware and accessories

Type of source material	Rate (EUR/kg)
Glass	0.44
Plastics (polymers), excluding bioplastics, oxy-degradable plastics and polystyrene	1.22
Metals	1.10
Wood, paper and cardboard, other natural fibres, bioplastics	0.24
Oxy-degradable plastics	0.70
Polystyrene	2.20

Note: The rates are for the packaging part of the natural resource tax.
Source: Country submission.

The tax serves as an incentive to join a PRO. Companies that do so are fully exempted from the tax. Until 2004, they were granted a tax break of up to 80% depending on the recovery rates. Several PROs provide packaging management for producers. The biggest are Latvian Green Dot, Green Belt and Green Centre. Revenue from the packaging tax is rather low; it declined as companies joined PROs. In 2014, it was less than EUR 1 million and represented 5% of the NRT revenue.

The packaging tax has been successful in encouraging companies to adhere to an extended producer responsibility programme. It has also stimulated the use of reusable packaging (e.g. wood pallets, plastic boxes, glass bottles), as users of such packaging have to pay the tax only once. But it does not seem to have influenced producer and consumer choices of packaging materials and design (Juruss and Brizga, 2017).

Tax on single-use plastic bags

A special tax on single-use plastic bags was introduced in 2008 as part of the NRT. Its rates, higher than for other plastic packaging, range from EUR 3.7/kg for lightweight bags (less than 3 g) to EUR 1.14/kg for heavier bags. For bags made of oxy-degradable plastic, the rates are the same as for other plastic packaging. The tax initially led to a significant drop in the use of plastic shopping bags, but it has been stable in recent years. A ban on single-use plastic bags is operational since January 2019; it applies to all bags except very lightweight bags needed for hygienic purposes or intended to pack non-prepacked food to prevent food waste. A total ban, including on all lightweight bags, is to be implemented in 2025.

Deposit-refund system for reusable packaging

A voluntary deposit-refund system was introduced in 2004 for reusable beverage packaging, i.e. glass bottles and plastic crates for bottles. As the system works well and has been successful, the SWMP has called for making it mandatory, and there are plans to extend it to other types of plastic and metal beverage packaging. A draft law has been

prepared, and discussions on a compulsory system are under way. Extended producer responsibility companies opposed it, as they would lose part of their market share. A multidimensional economic assessment of the implementation costs is being carried out. It builds on estimates by the MEPRD, complemented with industry data and economic information provided by other Baltic states that have compulsory deposit systems.

The new system would apply to single- and multiple-use packaging for drinking water, non-alcoholic beverages, beer and beverages with low alcohol content. Covering some 8-10% of all packaging, it would be managed by an operator from the beverage producers or sellers association. Detailed specifications, to be defined in Cabinet regulations, would take the technical and economic feasibility into account. The new system would also be expected to improve the quality of the packaging waste collected, compared with the quality of waste from separate collection systems and sorting stations. The possibility of a joint system with Estonia, which has had a deposit-refund system for more than ten years, is being investigated.

4.5.4. Waste electrical and electronic equipment

Regulations on WEEE management were implemented in 2004, then revised in line with the related EU directive (2012/19/EU). Tax rates for WEEE are laid down in the Waste Management Law. Three PROs manage end-of-life WEEE, with Latvian Green Dot covering 50% of the market and Green Belt 37%. In 2018, two PROs for WEEE had to be closed following compliance checks by the SES.

Producers of electrical and electronic equipment are required to work with recyclers to facilitate the development and manufacture of equipment that can easily be dismantled or reused, and whose components can easily be recovered and recycled. The producers have to be registered and provide information on the quantity and types of equipment they put on the market, along with the quantity and types of end-of-life equipment collected, reused, recycled or recovered, and exported. PROs such as Green Dot register member producers, importers and traders of such equipment in state registers held by the MEPRD and administered by the Latvian Electrical Engineering and Electronics Industry Association. This facilitates information exchange on the management and control of related goods. Reports on electrical and electronic equipment placed on the market and related waste collected, reused, recycled or recovered are provided twice a year electronically via the related registers, as are data on goods placed on the markets of other EU countries.

Targets for WEEE recovery are in line with EU requirements. With a per capita collection rate of 2.5 kg from households and a three-year average collection rate of 26% of the equipment placed on the market, Latvia missed the 2016 EU targets for WEEE. Reaching the target for 2021 will be a challenge (Table 4.1).

4.5.5. Construction and demolition waste

Latvia produces about 306 kt of CDW a year (including hazardous CDW containing, for example, asbestos from roofs built during the Soviet period). CDW has long been given little attention and was barely monitored. Illegal dumping of hazardous CDW used to be common and can still happen (EC, 2015a). CDW generated by households is managed by the waste manager who provides municipal waste management services on the territory of the relevant municipality.

Today Latvia has specific provisions for CDW, with recovery, reuse and recycling targets specified in the SWMP. Producers of non-hazardous CDW have to ensure that by 2020,

70% of all CDW generated in a year is reused, recycled, or recovered, including through backfilling. CDW is sorted manually. Bricks, glass and concrete are usually used for backfilling or landfilled; wood is almost exclusively incinerated with energy recovery; wood chips are used for pellets or particle boards; metals are recovered for recycling in the country. According to the LEGMC, Latvia imports CDW from neighbouring Baltic countries, particularly Lithuania; it is mostly metals for recycling and other CDW for road construction.

The market for recycled aggregates is underdeveloped. Natural aggregates are available at lower prices and there is a general mistrust in the quality of recycled construction and demolition material. Financial incentives do not exist, other than the NRT on material extraction.

Despite these constraints, the 70% target does not seem very ambitious, as it includes backfilling operations. It has already been surpassed: in 2015, 88% of CDW was reported as having been recycled or recovered. Latvia could be more ambitious and further encourage high-value recycling of CDW. This would require proper training and information, the development of standards for recycled aggregates and the use of synergies with the 2008 Guidelines on the Promotion of Environmentally Friendly Construction and related public procurement.

4.6. Encouraging waste prevention and moving towards a circular economy

Important drivers for preventing waste generation and keeping materials in the economy are the availability of domestic natural resources – which are limited for non-renewable resources and mainly consist of biological resources – and related EU requirements and targets, including the energy and resource efficiency targets of the EU's Europe 2020 strategy and circular economy package. The circular economy is not yet embedded in national policy documents, but a national circular economy strategy is being elaborated. Circular economy principles are implicit in waste policy documents and regulations. They are promoted through recycling and recovery targets, extended producer responsibility systems and the NRT on material extraction, recyclable materials and end-of-life disposal.

Latvia's still modest performance in waste management means essential steps need to be taken before circular economy approaches can be implemented. The potential for progress is good. The SWMP emphasises the value of waste as a resource, with the aim of increasing recycling and reuse and preventing waste generation. Other initiatives and projects providing opportunities for waste prevention and circular economy include eco-innovation and new technology development in areas such as smart materials and optimised production processes. Closed-loop approaches are also encouraged through the bioeconomy concept, introduced in forestry and promoted in agriculture and the food industry.

Harnessing these opportunities must go along with effective alignment of measures and objectives across policies and ministries, well-targeted information and training activities, and continued support to businesses that lead the way. It will also require measures to stimulate markets for recyclable materials and recycled products and address the cost gap between primary and secondary raw materials; more effective incentives for waste prevention, recycling and reuse; and better information on the supply and quality of secondary raw materials. More investment will be needed to promote measures higher up in the waste hierarchy and upstream the material life cycle (circular use, eco-design, waste prevention). Co-operation in the Baltic Sea region will be essential.

4.6.1. Waste prevention

Public action on waste prevention in Latvia is fairly recent. Waste prevention measures are included in the SWMP and SWPP, but implementation is in its early stages. The main objectives are to:

- decouple economic growth from negative environmental effects of waste
- reduce the amounts of waste generated by promoting reuse of end-of-life products and longer use
- reduce harmful substances in the manufacture of materials and products.

Waste prevention is encouraged through product policies and eco-design measures, in line with the framework for eco-design provided by the EU Eco-Design Directive (2009/25/EC) and the framework for reducing toxic content in products provided by the REACH and RoHS directives. Regulations define the concepts of eco-design, product labelling, life-cycle analysis and related requirements. Waste prevention is also encouraged through the mandatory use of BAT for pollution-intensive activities and the use of cleaner production principles for others.

These measures' effects on waste prevention is not monitored, however. Nor is much known about actual waste prevention in production processes or further upstream in design phases, or about measures to minimise the environmental impact of waste and materials over their life cycle. Awareness among businesses about the benefits of waste prevention seems low. An EU survey (EC, 2018b) revealed that, in 2017, 35% of Latvia's SMEs took measures to minimise waste (compared with an EU average of 65%), 55% to save materials (against an EU average of 57%) and 15% to recycle waste or reuse materials within the company (against an EU average of 42%).

4.6.2. Innovation and technology development

Latvia is committed to eco-innovation and new technology development, harnessing EU support and other international funding to advance in these areas. Responsibility for eco-innovation lies with the Ministry of Economy, for innovation related to industry and entrepreneurship, and the Ministry of Education and Science, for research related to innovation.

Most developments in environmental technology take place in small companies, which lack access to external markets and do not have much uptake or commercialisation capacity. Examples include green technology start-ups that work on eco-design and material substitution through innovative solutions in construction, composite materials and metalworking. In 2014, a green technology incubator was launched to support development of eco-innovative companies and entrepreneurship, with support from the Norwegian Financial Mechanism's Green Industry Innovation programme.

Promising developments are taking place under the Smart Specialisation Strategy through the Ministry of Economy and the Ministry of Education and Science.[13] Its priorities include increasing energy efficiency, developing new materials, optimising production processes and introducing technological innovations. One specialisation area focuses on smart materials, technology and engineering systems concerning, for example, waste control and processing, packaging and bioenergy. Implementation of the strategy is supported by a cluster programme and competence centres that bring together the research and business communities:

- The competence centres,[14] managed by industry, facilitate experimental and applied research and the sharing of knowledge and experiences among enterprises that develop new technology and new products. The focus is on cross-sectoral and international collaboration. Eco-innovation represents about one-fourth of the research projects.
- The cluster programme fosters co-operation among SMEs and between SMEs and research institutes and selects projects that receive EU funding for a period of four years. Examples include the Clean Technology Cluster.

Progress with eco-innovation of interest to the circular economy has been slow. It is hampered by the overall rather modest innovation performance, especially in the medium- and high-tech fields. Other barriers are the lack of financial resources available to businesses, and often a lack of motivation (EC, 2017b). As awareness about the benefits of sustainable production and circular business models has long been low, companies seldom invest in new products and technology or integrate innovation in business strategies. As in other domains, dependence on foreign financial support is high, which complicates the development of long-term domestic policies. There is thus scope for improving the conditions for eco-innovation development, including through raising awareness and improving financial planning (EC, 2017a).

Innovation and new technology in areas of interest to waste prevention, material management and a circular economy could drive growth in sectors that contribute to the transformation of the Latvian economy. They should receive more attention when projects and supporting businesses are selected under the Smart Specialisation Strategy, and the objectives of closing material loops and preventing waste generation should be fully integrated into innovation policies.

4.6.3. Initiatives supporting a circular economy

In practice, circular economy initiatives and circular business models are not well developed, and little information is available on circular economy approaches. A number of initiatives promote circular economy business models via sharing economy projects, such car sharing, book sharing, repair services, and sharing and reuse of clothes through charity platforms such as Otra Elpa and second-hand markets such as Mandele Andele.

Other examples exist in the food industry, where smoothies and similar products are produced from by-products like whey by, for instance, Smiltenes Piens, one of the country's largest milk processors. Other companies, such as the Valmiermuiža brewery, use *trub*, a brewing by-product, as an ingredient in cookies or animal feedstock, or for biogas production. Near Liepāja, the Kivites landfill site offers its infrastructure, heat and electricity (generated from waste) to other industries. In the Riga region, the Getlini landfill uses heat from landfill gas to produce vegetables in greenhouses (Box 4.2).

4.6.4. Secondary raw materials and recycling markets

Markets for secondary raw materials are weak and depend on external demand. The economy's size means there is insufficient waste for domestic recycling companies to be profitable without importing specific types of recyclable waste, and exacerbates the competition between waste management companies and recycling businesses. Recycling markets also suffer from mistrust of the quality of recycled goods, which are often still considered waste (e.g. compost, recycled aggregates from CDW), as well as from low investment in high-value recycling and competition with cheaper primary resources.

Latvia has no specific measures to support recycling markets; most measures are indirect. They include policy targets for the collection and preparation for reuse, recycling and recovery of waste; taxation and exemptions; and financial support through EU funds. The main economic instrument supporting recycling markets is the NRT. Beyond its role in promoting adherence to extended producer responsibility, it aims to create incentives to reduce the cost gap between primary and secondary raw materials by taxing extraction of mineral resources. But it has so far not been effective in doing so.

To further develop recycling markets and stimulate demand for recyclable materials and recycled products, synergies with green public procurement and eco-innovation must be better used. And domestic high-value recycling (the use of secondary raw materials and recycled feedstocks to produce goods with greater added value) must be promoted with a focus on areas where Latvia is well positioned and could develop competitive advantages. Examples are feedstocks from recycled plastics and polymers, now exported for further processing, and inert CDW, still used for backfilling. This implies efficient separate collection systems and high-quality sorting, efficient extended producer responsibility programmes and clear end-of-waste criteria for recyclable materials.

More could also be done to increase the availability of high-quality recyclable materials by paying greater attention to product design and supply chain management, and improving the quality of sorting and separate collection. Economic incentives for households to separate waste are insufficient. The extended producer responsibility systems do not fully cover the costs of separate collection and are not co-ordinated with municipal programmes.

Greater use of synergies with Baltic Sea countries and other neighbours will be instrumental. Consideration could be given, for example, to establishing a regional trading system for recyclable materials and secondary raw materials (recycled feedstocks).

4.6.5. Green purchasing by the public sector

Public procurement plays an important role in the Latvian economy, in particular for SMEs, for which public tenders are the main income source. Green public procurement is encouraged through the NDP 2014-20, the Green Procurement Support Plan[15] and the Public Procurement Law. The application of GPP criteria became mandatory in 2014 for food supply and catering services in state and local government institutions,[16] and in 2017 for six other product groups and services, including copying and graphic paper, office information and communication technology, office furniture, cleaning products and services, indoor lighting, and street lighting and traffic signals.[17] Implementation guidelines are available for each product and service group. GPP in the construction and transport sectors is voluntary and depends on the market availability of environment-friendly alternatives. Guidance on greening construction was adopted in 2008.[18] Eco-label requirements and criteria for environmental management standards and certification can be integrated in all procurement. An electronic catalogue of environment-friendly goods and services is available to contracting authorities and public service providers.

The MEPRD, the Latvian Environmental Investment Fund and the Central Procurement Office provide GPP training and facilitate experience sharing. Particular attention is given to food products, catering services and construction. Several projects benefit from support by the EU Baltic Sea Region Programme and from Latvia's participation in inter-regional EU projects.[19] A circular public procurement project has provided training and guidance to municipalities.[20]

In 2015, the government set targets to gradually increase GPP's share in total procurement to reach at least 20% by 2016 and 30% by 2017. The data on GPP collected annually by the Procurement Monitoring Bureau indicate these targets were not met. In 2016 and 2017, GPP represented 13-14% of total procurement. The government, deciding the 30% target was too ambitious, set more realistic targets associated with stricter requirements and clearer guidance: 15% by 2018, 18% by 2019 and 20% by 2020.

Monitoring changes over time in the application of GPP is not easy. The criteria for classifying procurement as GPP have become stricter, so recent data are considered more reliable. The government reported that in 2018 the share of public procurement in GDP was about 20% and the share of GPP in total procurement about 18%, three percentage points above the target. Construction work represents the bulk of GPP at 33%, followed by vehicles (21%) and catering services (16%). Little information is available on the share of GPP that integrates life-cycle thinking and applies criteria on secondary raw materials and eco-design.

Progress over the review period was slow. The share of GPP in public tendering remains modest compared to those in other EU countries and to the indicative target of 50% set by the European Commission for 2010. Public authorities still perceive GPP as being more expensive and complicated; many fear that green requirements and criteria restrict competition for public tenders and could result in appeals.

Public procurement could be much better used to drive circular business models, stimulate demand for greener products and provide incentives to businesses for product innovation and eco-design. Particular attention should be given to circular public procurement that promotes consideration of the whole life cycle of products throughout the supply chain. The introduction of an obligation to use a given amount of secondary raw material and to favour products made from such material in public procurement could also be considered. This will need to be accompanied by improvement in public procurement more generally. The Competition Council, supervised by the Ministry of Economy, has long identified bid rigging in public tendering as a problem. The 2017 OECD Economic Survey of Latvia underlined the need to strengthen the transparency of public procurement by ensuring the independence of institutions in charge of combating corruption.

4.1.2. Cross-sectoral co-operation and policy integration

Encouraging life cycle-based materials and product management and circular economy approaches will have to go along with effective alignment of measures and objectives across policies and ministries. It will require mechanisms for policy co-ordination and stakeholder involvement beyond what is currently in place.

At the national level, co-operation between the MEPRD and other ministries works well for issues related to traditional waste management and development of bioenergy projects. But practical co-operation on eco-innovation and new technology is not yet well established, and the synergies between measures promoted by the MEPRD and the Ministry of Economy are not yet exploited. This hampers implementation of waste prevention measures, among other issues, such as uptake of new technology and innovations in production processes and other business activities. Closer co-operation between the two ministries is thus instrumental; it would also help raise business awareness about the economic benefits of waste prevention and a circular economy.

Beyond inter-ministerial co-operation, Latvia needs to broaden and deepen co-operation with stakeholders and strengthen policy integration at all levels. The regular meetings of

secretaries of state are important for co-ordinating issues related to waste management and prevention across ministries. But there is no institutional platform for broader co-operation on circular economy issues, where representatives of business, finance and other stakeholders could meet and guide related investment choices.

Recommendations on waste management and circular economy

Improving the effectiveness and governance of waste management

Review the taxation of waste management in line with the waste hierarchy: Further increase the natural resource tax for landfilling beyond 2020; encourage municipalities to increase municipal waste fees to ensure full cost recovery of service provision; apply PAYT systems in major cities to provide greater incentives to households to participate in separate collection; implement measures to change consumer behaviour and product design.

Merge the separate collection programmes operated through extended producer responsibility systems and those operated by or for municipalities to improve the cost-effectiveness of these systems and the quality of the covered materials.

Specify the requirements for extended producer responsibility systems (calculation of fees, eco-design, recycling objectives, arrangements for service provision and cost-sharing with local authorities, reporting obligations, including on financial aspects) to improve their cost-effectiveness, transparency and co-ordination; increase resources for compliance monitoring and quality assurance; consider establishing a clearinghouse mechanism to assist in these tasks.

Ensure that national waste policies and targets are cascaded at local level, including through systematic establishment of regional and local waste management plans and regular reporting on results, including on financial aspects.

Exploit synergies with neighbouring countries to efficiently use waste treatment capacities in line with the waste hierarchy and to ensure adequate co-ordination of deposit-refund systems.

Promoting waste prevention and circular business models

- Improve the material productivity and efficiency of the economy and encourage waste prevention in industry and upstream in the value chain (design phase); fully integrate the objectives of closing material loops and preventing waste generation into innovation policies; exploit synergies between measures on cleaner production, eco-innovation, waste prevention, bioenergy and smart specialisation by establishing effective mechanisms for co-ordinating and monitoring the actions of all ministries involved.
- Strengthen markets for secondary raw materials and recycled goods through public procurement and increased co-operation with neighbouring countries; encourage investment in high-value domestic recycling.
- Broaden institutional co-operation to steer the transition to a circular economy and related investment choices, and deepen co-operation between the MEPRD and the Ministry of Economy.
- Improving the information basis on waste and materials

- Improve and expand national waste management information and official statistics on waste and materials; create a consolidated, transparent and integrated system that covers all management steps and treatment routes, including transboundary movements, and that supports the development, implementation and monitoring of national policies, along with international reporting.

Notes

[1] The WMPs are those of the Vidusdaugava region for 2015-21, the Ziemeļvidzeme region for 2014-20 and the Zemgale region for 2014-20.

[2] The bioeconomy includes agriculture, forestry, fisheries and aquaculture, the food and wood industries, and parts of the chemical, bio-technological and energy sectors; all have high job and growth potential. The Ministry of Agriculture developed the strategy with an inter-ministerial working group (Ministry of Economics, MEPRD, Ministry of Education and Science, Ministry of Welfare, Cross-Sectoral Coordination Centre) and involvement of business associations and research institutes.

[3] WMRs were established in the early 2000s, when Latvia developed its new waste management system.

[4] Latvia has two professional waste management associations: the Association of Waste Management Service Companies (LASUA, www.lasua.lv) and the Waste Management Association of Latvia (LASA, www.lasa.lv).

[5] The 3-Waste reporting form is submitted annually by enterprises, institutions and organisations that produce municipal and hazardous waste and have Category A and B pollution permits, and by enterprises with a Category C certificate for polluting.

[6] The NRT covers waste disposal, packaging waste, water abstraction, aggregates, air and water pollution, harmful goods, passenger cars, and coal, coke and lignite.

[7] In 1995, Latvia generated 460 000 tonnes of biodegradable municipal waste.

[8] Decision of the Regulatory Council of February 16, 2017 No.1/5 *Methodology for calculating the tariff for municipal waste disposal service*. www.sprk.gov.lv/lapas/atkritumu-apglabasana40_-Tarifi36

[9] Reporting by source (municipal, industrial) is already envisaged for WEEE and environmentally harmful goods.

[10] The main arguments used by the government to get the deadline extended were poor road infrastructure and low population density, which make waste collection more expensive than in other countries.

[11] The NRT on packaging was developed by what is now the MEPRD with involvement by the Latvian Packaging Association, PROs, the Environmental Consultation Board, waste management associations, waste management companies, landfill management companies, the retailer and beverage producer associations, and the Packaging Certification Centre (www.lisc.lv).

[12] In 2005 new laws on the NRT and on packaging waste were adopted to transposing the EU directives on waste (94/62/EC) and packaging (2004/12/EC).

[13] The Ministry of Education and Science released the first assessment report on the Smart Specialisation Strategy in February 2018.

[14] Competence centres are co-funded by the European Regional Development Fund. Relevant centres include those on smart materials and technology; smart engineering, transport and energy; engineering; food; and the forestry sector.

[15] Elaborated by the MEPRD in consultation with stakeholders. Implementation benefitted from support from the EU structural funds and Cohesion Fund.

[16] The Environmental Policy Strategy for 2014-20 envisages development of GPP criteria and guidelines, provision of GPP information to contracting agencies and availability of green products on the market.

[17] Mandatory GPP rules are included in the Cabinet regulation "Requirements for GPP and procedures for application", in force since July 2017. The purpose of the regulation is to regulate the implementation, monitoring and assessment of GPP by (i) determining the product groups and services for which GPP is mandatory (Annex 1), (ii) defining the GPP requirements and criteria to be used for the goods and services for which GPP is voluntary (Annex 2), and (iii) defining the Methodology of Life Cycle Costs for Energy Consuming Products (Annex 3).

[18] Guidance on environment-friendly construction was issued in 2008, as were guidelines on the promotion of green procurement in state and municipal institutions, both developed by the environment ministry and the Procurement Monitoring Bureau.

[19] The Zemgale planning region participates in the EU Interreg project "Green Public Procurement to Achieve Green Growth" (GPP4Growth), which brings together nine partners from nine countries. The project runs from January 2017 to December 2021. GPP4Growth (www.interregeurope.eu/gpp4growth) supports public authorities in seizing opportunities to use their purchasing power to stimulate eco-innovation, resource efficiency and green growth, mostly by using award criteria in calls and tenders that pay particular attention to environmental considerations.

[20] The three-year project (2017-20) was supported by the Baltic Sea Region Programme and co-financed by the European Regional Development Fund, with involvement of the LEIF and the Latvian Chamber of Commerce and Industry.

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Chapter 5. Biodiversity

Latvia's forests, grasslands, wetlands, and Baltic marine and coastal areas are biodiversity-rich and provide home to numerous species of international significance. However, the conservation status of most habitats and species continues to decline and biodiversity considerations are not sufficiently integrated into sectoral policies. This chapter reviews pressures influencing the status and trends of biodiversity; the legal, strategic and institutional framework; policy instruments and financing established to promote biodiversity conservation and sustainable use; and the degree to which biodiversity considerations have been mainstreamed into sectoral policies.

"The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

5.1. Introduction

Latvia lies on the shores of the Baltic Sea and is home to abundant biodiversity and diverse ecosystems, such as forests, grasslands, coastal areas, and bogs, including peatlands. With more than half the territory covered in forests, Latvia has one of the highest shares among OECD countries. Forests are also an important economic asset, used, among other purposes, to produce biomass for energy.

Latvia has an established tradition of nature conservation dating back to the early 20th century. It surpasses the 2020 Aichi targets for terrestrial and marine protected areas; it ranks 25th on the world Environmental Performance Index biodiversity and habitat indicator, and 15th in the OECD, after Estonia and Lithuania. Nevertheless, the majority of habitats and species are in an unfavourable state, which is due to land-use change, fragmentation, intensive resource use, pollution and agricultural expansion. Insufficient management plans in protected areas, as well as limited options to conserve biodiversity outside protected areas and promote mainstreaming into other sectors, are among the reasons why the status and trends of ecosystems and species are not improving. Latvia is one of the few OECD countries that, despite being party to the Convention on Biological Diversity (CBD), have not yet developed a national biodiversity strategy.

Given the past decade of consistently strong economic growth, which is expected to persist and relies heavily on natural resources, further efforts are needed to reduce pressures on biodiversity and thus balance economic development and environmental protection. Nature conservation should be considered a government priority, together with better mainstreaming of biodiversity objectives into agriculture and forestry policies. This would improve the well-being of the population and sustainable resource use. Completing ecosystems mapping and developing a national biodiversity strategy would represent important opportunities to establish a coherent policy framework for biodiversity, increase awareness among policy makers and the public, and mobilise resources to achieve Latvia's biodiversity objectives.

5.2. State, pressures and trends

5.2.1. State and trends in biodiversity

Forests cover 54% of Latvia's land area (excluding inland and coastal waters). Arable land and cropland account for nearly 21% of land area and meadows and pastures for 10% (FAO, 2018). Of the multiple rivers flowing into the Baltic, the largest are the Daugava, Gauja, Lielupe and Venta. Box 5.1 describes the main Latvian ecosystem types and pressures.

Forests are mostly natural, with only 18% being plantation forests. They are very diverse and provide multiple ecosystem services, including habitat provision, carbon sequestration, water regulation and erosion prevention. There are three main tree species in Latvian forests: Scots pine (29%), silver and downy birch (28%) and Norway spruce (17%).

Box 5.1. Major ecosystem types and related pressures

Grasslands

Semi-natural grasslands (meadows and pastures) are among the most diverse and richest habitats, yet at the same time increasingly threatened. Grasslands host 520 plant species (one-third of Latvia's flora), including 40% of all protected plant species. Numerous bird species breed in semi-natural grasslands or use them as nesting and feeding grounds. Many grassland flora and fauna species are decreasing while habitat loss and degradation increase. Grasslands' coverage has significantly declined since the mid-20th century, when they represented around 13% of the territory. As a result of agricultural land expansion, natural grasslands have shrunk to around 0.3% of the land area.

Forests

Forests are an important source of biodiversity, with old stands especially providing valuable habitats for animal and plant species. The largest forests are in the northwest, on the Kurzeme Peninsula; along the banks of the Daugava; and in the northeast, where conifers (pine and spruce) predominate. Birch, aspen and alder are the main deciduous species. The typical representatives of Latvian forest fauna are game animals. Protected species are brown bear (~20 individuals), dormouse and northern birch mouse. There is large diversity of bird species: out of 330 wild bird species, more than 100 can be found in forests. Latvian forests are nesting areas for 5% of the world population of black stork. Intensive forest management has replaced old forests with younger ones, with negative effects on biodiversity.

Wetlands, bogs and peatlands

Bogs are a type of wetland, which refers to land that is covered or saturated by water for all or part of the year. Peatlands are wetlands drained for peat extraction. There are 8 protected bog habitats and more than 50 protected plant species – mostly orchids and sedges. Storks and herons are usually found in marshes and meadows. Bogs are organic carbon sinks. The large majority of bogs (70%) are in pristine condition, while the remainder are affected by peat extraction and drainage.

Inland waters

Latvia's 12 400 rivers and over 2 000 lakes host 2 680 algae, 1 614 invertebrate, 40 fish and 3 lamprey species. Salmon and trout are examples of specially protected species, and 27 habitats are protected. More than half of inland waters originate in neighbouring countries, which leaves them exposed to transboundary pollution and accidents (EEA, 2015), hazards to which freshwater species are particularly vulnerable. Other threats to biodiversity are eutrophication, hydroelectric power stations and poaching.

Coastal and marine areas

Coasts offer wide diversity of habitats and species. Seven marine and more than 40 coastal areas are Natura 2000 sites. The greatest biodiversity is found in coastal areas where benthic algae grow. The main threats to biodiversity in coastal areas are habitat degradation (due to tourism and recreational activities), habitat loss (due to housing development), expansion of invasive species and low environmental awareness. In marine areas, eutrophication and invasive species are the biggest challenges.

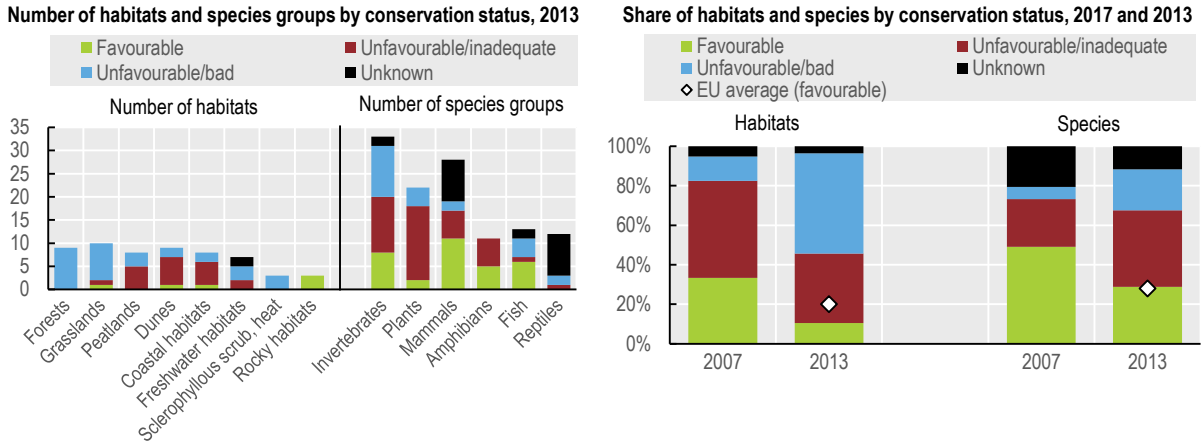
Source: MEPRD (2014); EEA (2015); UNFCCC (2017).

Natural habitats

The condition of natural environments is poor and continues to decline (Figure 5.1). The 2013 report on habitat conservation status, issued pursuant to the EU Habitats Directive (92/43/EEC), says a majority of habitats (51%) are unfavourable/bad and around one-third (35%) are unfavourable/inadequate, compared to EU averages of 30% and 47%, respectively. Only 10.5% of all habitats have favourable conservation status (the EU average is 16%). Forest, grassland and peatland habitats' status are among the worst. Between 2007 and 2013, forest habitats significantly deteriorated, mostly due to increased pressures from forestry and agricultural activities (EC, 2017a).

Peatlands' conservation status is unfavourable. Peat is among the most economically significant resources in Latvia. It is estimated that peat deposits cover 10.4% of the terrestrial territory. They are located in bogs, but also in some forest types, along with drained mires (MEPRD, 2014).

Figure 5.1. The conservation status of habitats and species is poor and declining



Source: EEA (2019), *Habitats of European Interest* (database); Eionet (2019), *Reporting under Article 17 of the Habitats Directive*.

StatLink http://dx.doi.org/10.1787/888933969715

Flora and fauna

The conservation status of species raises concerns (Figure 5.1). There are 27 443 species known in Latvia (18 047 animals, including mammals and birds; 5 396 plants; and about 4 000 fungi). Common mammal species are squirrel, fox, hare, lynx and badger.

Protected species account for 2.6% of total known species; 22 animal and plant species are on the list of specially protected species with exploitation limits (MEPRD, 2014). Threatened species account for 2% of total known species, with amphibians and reptiles being the most vulnerable.

The latest EU assessment shows that most species have an unfavourable status: 39% unfavourable/inadequate and 21% unfavourable/bad. These trends are in line with the respective EU averages of 42% and 18%. Only around one-third of species have a favourable status (Figure 5.1) (EC, 2017a).

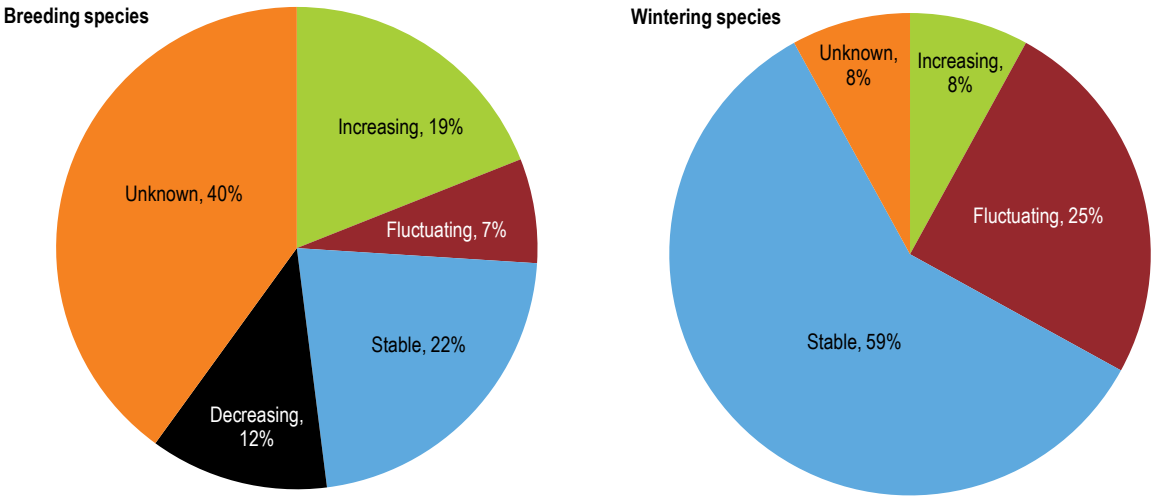
The bird population includes nightingale, oriole, blackbird, woodpecker, owl, grouse, partridge, finch, quail and lark. With regard to birds' conservation status, the first report

under the Birds Directive (2009/147/EC), in 2013, showed that 22% of breeding species' population and 59% of wintering species' population were stable, with 19% and 8% increasing, respectively. A significant knowledge gap exists for breeding species (Figure 5.2). The farmland bird population is among the highest in the OECD (Section 5.7.3).

Latvia is home to 223 nesting bird species, 70 of which are protected. In addition, it hosts about 5% of the world's and 8% of Europe's population of black storks, 20% of the world's and 24% of Europe's population of lesser spotted eagle and 25% of Europe's corncrake population (MEPRD, 2014).

Figure 5.2. The population trend of breeding and wintering bird species is stable

Population trends of breeding and wintering bird species, 2008-12



Source: EC (2017a), *The EU Environmental Implementation Review Country Report: Latvia*, European Commission, Brussels.

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Pressures on biodiversity

Biodiversity loss can have a costly impact on human well-being and economic growth. In Latvia, the main pressures on habitats and species are natural system modifications, which entail fragmentation and degradation of ecosystems as a result of human activity, including dam construction, changes of hydrological regime and land reclamation. Other threats are resource use (e.g. intensive forestry), pollution, agricultural expansion, urban development and climate change.

Pollution in the Baltic Sea

National marine waters – territorial plus the exclusive economic zone (EEZ) – constitute 7.7% of the total Baltic Sea area. The latest environmental assessment of the sea, conducted in 2018, concluded that more than 95% was affected by eutrophication, i.e. excess nutrients resulting in intense plant growth. Nitrogen and phosphorus pollution is mostly from agricultural run-off, municipal wastewater and transboundary sources. The 2016-21 river basin management plans for the four Latvian river basins include measures to reduce diffuse and point-source water pollution. Implementing those would help reduce

eutrophication of marine waters. Hazardous substance contamination is also cause for concern, but has shown some improvement.

Another source of pollution in the Baltic is waste (Chapter 4). Plastic represents around 70% of it and the figure is expected to increase, posing a significant threat to marine biodiversity. Some 80% of waste comes from land-based sources, while 20% is sea-based. Coastal waters are also affected by waste. Latvia uses a methodology developed by the UN Environment Programme to monitor marine litter on beaches. According to the 2018 environmental assessment of the sea, 51% of marine litter collected on beaches is plastic, 12% paper/cardboard, 10% metals and 9% glass/ceramics. The country has the largest number of monitored beaches in the region (GoL, 2018).

Land use change and fragmentation

Even though land cover has significantly changed over time, Latvia is one of the least urbanised OECD countries. The annual land take rate (growth of artificial areas) was 0.38% over 2006-12, below the EU average of 0.41%. It was mainly driven by housing, services and recreation, as well as industrial and commercial activities (EC, 2017a).

Recent urbanisation trends are increasing the fragmentation of natural environments, especially in the Pierīga region. This is mainly due to building and transport infrastructure development. Future development of road infrastructure should be weighed against the risk of increased landscape fragmentation, a leading cause of the decrease in wildlife population throughout Europe (EEA, 2011). To address this risk, the Sustainable Development Strategy to 2030 promotes the analysis, preservation and management of landscapes, as well as cultural and historical heritage territories. The strategy supports implementation of the European Landscape Convention to ensure integration of landscape planning and nature protection issues in sectoral policies.

Invasive species

As Latvia has not systematically monitored invasive species, information on them is incomplete. The 36 invasive species and 12 potentially invasive species reported represent a threat to indigenous flora and fauna.

The most problematic invasive species is hogweed. Introduced in 1950s as cattle feed, it expanded beyond control in the 1980s and ’90s, spreading to the whole territory and now covering some 120 km^2. Giant hogweed in particular is problematic for the environment and human health, as it easily spreads to neighbouring land and toxic components in its leaves, stems, roots, flowers and seeds can cause severe skin burns. Aquatic species (including crustaceans, worms and algae) are the second most significant category of invasive species (NOBANIS, 2019).

Climate change

The 2017 draft National Climate Change Adaptation Plan to 2030 identifies biodiversity and ecosystem services as being among the most vulnerable sectors (Chapter 1). Key impacts on biodiversity relate to changing distribution patterns of species and habitats, including the emergence of new species and pests, increased water temperature and altered water composition, a risk of the spread of pathogens and infections uncharacteristic for Latvia, and increased floods and storms in coastal areas. A shift in conditions favouring rare or new pests could have repercussions for agriculture and forestry (UNFCCC, 2017).

Climate change effects on marine waters are twofold. Expected warmer winters will increase river run-off, which in turn will cause nutrients to be leached from unfrozen topsoil; and warmer sea temperatures will keep favouring the blooming of algae, thus contributing to eutrophication (GoL, 2018).

At present, it is difficult to fully assess the impact of climate change on biodiversity in Latvia due to a lack of data (UNFCCC, 2017). Filling this gap is fundamental to reduce climate change impacts on biodiversity and ecosystems, including species loss and extinction, which projections indicate would be lower at 1.5°C of global warming than at 2°C (IPCC, 2018).

5.3. Legal and institutional framework

5.3.1. Legal framework

Latvia's legislation related to biodiversity is relatively comprehensive, covering fisheries, forests, agriculture and protected areas, among other issues (Table 5.1). Biodiversity policy is mostly determined by EU legislation. A major gap is the absence of a national biodiversity strategy, which significantly weakens the potential to achieve biodiversity objectives.

The 2004 EU accession shifted Latvian priorities towards a European-centred approach to nature conservation. Major changes were made to legislation to transpose EU directives. The establishment of Natura 2000 sites increased the profile of biodiversity conservation, which was also strengthened by specific requirements on environmental impact assessment (EIA) (Section 5.5.1). Implementing the EU acquis has brought Latvia closer to fulfilling its commitments under some international conventions, such as the CBD, since the EU acquis requirements largely overlap the CBD goals (MEPRD, 2014).

Legal framework

As in other areas, Latvian biodiversity policy is mostly governed by EU legislation, particularly the Habitats and Birds directives. Table 5.1 presents key national environmental laws.

Table 5.1. Main biodiversity-related laws

Title	Year	Aim
Environmental Protection Law	2006, last amended in 2013	Secure conservation and restoration of environmental quality and provide sustainable use of natural resources.
Fishery Law	1995, last amended in 2014	Govern the use of fish resources in inland waters, territorial marine waters and waters of the EEZ.
Law on Conservation of the Species and Biotopes	2000, last amended in 2017	Transpose the EU Habitats and Birds directives.
Law on Forests	2000, last amended in 2006	Regulate forest management.
Law on Agriculture and Rural Development	2004, last amended in 2007	Administer sustainable agricultural and rural development, in accordance with EU agricultural policy.
Law on Specially Protected Nature Territories	1993, last amended in 2013	Define procedures to manage a wide range of types of protected areas.
Marine Environment Protection and Management Law	2010, last amended in 2014	Ensure protection and management of the marine environment.

Source: Ministry of Environmental Protection and Regional Development of Latvia.

In 2016, Latvia adopted a Programme of Measures for Achieving Good Marine Environmental Status to 2020, as required by the Marine Strategy Framework Directive (2008/56/EC).[1] The measures are meant to enhance coastal areas' recreational value and improve the population's health and well-being (GoL, 2018). However, the results of a risk analysis indicate that existing and planned measures would not provide significant improvement in marine status. A major gap in Latvia's strategy is a lack of definitions regarding key biodiversity pressures (e.g. contaminants, marine litter). Latvia therefore proposed new measures focusing on marine pollution reduction, risk mitigation and recovery, maritime spatial planning, public participation and outreach activities. There are also two new measures for biodiversity, mostly aiming at improving knowledge and information on seabed habitats and on certain bird and fish species (Milieu, 2018).

National strategies and plans

Latvia is one of the few OECD countries without a national biodiversity strategy and action plan (NBSAP), which is an Aichi target for 2020. Key national strategies and plans include biodiversity-related objectives, though they do not result in a coherent framework. In 2000, Latvia approved a national programme on biodiversity and a related action plan, but did not finish implementing it due to the start of the EU accession process, which became the political priority and absorbed most administrative and financial resources. The Environmental Policy Strategy 2014-20 covers biodiversity protection issues linked to implementation of CBD goals and objectives, and the government considers it equivalent to an NBSAP.

The 2014-20 Environmental Policy Strategy sets the main biodiversity goals, primarily aiming at fulfilling EU requirements. Some could be better defined; for example, the 7 000 ha habitat restoration target does not include a breakdown of habitat type (forest, grassland, etc.). As the baseline of targets shows a modest starting point of biodiversity conservation activities, the established objectives can be considered relatively far-reaching. Efforts should be scaled up in a long-term biodiversity strategy; in particular, the target for management plans for species and habitats could be more ambitious and should include an assessment of which protected areas need a management plan (Table 5.2).

Additional biodiversity goals to 2020 are set in the 2014-20 national development plan, which has a chapter on "Sustainable Management of Natural and Cultural Capital". It essentially considers natural capital a resource, the aim being to increase the volume of ecosystem services. The plan includes rather unambitious targets to 2020, some of which are only slightly higher than the baseline (Table 5.2).

Similarly, the 2010 Sustainable Development Strategy to 2030 has a chapter on "Sustainable Management of Natural Values and Services". Its objectives include integrating natural capital considerations into economic, spatial and regional development policies, estimating national natural capital and ecosystem services, and establishing a nature conservation plan. The strategy's chapter on spatial development also covers biodiversity-related objectives, including landscape planning, awareness raising and further development of rural tourism, aquaculture and fishing. The strategy is not accompanied by action plan. Table 5.2 shows the few specific targets and indicators related to biodiversity.

Table 5.2. Latvia's biodiversity objectives to 2020 and 2030

Environmental Policy Strategy	Baseline (year)	2020 target	
Share of protected areas that have begun implementing management plans (%)	37.5% (2019)	55%	
Number of species and habitat management plans being implemented	13 (2013)	20	
Share of species and habitats of EU importance for which conservation objectives have been set (%)	None (2013)	100%	
Habitat restoration in accordance with Natura 2000 priorities (ha)	None (2013)	7 000	
Share of species and habitats of EU importance for which maps are available (%)	10% (2013)	100%	
Fine-tuning of Natura 2000 area borders taking into account latest scientific and monitoring data as well as results of species and habitat mapping (%)	None (2013)	100%	
Amount of annual funding for management of Natura 2000 sites (ha)	EUR 14/ha/ year (2013)	EUR 50/ ha/year	
Compensation for restrictions on economic activity in protected areas (% of restrictions compensated)	47% (2013)	100%	
National Development Plan (2020) and Sustainable Development Strategy (2030)	Baseline (year)	2020 target	2030 target
Share of organic farming (% of agricultural land)	8.7 (2009)	10	>15
Index of farmland birds (1999 = 100)	115 (2011)	115	>120
Index of forest birds	100 (2005)	95	-
Forest cover (% of total land)	50 (2008)	52.7	55
Protected areas (% of total land)	12 (2017)		18

Source: Environmental Policy Strategy 2014-20; National Development Plan 2014-20; Sustainable Development Strategy 2010-30.

The Latvian Bioeconomy Strategy 2030 (LIBRA) is the long-term national strategy to enable a knowledge-intensive bioeconomy. Developed by the Ministry of Agriculture, LIBRA contains references to environmental quality, including biodiversity and climate change mitigation and adaptation.

In 2015, the government approved the Forest and Related Sectors Development Strategy to 2020, which set the goals of managing forests sustainably and improving education and skills related to the forestry industry. The strategy, however, highlights the lack of biodiversity data and monitoring in commercial forests, the absence of requirements for forest habitats and the need for targets on the share of forests to be included in protected areas. The next policy strategy for the sector beyond 2020 should ideally fill these gaps.

The 2014 Rural Development Programme to 2020 is another sectoral strategy that includes a biodiversity dimension, but biodiversity and nature conservation are not directly reflected in policy documents regarding transport, education or science.

As an active international player, Latvia is a party to several conventions and international agreements related to biodiversity, including the CBD and Sustainable Development Goals (SDGs). Stronger efforts would be required to fully integrate CBD targets into national objectives (Table 5.3). Relative to OECD averages, Latvia is performing well on SDGs 14 (oceans) and 15 (biodiversity) (OECD, 2018a).

Table 5.3. Limited progress towards 2020 Aichi Biodiversity Targets and contributions to the relevant Sustainable Development Goals

	Targets	Progress
Aichi target 1	People are aware of the values of biodiversity	B - there are no specific national targets and indicators
Aichi target 2	Biodiversity values have been integrated into national and local development and poverty reduction strategies	B - there are no specific national targets and indicators
Aichi target 3	Subsidies harmful to biodiversity are eliminated, phased out or reformed	B - there are no specific national targets and indicators
Aichi target 4	Steps are taken to achieve or implement plans for sustainable production and consumption	B - there are no specific national targets and indicators
Aichi target 5	The rate of loss of natural habitats, including forests, is at least halved	A
Aichi target 6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably	B - there needs to be an additional evaluation
Aichi target 7	Areas under agriculture, aquaculture and forestry are managed sustainably	B - assessment of inter-relations between these policy sectors needs to be developed
Aichi target 8	Pollution, including from excess nutrients, is brought to levels that are not detrimental to ecosystem function and biodiversity	B - EU legislation on waste, air, soil, water policy is largely implemented
Aichi target 9	Invasive alien species and pathways are identified and prioritised	B - target will be approached according to new EU regulation
Aichi target 10	Anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised	N/A
Aichi target 11	At least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes	B - not achieved for terrestrial areas; achieved for marine ones
Aichi target 12	The extinction of known threatened species is prevented and their conservation status improved	B - see target 5
Aichi target 13	The genetic diversity of cultivated plants and farmed and domesticated animals is maintained	B
Aichi target 14	Ecosystems that provide essential services, including services related to water, are restored	B
Aichi target 15	Ecosystem resilience and the contribution of biodiversity to carbon stocks are enhanced	B - see target 10
Aichi target 16	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational	B - Nagoya Protocol will be implemented
Aichi target 17	Each party has developed a national biodiversity strategy and action plan	B - refer to national strategies
Aichi target 18	Indigenous and local communities and their customary use of biological resources are respected	B - see target 1
Aichi target 19	The science base and technologies relating to biodiversity are improved	B - refer to national strategies
Aichi target 20	The mobilisation of financial resources increases	B - refer to national strategies

Note: Assessment of the rate of progress in reaching the Aichi targets is expressed as A/B/C: A likely achieved; B positive, but insufficient progress; C no progress. Progress reflects self-assessment in the fifth national report to the CBD.
Source: MEPRD (2014).

Other international commitments are under the UN Convention on the Law of the Sea, the International Convention for the Prevention of Pollution from Ships and its Protocol (MARPOL), the Ramsar Convention on wetlands and the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Latvia is also a party to the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area and a member of its governing body, the Baltic Marine Environment Protection Commission (HELCOM). The convention provides the basis for co-operation among Baltic coastal states for the prevention of marine pollution. The related action plan sets out objectives to restore good ecological status to the Baltic marine environment. It was adopted by all coastal states in 2007, reflecting up-to-date scientific knowledge and management strategies. The action plan is revised every few years at the HELCOM ministerial meeting.

Latvia, Estonia, Finland and Sweden initiated the Good Environmental Status through Regional Co-ordination and Development (GES-REG) project, funded by the EU Central Baltic INTERREG programme, to implement requirements of the Marine Strategy Framework Directive. Countries exchange information and best practices on marine water use, develop scenarios and assess degradation costs. It has been estimated that the Latvian population may be willing to pay more than EUR 3.8 million extra annually to reach good environmental status in relation to marine biodiversity, water quality and invasive species, compared to a business-as-usual scenario. Willingness to pay can be considered recognition of the benefits gained from improvement in marine waters (SEI, 2014).

In addition, Latvia co-operates bilaterally with countries in the region. Since 2010 it has had an agreement with Finland on sharing experiences on protected areas management and awareness-raising initiatives. Latvia's Nature Conservation Agency (NCA) co-operates with the Estonian Environmental Board, and there are joint management plans for the Ramsar transboundary wetland complex of the Nigula Nature Reserve and Northern Bogs in Limbazi and Valmiera regions, the latter part of a UNESCO Biosphere Reserve. Another agreement is in place with Belarus on the management of transboundary protected areas.

5.3.2. Institutional framework

National level

Latvia has a centralised governance system relating to the environment and biodiversity, which has remained stable over the past decade. The Ministry of Environmental Protection and Regional Development (MEPRD) is responsible for the design and implementation of biodiversity policy. Within the ministry, the Nature Protection Department oversees work on species, habitats and protected areas. The ministry is also responsible for water management, pollution prevention, waste policy and climate change.

As is common in OECD countries, other ministries share competences related to biodiversity policy. Forestry, fisheries and agriculture are within the purview of the Ministry of Agriculture. Stronger co-ordination between it and the MEPRD would provide an opportunity to better mainstream biodiversity and reconcile sometimes conflicting priorities.

Institutions with biodiversity-related competences that work under the auspices of the MEPRD and the Ministry of Agriculture are:

- NCA, the implementation agency for biodiversity policy. It is responsible for management and control of protected areas, biodiversity monitoring and administration of certain compensation. It is also the competent authority for the control of international trade in endangered species.

- State Environmental Service, the enforcement authority (Chapter 2). It comprises a central office in Riga and eight regional offices. It is responsible for monitoring compliance with fishery legislation in inland waters and the sea.
- Environment State Bureau, which co-ordinates EIA and strategic environmental assessment (SEA), as well as EIA in transboundary contexts (Chapter 2). EIA and SEA are conducted on all projects and plans with expected environmental impact.
- Latvian Environmental Protection Fund (LEPF). It supervises and administers the national funding for environmental protection projects.
- State Forest Service, under the Ministry of Agriculture, establishes and oversees micro-reserves in forests.
- Rural Support Service, under the Ministry of Agriculture, administers part of the EU payments for protected areas, mostly Natura 2000.

5.4. Biodiversity monitoring and information

Latvia lacks a comprehensive national approach to mapping and assessing ecosystems and their services. An ongoing project to map terrestrial ecosystems (see below) and other ad hoc projects help address data gaps and improve biodiversity knowledge. Acquiring solid biodiversity information is a key prerequisite for effective and efficient policy making, e.g. on identifying forests' biodiversity value and required protection levels. It would also allow for the establishment of business-as-usual baselines and the quantification of benefits and targets. Policy makers should make effective use of this information to plan future work and to determine monetary values for ecosystem services.

A 2017 European Commission report indicates there are significant gaps in the knowledge base required for implementation of the Habitats and Birds directives. Designations done in 2004 have not been updated, which undermines science-based assessment of the state of habitats and species (EC, 2017a).

Latvia has undertaken an assessment of its marine ecosystems, and is currently mapping terrestrial ones. It carried out a Mapping and Assessment of Ecosystems and their Services (MAES)[2] for its marine waters in 2016, in the framework of the Maritime Spatial Plan[3] (Section 5.5.1). The assessment mapped areas of high ecological value, focusing on sea bottom (benthic) habitats but also considering pelagic habitats. The mapping has some limitations, in that data for part of the coastal waters were available on distribution of benthic habitats, algae, birds and fish species, while for most of EEZ data were available only for fish distribution. Marine ecosystem services were also studied, including filtration of nutrients, carbon storage, provision of food for fish, and cultural services.

The project provided valuable information to maintain essential services of marine ecosystems, as well as related benefits to people and the environment. Policy makers should use the marine MAES to evaluate scenarios for activities having an impact on marine waters and identify appropriate solutions for ecosystem conservation. In addition, the results should be used in SEAs and information campaigns (BISE, 2016).

In 2016 Latvia started a project to map terrestrial ecosystems with the support of the EU Cohesion Fund. The key objective is to gain information on the extent and quality of habitats of EU importance.

Additional projects are funded by the EU LIFE programme, which supports Natura 2000 sites and other projects on forests, grasslands and marine ecosystems (Box 5.2). In addition,

there are specific programmes for certain bird species, some carried out in co-operation with other Baltic states. The NCA is primarily responsible for biodiversity monitoring, with a dedicated budget of around EUR 400 000 per year. It maintains the Ozols (Oak) online information system, which includes information on protected areas, micro-reserves, protected species and habitats, and management activities.

The LEPF is implementing an overarching project on environmental monitoring, which mostly focuses on improving monitoring equipment to be able to monitor inland and marine waters, hogweed regions, and birds and bat migration routes. Not all project activities are strictly related to biodiversity monitoring. Its overall cost is estimated at EUR 7 million, 84% of it from the EU Cohesion Fund, 12% from the national budget and 4% self-financed (LEPF, 2018).

Box 5.2. Kemeri National Park

Kemeri National Park, established in 1997, is the third-largest national park in Latvia, covering over 380 km². The park comprises around 30 habitats of EU priority, such as mire woods, black alder swamps, raised bogs and rich fens, and is home to several species of birds and wildlife, with a varied landscape that makes it a popular attraction. The main threats include degradation of bog habitats caused by drainage, river straightening, overgrowing of meadow areas and blocking of watercourses by dams.

Over half the park is forested. One-quarter is bogs, which are the main tourist attraction, while 10% is occupied by lakes, rivers and sulphur springs. Lake Kaņieris is designated as an internationally important wetland under the Ramsar Convention and is an important site for migratory and nesting bird species.

HYDROPLAN is the most recent LIFE project, running from 2011 to 2019. The key objectives are to restore natural or semi-natural hydrological conditions in three wetland ecosystems affected by drainage, carry out research and build a system for long-term monitoring of activities. The hydrological restoration of the Zalais Purvs bog entailed filling up 68 km of ditches with peat and stopping the water flow by building around 500 dams. As a result, the hydrological regime was restored in a total area of 550 ha. Additional hydrological restoration was conducted in Skudrupīte meadows, where a riverbed was re-meandered, increasing the river length. Now, during floods, the water spreads over a larger area, thereby providing the natural hydrological regime for floodplains on 85 ha. Stones were added to the river for water purification and to provide habitats for animals.

Source: Ķuze et al. (2007); LIFE (2018).

5.5. Policy instruments for biodiversity conservation and sustainable use

As in most OECD countries, conservation measures in the form of protected areas have traditionally been Latvia's focus for safeguarding biodiversity, while less attention has been devoted to sustainable use of resources. To strike a balance between these two concepts and increase opportunities to conserve biodiversity, approaches complementary to protected areas could be sought to enhance the capacity of rural activities (forestry, fishing and agriculture) for maintaining high biological and physical diversity in their managed areas. Expanding the use of voluntary and economic instruments could help balance trade-offs between biodiversity objectives and economic activities.

5.5.1. Regulatory instruments

Regulatory (command-and-control) approaches for biodiversity conservation and sustainable use are common in most OECD countries, and protected areas are a key instrument. In Latvia, the protection of species and habitats is ensured through specially protected nature territories (SPNTs) and micro-reserves. Within SPNTs and micro-reserves, 333 sites are part of the Natura 2000 network. Micro-reserves provide conservation of protected species and habitats outside the SPNT system or in areas within them requiring additional protection (Pierhuroviča and Grantiņš, 2017).

Other regulatory instruments applied to conserve wild fauna and flora range from prohibition of exploitation of certain species, hunting and fishing restrictions, and measures to control artificial propagation of certain plants. The NCA compiles information on measures chosen and assesses their impact (Pierhuroviča and Grantiņš, 2017).

Latvia's six sites designated as wetlands of international importance (Ramsar sites) have a total surface area of 1 503 km^2. Most are nesting areas for internationally significant bird species (such as *Ciconia nigra, Aquila pomarina, Crex crex*) and some are recreation and tourism destinations (Ramsar, 2014).

Latvia currently lacks a national strategy for green infrastructure.[4] A 1998 plan to establish one was never implemented. The 2020 national development plan and the 2030 Sustainable Development Strategy include green infrastructure targets such as increasing the organic farming area, expanding forest coverage and developing green corridors. There have been some green infrastructure initiatives, including LIFE projects and cross-border co-operation initiatives with Lithuania. However, further efforts are needed to increase connectivity between habitats and collect information about green infrastructure. Latvia would benefit from a strategic national policy framework for green infrastructure development, stronger know-how and awareness among decision makers (especially at the local level), broader public participation and mechanisms for cross-sectoral co-ordination (EC, 2018; EC, 2019).

Protected areas

SPNTs are geographically defined areas categorised as nature monuments, protected landscapes, national parks, nature parks, strict nature reserves, biosphere reserves, nature reserves and protected sea territories. They can also be divided into functional zones with different protection levels (Pierhuroviča and Grantiņš, 2017).

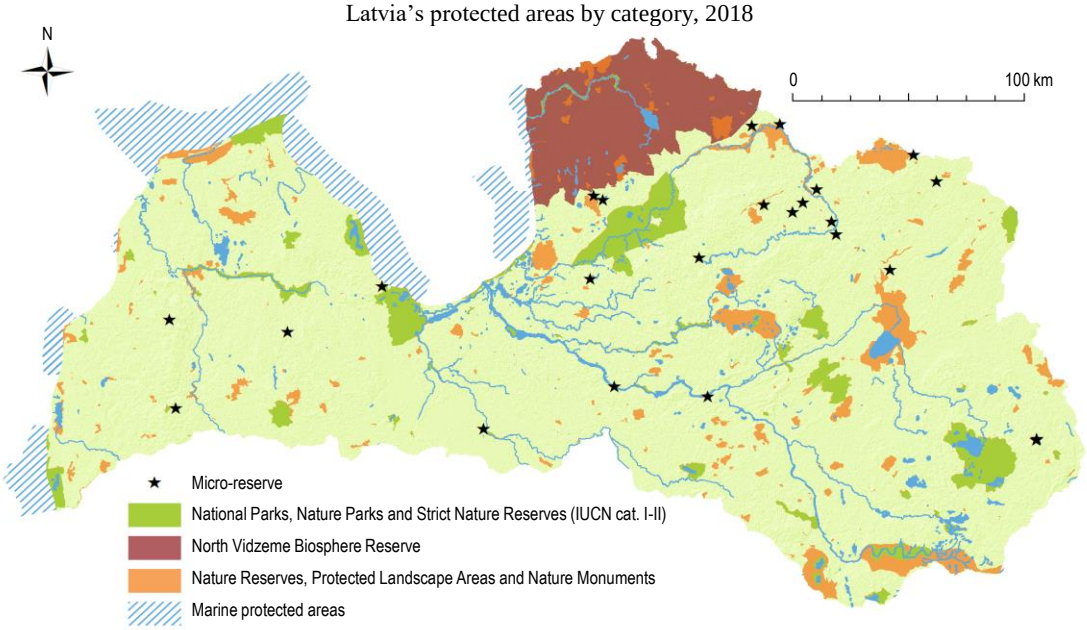
The latest EU assessments show insufficient designation of terrestrial Sites of Community Importance (SCIs)[5] under the Habitats Directive, although Latvia is in line with the EU average. There are 333 Special Areas of Conservation (SACs) under the Habitats Directive, covering an area of 12 241 km^2 (7 877 km^2 terrestrial and 4 364 km^2 marine). There are 102 Special Protection Areas (SPAs) under the Birds Directive covering 6 610 km^2 (6 184 km^2 terrestrial and 426 km^2 marine) (EC, 2017a). There are significant overlaps between SACs and SPAs. The latest nature reserve for inclusion into the Natura 2000 network was designed in 2013.

In 2004, when the Natura 2000 network was established, Latvia designated a majority of SPNTs as Natura 2000 sites, except for the North Vidzeme Biosphere Reserve and many nature monuments. Natura 2000 areas now cover about 12% of the land area (the EU average is around 18%) and total SPNTs 18.2% (Figure 5.3).

Seven marine protected territories were established in early 2010 (MEPRD, 2014). In total, marine protected areas amount to 16.4% of the EEZ.

Figure 5.3. Natura 2000 is the key instrument to protect biodiversity

Latvia's protected areas by category, 2018

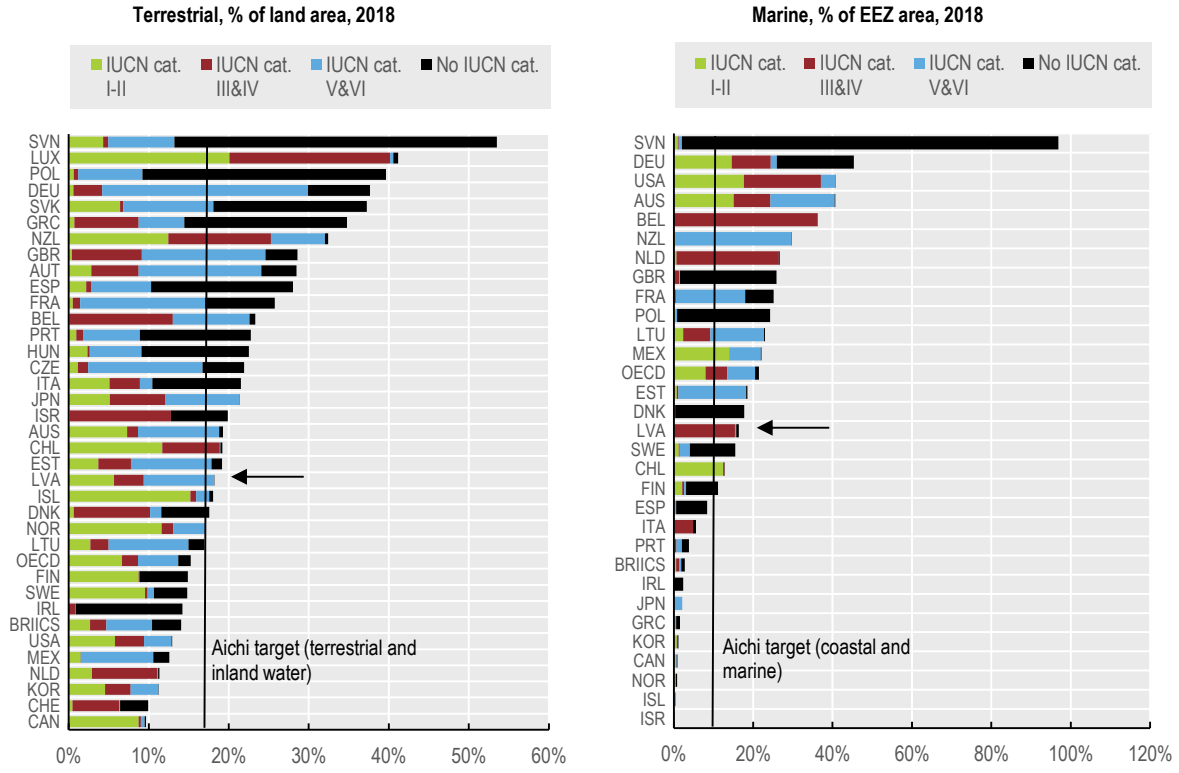


Note: With the exception of the North Vidzeme Biosphere Reserve and several nature monuments, nationally designated protected areas in Latvia are also designated protected areas under Natura 2000 (e.g. SACs and SPAs).
Source: IUCN and UNEP-WCMC (2018), *The World Database on Protected Areas*.

Latvia achieved 2020 Aichi target 11 on marine and terrestrial areas (Figure 5.4). The target calls for reaching at least 17% of terrestrial and inland water and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, conserved through effective and equitable measures. Latvia achieved the marine target in 2010 by establishing new marine protected areas, though these are mainly located in territorial waters while areas in the EEZ could be investigated more (MEPRD, 2018).

Nature management plans have been developed for the management of Natura 2000 sites with the support of EU funds and the LEPF. Protection and management regimes can vary from minor restrictions to absolute prohibition of any activity. In many nature reserves, economic activities, such as farming, mowing, grazing and forest management, are allowed (Pierhurovič a and Grantiņš, 2017). Less than 40% of protected areas have management plans. The Environmental Policy Strategy aims at reaching 55% of protected areas with management plans by 2020. Additional targets related to Natura 2000 include mapping and setting conservation objectives for all species and habitats of EU importance and increasing the available annual funding. For most indicators the baseline data show that a significant effort is needed to reach the 2020 objectives (Section 5.3.1).

Figure 5.4. Latvia achieved the Aichi targets for terrestrial and marine protected areas



Note: IUCN categories reflect management objectives. Categories I and II refer to strict nature reserves, wilderness areas and national parks. Categories III and IV refer to natural monuments and habitat/species management areas. Categories V and VI refer to protected landscapes/seascapes and areas with sustainable use of natural resources. Other nationally designated areas with no IUCN category are grouped with regionally and internationally designated areas. Data refer to metropolitan or mainland countries, not including overseas territories. TUR: data not available (according to official national sources about 9% of the territory is protected). EEZ = exclusive economic zone.
Source: OECD (2018), "Biodiversity: Protected areas", *OECD Environment Statistics* (database).

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The Environmental Policy Strategy has a target on elaboration and implementation of management plans for species and habitats, which is also mandated by the Law on Conservation of the Species and Biotopes. Suggestions about protection of species and habitats can be submitted by any person or organisation. There are management plans covering 18 animal species, but half need updating. Five plans under development will cover 17 further species: woodpeckers (7 species), owls (6), seals (2) and bats (2).

The NCA sets yearly priorities for species and habitats in need of management plans. Similarly, it determines the priority order for setting management plans for Natura 2000 sites. Implementation is a challenge due to human and financial resource constraints.

In accordance with Article 6 of the Habitats Directive,[6] there is a special EIA procedure for planned projects in Natura 2000 sites. It is governed by a 2011 regulation establishing consultations with the NCA during the EIA procedure: once after the initial screening and again when the study is prepared, following public consultations. During the assessment, all available information (e.g. from the Ozols information system) is taken into account. In case of information gaps, a certified expert may be engaged to research additional information. EIAs for Natura 2000 sites have recently decreased, from 31 assessments in 2015 to 25 in 2017.

Spatial planning

Biodiversity-related considerations are included at different levels of spatial planning, but it is unclear how biodiversity objectives are weighted against competing priorities. SEA is performed for all planning documents with expected significant impact, including on land use (Chapter 2).

Spatial planning at the national level is governed by the Sustainable Development Strategy to 2030, the National Development Plan to 2020 and the Maritime Spatial Plan. According to the Sustainable Development Strategy, the government should introduce a plan for the preservation and restoration of natural capital, which would also include spatial planning of nature preservation and restoration. In order to do so, the strategy calls for estimating and mapping natural capital and developing target indicators.

The Maritime Spatial Plan, approved in 2019, is a long-term spatial development planning document that defines the use of the sea. Marine protected areas (part of Natura 2000) are established under the plan to protect habitats and species and ensure feeding and wintering grounds of water birds.

Regional strategies cover planning of natural areas, including the SPNT network, culturally and historically significant territories and valuable territories such as scenic landscapes. Local plans define functional zones, including building, industrial, transport, nature, forest and agriculture (Pierhuroviča and Grantiņš, 2017).

5.5.2. Economic instruments

Latvia complies with the OECD acquis on biodiversity, which recommends the use of economic instruments in the conservation and sustainable use of biodiversity.[7] Environmentally related taxes, charges and fees are some of the more commonly used economic instruments for managing biodiversity across OECD countries. Payments for ecosystem services and environmentally motivated subsidies are also commonly used (OECD, 2012). Latvia applies some subsidies, taxes, charges and fees linked to biodiversity, but there is scope to expand the use of economic instruments.

The main instrument is the compensation to private owners for restrictions on economic activities in SPNTs, which can be considered a form of payment for ecosystem services (PES). Established in 2006, it has had a positive impact in fostering nature conservation. At the time, landowners could choose between one-off compensation or annual payments, the latter becoming the standard system after the 2008-09 economic crisis. Latvia needs to ensure that compensation is adequate to actually serve its PES purpose, especially in light of the ongoing habitat mapping project which may result in the designation of additional protected areas.

In 2013, the government adopted the Law of Compensation for Restriction on Economic Activities in Protected Areas. Compensation is co-financed by the European Agricultural Fund for Rural Development (EAFRD), which covers Natura 2000 payments on agricultural and forest lands. In addition, there are payments for maintaining biodiversity in biological grasslands and preservation of genetic resources of farming animals (MEPRD, 2014). Compensation in areas outside Natura 2000 is supported through the national budget and managed by the NCA. There are also tax exemptions for landowners in protected areas with full or partial restriction of economic activities (Pierhuroviča and Grantiņš, 2017).

The Law of Natural Resource Tax (2005, last amended in 2018) established a comprehensive tax levied on resources used for commercial activities (Chapter 3). The tax

aims at encouraging sustainable use of natural resources, reducing pollution and securing revenue for environmental protection measures. It is applied to, among other activities, extraction of peat, soil, construction materials, mud and thermal water. Rates have progressively increased, but the impact on biodiversity has so far not been assessed.

Other economic instruments are licence fees for fishing and hunting, deforestation and non-compliance fees related to forestry use, fishing and hunting permits, and liability charges for biodiversity damage. Latvia's liability regulation establishes a system for calculating environmental damage (when it is impossible to remediate) based on fixed rates, instead of attempting to reflect real damage (Chapter 2).

5.6. Financing biodiversity management

The national budget for nature conservation activities (including compensation) almost doubled over 2014-17. Between 2008 and 2018, public support was the main source of funding for biodiversity conservation and sustainable use. Project-based funding is provided by national funds, such as the Forestry Development Fund, the LEPF and the Fishery Fund , the latter two having seen their resources increase since 2008 (despite facing some cuts during the economic crisis of 2008-09). Since 2004, the funds have not earmarked resources and all tax revenue has gone into the central budget. The LEPF's budget is decided annually. Examples of projects related to biodiversity include elaboration and implementation of management plans, restoration of habitats and spawning grounds, replenishment of fish stocks and monitoring of species.

The Environmental Policy Strategy includes a target for resource mobilisation per hectare of Natura 2000 area: EUR 50/ha annually by 2020, starting from a baseline of EUR 14 in 2013 (Table 5.2). Funding comprises all available sources, including national funds and the EU.

Latvia has participated in the EU LIFE programme since 2000, receiving more than EUR 26.5 million. The programme has supported around 30 projects in the field of nature and biodiversity conservation. Eight are currently under implementation, including the protection of coastal habitats in the Piejūra nature park and the restoration of degraded bogs in the Northern European Lowland (UNFCCC, 2017).

As an EU member, Latvia benefits from structural funds, including on rural development (the EAFRD), as well as direct payments under the Common Agricultural Policy (CAP). The EAFRD is administered by the Ministry of Agriculture. More than 40% of the EAFRD is allocated to environmental and climate related measures aimed at improving agricultural activities and rural practices by incorporating environmental protection elements. These measures include the promotion of organic farming, which accounts for 13% of the fund (Section 5.7.3). As in all EU countries, Latvia allocates 30% of direct payments under the CAP to greening the sector, which entails three main obligations: crop diversification, maintenance of permanent grassland, and ecological focus areas.

In accordance with the Law on Scientific Activity (2005), every four years the government approves priorities for financing research. Environment-related research (including biodiversity and ecosystems) has always been among the priorities. In 2018, out of 397 project proposals, 73 (18%) were in the fields of climate change and nature protection, and 76 (19%) in the field of sustainable use of local natural resources.

For more effective financing of biodiversity management, Latvia would need to augment public financing with private-sector finance. For example, in the Netherlands, the

government provides financial facilitation and tax reduction to private investors that support green projects such as nature restoration (OECD, 2012).

5.7. Mainstreaming biodiversity into economic sectors

Latvia needs to better mainstream biodiversity into national objectives of other economic sectors. Many pressures on biodiversity stem from policies outside the purview of the MEPRD, such as forestry, fisheries and agriculture. Policies need to be aligned to harness synergies and minimise potential trade-offs. Mainstreaming can be interpreted in various ways. It can entail processes, outcomes or both, and can focus on sectors or be carried out at the national level. A recent term, "reciprocal mainstreaming", emphasises that biodiversity considerations should be integrated into all other policy agendas, and vice versa. Figure 5.5 presents a framework for developing an integrated approach to biodiversity management and mainstreaming (OECD, 2018b).

Figure 5.5. Assessment framework for biodiversity management and mainstreaming

Source: OECD (2018b), *Mainstreaming Biodiversity for Sustainable Development*.

Mainstreaming can also be achieved through specific policy instruments for the conservation and sustainable use of biodiversity outside protected areas. Some measures are described in the sectoral sections below, while additional options are listed in Box 5.3.

Box 5.3. Conservation and sustainable use of biodiversity outside protected areas

Biodiversity offsetting

Biodiversity offsets are measures that compensate for the residual impact of a development activity, ensuring that development activities yield no net loss, and preferably, a net gain on biodiversity. They are based on the polluter-pays approach in that developers incur an extra cost to mitigate the adverse residual impacts of their activities.

Several features must be considered in the design and implementation of biodiversity offsets in order for them to be effective. These include taking into account the mitigation hierarchy. Offsetting should be a last resort and should be employed only after appropriate measures have been taken to avoid, minimise and rehabilitate biodiversity on-site. It is also acknowledged that there are limits to what can be offset, referring to cases of irreplaceable or highly vulnerable biodiversity.

Biodiversity offsets can be applied in a variety of sectors, from the extractive industries to agriculture. Examples in the context of forestry are the Environmental Compensation for Land-Use Changes in Forested Areas Programme in Mexico and the offset programme under the Forest Code in Brazil.

Performance-based agri-environmental payments

These are payments that relate to the achievement of a defined environmental result or management requirement, and the farmer or land manager is allowed to choose the most appropriate way to achieve that result. Support considered potentially the most beneficial includes decoupled support payments based on non-commodity criteria (i.e. per hectare of agricultural land rather than per animal head), and support for farming practices beneficial to biodiversity.

Targeted quantitative restrictions on the use of agrochemicals (pesticides and fertilisers)

Regulatory approaches can be used to control input, sale and use. The Law on Environmental Protection (2014) in Viet Nam, for example, established that producers, distributors and users of pesticides must be registered and assessed for meeting legal standards. Absolute bans on certain agrochemicals (or other inputs) may be required in case of expected drastic, irreversible impacts.

Source: OECD, 2018b.

5.7.1. Forestry

Integration of biodiversity goals in forestry policy is a relatively long tradition. It became a common practice in Latvia and other countries in the Baltic region in the mid-1990s, when the "woodland key habitat" concept became an essential instrument for biodiversity conservation in forests (Timonen et al., 2010).[8] However, Latvia would benefit from developing a policy vision for the forestry sector to 2050. This policy vision should fully integrate biodiversity-related objectives and be support by sufficient resources.

Conservation measures and economic restrictions are in place only in small shares of forests. Expanding these tools to include other economic and voluntary instruments outside

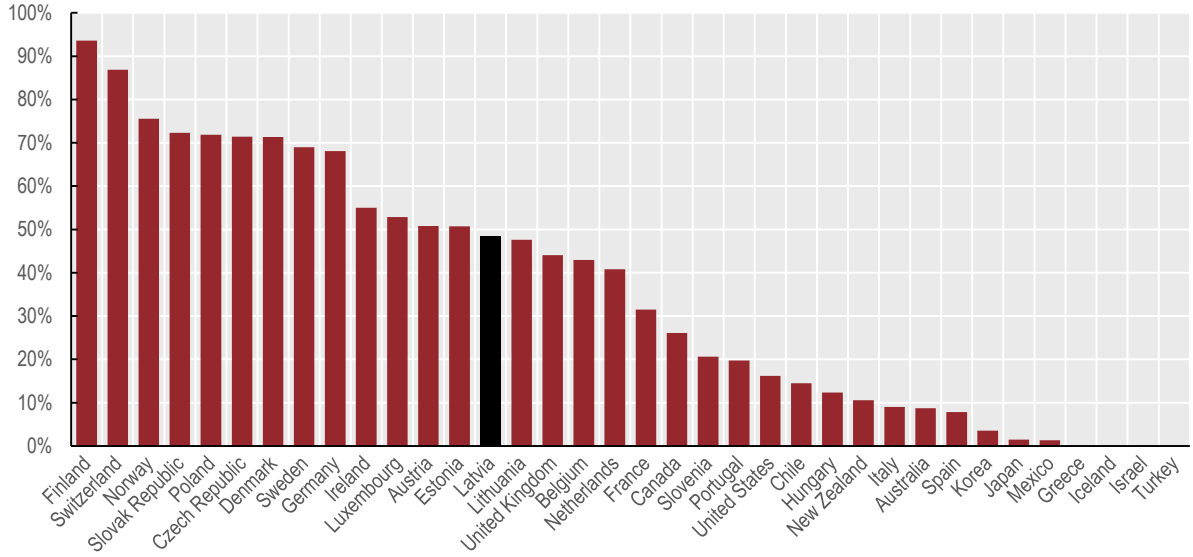
protected areas could help balance the trade-offs between biodiversity conservation and sustainable use of forest resources.

Protected forests represent 17.5% of total forests (MEPRD, 2014). Current forest management largely entails restrictions on economic activities in around 14% of forests (including outside protected areas), with around 3% of forest under strict protection (no economic or forestry activity allowed). Latvia is among EU countries providing compensation to a large area of forest in Natura 2000 areas (around 34 000 ha), but less than Hungary (115 000 ha) and Estonia (73 000 ha). Latvia exceeded its targets for supporting forest holdings over 2007-15, meaning it compensated more forest owners than intended (Sarvašová et al., 2019).

Outside protected areas, nature protection is ensured by sustainable management certification. About half of forests are certified by the Forest Stewardship Council (FSC), which certifies environmentally sound, socially beneficial and economically prosperous forests, and the Programme for the Endorsement of Forest Certification. The relevant indicator is not very high when compared with other OECD countries with intensive use of forest resources, such as Finland, which has more than 90% of forests under sustainable management certification. Estonia and Lithuania are at about the same level as Latvia (OECD, 2017) (Figure 5.6). The majority of forests are public property and all state-owned commercial forests are certified according to the Latvian National FSC Standard, which includes woodland key habitat inventories (Timonen et al., 2010).

Figure 5.6. Half of forests are under sustainable management certification

Percentage of forests under sustainable management certification, 2010



Source: FAO (2015), *Global Forest Resources Assessment 2015: Country Report – Latvia*.

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Nature protection non-government organisations and the NCA stress that existing forest protection is not adequate at all sites, and no effective instrument exists to protect

high-priority forest habitats outside Natura 2000. Establishing micro-reserves would help, but thus far only a few have been designated for forest habitats.

The Law on Forests regulates economically, ecologically and socially sustainable forest management, including provisions for nature protection. It establishes that regulation will set specific provisions on genetic diversity, protection of wetlands and restriction of economic activities. The majority of state-owned forests are the responsibility of the Ministry of Agriculture and managed by a state company, Latvian State Forests. The NCA manages state-owned forests in strict nature reserves and national parks. It monitors compliance in SPNTs and approves forest management plans for forest territories within national parks. Official forestry statistics are produced by the State Forest Service, National Forest Inventory, State Land Service and Central Statistical Bureau. Since 2008, the National Forest Inventory has been the main source of data (FAO, 2015).

From 1990, Latvian forest cover rose steadily, increasing by about 16% to 2008, and remaining stable since. The proportion of primary forests in Latvia (i.e. forests of native species, with no indication of human activity) has been stable in the past decade, albeit very small (around 0.5% of total forest area) and limited to nature reserves and national parks with the strictest level of protection. Compared with other European countries, such as the United Kingdom, Germany and Spain, where primary forests have disappeared, Latvia's effort to preserve them is commendable. Still, its share is significantly lower than those of countries like Canada, Korea and Mexico, which have more than 50% of primary forests. Estonia (3%) and Lithuania (1%) perform slightly better than Latvia. The majority of forests are naturally regenerated, while 18% are a result of planting and deliberate seeding. Planted forests do not necessarily represent a reduction or reversal in biodiversity loss, as plantation forests are often monocultures, thus supporting less biodiversity than natural ones. They may also replace more biodiverse types of habitat, such as grasslands (OECD, 2012).

Afforestation, which refers to the process of establishing a forest on land not previously forested (or not forested for a long time), more than doubled between 2008 and 2012. Most afforestation is done on abandoned agricultural land (Ruskule, 2012). Reforestation, referring to natural regeneration or re-establishment of a forest on land with recent tree cover, slightly increased between 2005 and 2015, by 5%.

Deforestation has significantly decreased (by 27%), as the trend was offset by the rise in afforestation. In 2012, deforestation amounted to around 3 km^2 per year (FAO, 2015). It is mostly driven by infrastructure development. It requires a permit and payment of a fee to cover potentially negative effects. The government establishes the amount of and criteria for the fee according to a formula that takes into consideration reduction of CO_2 sequestration, decrease in biodiversity and cost of replantation (Pierhuroviča and Grantiņš, 2017). In 2017, the State Forest Service received 1 070 deforestation applications, a 50% increase from 2016, with corresponding fees growing more slowly (by 18%).

The global economic crisis weakened the forest administration system in terms of staff and financial resources. The State Forest Service went from a budget of USD 37.3 million and almost 2 000 employees in 2008 to USD 16.9 million and 700 employees in 2013. Moreover, restrictions on performance of economic activity have decreased in recent years (Pierhuroviča and Grantiņš, 2017). Inspections of protection requirements of habitats and species remained stable between 2011 and 2017, while inspections for compliance in SPAs decreased by 30%. This is probably due to lack of resources in the NCA, which inspects compliance with protection regimes and detects violations such as illegal logging or fishing, and tree cutting in protected areas.

Fisheries and aquaculture

Latvia has a strong fishery tradition, which reflects its geographical position. The sector comprises fishing, aquaculture and fish processing. The Baltic Sea and Gulf of Riga are the main fishing grounds and marine catches represent an important natural resource. The main pressures on marine biodiversity relate to intensive fishing, bycatch and invasive alien species (EC, 2017a).

Fish stocks in the Baltic Sea are subject to national quotas set by the EU. Latvian quotas have declined over the last decade and they have been used in full. Quotas are not tradable, although there is a system to transfer or exchange them among companies. For inland waters there are total catch limits or limits per fish species in each water body. Commercial fishing in inland waters accounts for a small fraction of catches compared to fishing in the Baltic Sea (500 t/year vs 6 000 t/year), with bream and lamprey being the dominant species and angling being widespread. Latvia is above the OECD average in fish catches per capita. The fishing industry may have to undergo transformation in the future to move towards a more sustainable use of fish resources (GoL, 2018).

The Fishery Law regulates the conservation, monitoring and use of fish resources. It determines types of fishing and restrictions based on areas, gear and methods. The Ministry of Agriculture issues licences for commercial fishing in the Baltic Sea, while municipalities do so for inland waters. Licences are granted for five years, with fees of EUR 71.14 for fishing in international waters, EUR 35.57 for the Baltic Sea deeper than 20 meters and EUR 14.23 for coastal waters or inland waters. Additional licences are required for angling.

Inter-ministerial co-operation is essential to bring relevant stakeholders together to develop strategies and plans that take various dimensions of sustainable fisheries into account. The Fishery Advisory Council brings together government representatives with fishery organisations, and the Advisory Council for the Sustainable Use and Management of Latvia's Internal and Marine Coastal Waters Resources, which promotes the co-operation between associations and the state administration, including local governments to work on the sustainable use and management of inland and marine water resources.

Latvia approved the Multiannual Framework for Aquaculture Development 2014-20, in line with the EU Common Fisheries Policy. In the framework, aquaculture activities are considered an alternative source of fish for consumption that could help lower the pressure on natural resources. Aquaculture can in fact have both positive and negative impacts on biodiversity. While it is positive to reduce overexploitation and promote species diversity, there are risks related to water pollution, escape of non-native species (which can become invasive) and disease transmission to wild fish.

There are 160 aquaculture farms registered with the Food and Veterinary Service. Five are state farms involved in replenishing fish stocking in natural water bodies, while the rest are private. Since 2008, aquaculture production has steadily increased (by 35%), but Latvia has the second lowest level of production among OECD countries. The main species produced are carp, trout, goldfish, pike, catfish and sturgeon.

The European Maritime and Fisheries Fund (EMFF) has allocated EUR 34.7 million over 2014-20 for further intensification of aquaculture (43% of pond fish farming activities located in Natura 2000 areas) (EC, 2017a). It is supported by an operational programme setting biodiversity-related measures and relevant targets, with a focus on aquaculture. Other priorities include promoting environmentally sustainable, resource efficient, innovative, competitive and knowledge-based fisheries.

The Latvian Fishermen's Producers Organisation meets the Marine Stewardship Council standard for sprat fishery in the central Baltic Sea. Latvia is the first Baltic state to obtain sprat certification. Some Latvian companies have undergone certification for pelagic trawl.

5.7.2. Agriculture

Agricultural production both depends on biodiversity and has an impact on it. Agriculture is a priority sector for biodiversity mainstreaming in many countries around the world. Latvia is not fully integrating biodiversity considerations into the agricultural sector. As with all sectors, a clearer understanding of the key pressures on biodiversity is needed so as to prioritise the mainstreaming efforts accordingly. India and Uganda, for example, monitor biodiversity conservation in agriculture through their sectoral policies. France's latest Biodiversity Law includes agricultural elements, such as a ban on certain pesticides and authorisation of free vegetable seed exchanges between farmers to preserve agricultural biodiversity (OECD, 2018b).

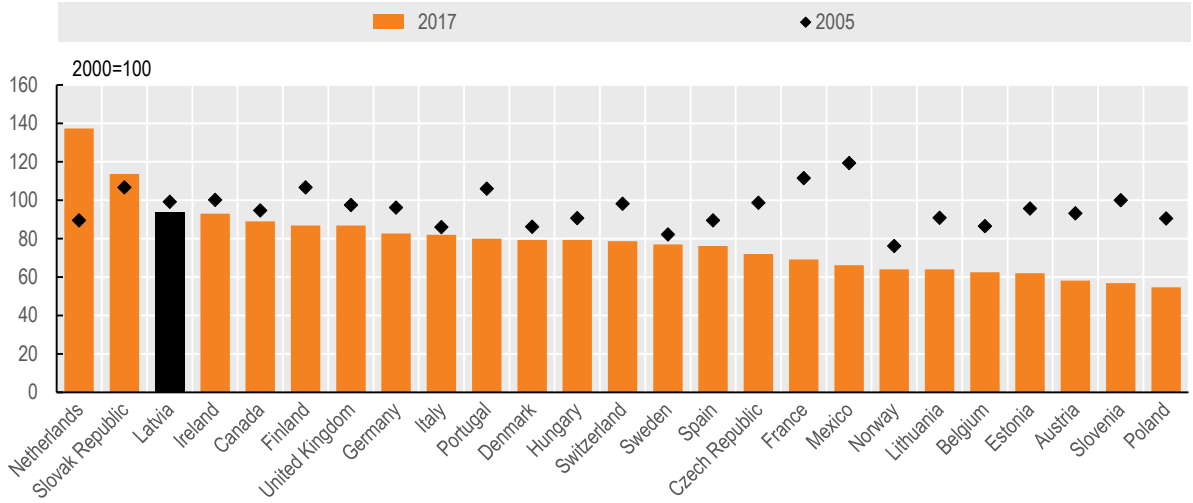
The Farmland Bird Index, a barometer of change for biodiversity on agricultural land, shows that Latvia is among the top three OECD countries in terms of farmland bird population, signalling that agricultural land is more favourable to birds and to biodiversity in general than in many other countries (Figure 5.7). An evaluation of the Rural Development Programme for 2007-13 showed that farmland bird population improved in territories that received payments from the second CAP axis (related to agri-environmental programmes, Natura 2000, afforestation and other biodiversity protection payments). However, some other indicators of biodiversity quality, such as botanical quality of grassland habitats, have deteriorated (OECD, 2019). Natural and managed grasslands are biologically the most important, but cover only 0.3% of the territory. Traditionally, grasslands were managed by grazing and mowing, which have been significantly reduced (MEPRD, 2014).

The Law on Agriculture and Rural Development mentions maintenance of landscapes and the biological diversity of the environment, with no additional specifications. The 2014-20 Rural Development Programme, under the CAP, aims at restoring, preserving and enhancing ecosystems related to agriculture and forestry. The target is to manage 14% of the agricultural area in a more environment-friendly manner by 2020, which entails restoring, preserving and enhancing ecosystems related to agriculture (EC, 2018).

One goal of Latvia's Sustainable Development Strategy until 2030 is to increase the share of land in organic farming to above 15% of total agricultural land by 2030. The share rose from 6.8% in 2005 to 13.5% in 2017, and in 2016 was the sixth highest in the EU (Figure 5.8). Organic farming can benefit biodiversity by reducing the use of chemical fertilisers and pesticides and limiting livestock density. However, additional use of manure needs to be managed carefully to prevent increased ammonia emissions and nitrate leaching.

Figure 5.7. The farmland bird population in Latvia is among the highest in the OECD

Farmland bird index, selected OECD countries, 2005 and 2017

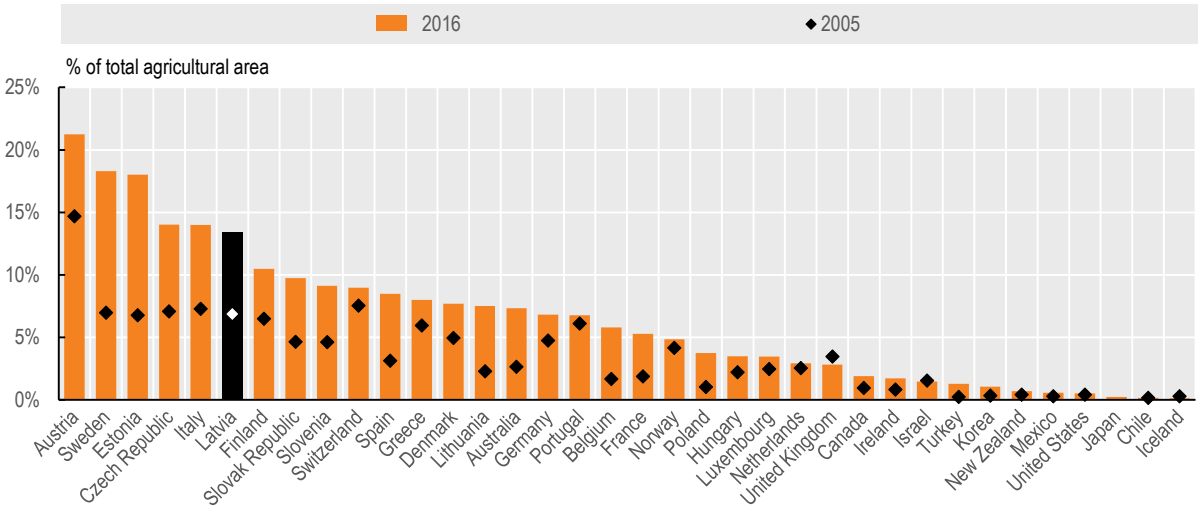


Note: 2017 or latest year available; 2005 or closest year available.
Source: OECD (2019), "Environmental performance of agriculture - indicators", *OECD Agriculture Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933969829

Figure 5.8. Organic farming is growing

Organically farmed area as a percentage of total agricultural area, OECD countries, 2005 and 2016



Note: 2016 or latest available year.
Source: OECD (2019), "Environmental performance of agriculture - indicators", *OECD Agriculture Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933969848

Latvia subsidises producers through credit subsides and relief on the diesel fuel excise tax. Some support to farmers is also based on animal numbers and production volumes, thus

negatively affecting the environment by favouring more intensive practices. Subsidy programmes should be carefully assessed, monitored and time-bound. Payments per hectare of grass rather than per animal head could be a first step towards greening the sector (OECD, 2019).

Subsidies are provided through the EAFRD and CAP (Section 5.6). Farmers are supposed to show compliance with the three obligations that are good for the environment (soil and biodiversity in particular) and for climate. They are allowed to meet the requirements though alternative practices, including other agri-environment-climate measures or certification programmes, which grant a similar level of benefit for the climate and the environment (EC, 2017b).

The majority of farmers have limited financial resources. In 2013 the country had a high share of semi-subsistence farms (56.5%) with direct payments provided by the CAP (EC, 2018). CAP subsidies have not been used in Latvia to invest in innovation. Financial support and policy incentives are mostly used to purchase machinery, upgrade farms with technology and invest in buildings (OECD, 2019). Credit subsidies could be used for investments towards more sustainable and environmentally friendly production methods.

Box 5.4. Increasing tourism initiatives related to biodiversity

In Pape Lake, situated in the Pape Nature Reserve, close to the Lithuanian border, the local government has invested in cane-cutting machines to increase fish resources and thus contribute to fishery development, while at the same time providing an ecotourism attraction. The EMFF contributed around EUR 12 000 for this initiative.

Green Routes without Obstacles was launched to facilitate cross-border ecotourism for people with mobility issues. The accessibility of several places was improved in Latvia (Rāzna National Park, Ezernieki), Lithuania (Grazute Regional Park) and Belarus (Zaboriye).

The objective was to contribute to equal opportunities in nature tourism by adapting infrastructure and educating tourism service providers. Information leaflets were developed and distributed to relevant organisations. To test the infrastructure, a 300-km cross-border marathon for people in motorised wheelchairs was organised. The NCA received EU support of around EUR 150 000 for this project.

Source: EC (2014); ENPI (2015).

5.7.3. Tourism

More efforts to better integrate biodiversity and tourism policies are needed. Setting fees for tourist operators in protected areas and fostering opportunities for ecotourism could help integrate biodiversity goals and provide additional resources to the sector.

The number of tourists visiting Latvia grows every year; it more than doubled between 2009 and 2017 (CSB, 2018). Baltic landscapes are of great importance in terms of both cultural and natural heritage, and the coastline is one of Latvia's preferred tourism destinations. While Latvia does not systematically collect tourism data related to biodiversity and protected areas, surveys conducted in 2014 and 2015 indicate that a majority of tourists chose natural areas, including water bodies and the seashore, with 14%

of respondents indicating they visited protected areas. This suggests that nature-based tourism is economically important.

Increased tourism however, if not well-managed, can have a negative impact on biodiversity from ecosystem degradation, habitat fragmentation, pollution and disturbance of endangered species. Tourism is mostly seasonal in Latvia, peaking in the summer. Climate change may affect the sector, in terms of both risks and potential benefits, the latter including longer summers and increase in related activities (UNFCCC, 2017).

Tourism and leisure impacts (such as excessive trampling), as well as expansion of built-up areas, are among the main threats to coastal habitats. Although SEA is required for planning documents related to tourism, among other sectors, additional action is needed to prevent loss of habitats and species.

The Concept of Latvian Tourism Development (2014-20) indicates sustainability is a key element of successful tourism development. In 2016 the government adopted the National Long-term Thematic Plan for Public Infrastructure Development of the Coastal Area through 2030, which focuses on tourism and recreation. While the plan recognises that protection of habitats and species is a key challenge, it includes no biodiversity-related objectives or indicators (GoL, 2018). The Latvian Association of Rural Tourism awards green certificates to sustainable guest houses (Chapter 2). There are ad hoc initiatives aimed at fostering ecotourism (Box 5.4).

Recommendations on biodiversity conservation and sustainable use

Strengthening the policy framework

- Develop a national biodiversity strategy and related implementation plan, with measurable targets, clear indicators and adequate human and financial resources for implementation.

Improving biodiversity knowledge

- Complete the comprehensive mapping of terrestrial ecosystems.
- Define research priorities and identify key data gaps and biodiversity pressures on marine and terrestrial ecosystems; assess the economic value of biodiversity and ecosystem services, and the cost associated with their loss, to better support policy implementation.
- Strengthen dissemination of biodiversity-relevant information to improve awareness among policy makers and the public.

Implementing effective policy instruments and financing mechanisms

- Update and complete the designation of protected areas; ensure that all ecologically important areas have management plans; develop additional management plans to meet the national target and allocate sufficient human and financial resources for implementation.
- Extend the use of economic instruments for biodiversity management; explore opportunities to increase payments for ecosystem services for forest conservation.
- Develop a comprehensive financing strategy to encourage private sector investment and reduce reliance on project-specific EU support.
- Systematically integrate biodiversity conservation objectives into land-use planning; ensure that biodiversity is effectively considered in SEA.
- Develop a strategic policy framework for green infrastructure and improve wildlife corridors to reduce fragmentation of habitats.

Mainstreaming biodiversity in forestry, agriculture and tourism

- Ensure that the next forestry policy strategy includes a long-term vision for sustainable management, with biodiversity-related objectives and sufficient resources, and is developed with wide participation by all relevant stakeholders; implement additional economic and voluntary instruments to ensure the sustainable use of forests outside protected areas and to improve the status of forest habitats (e.g. voluntary offset programmes, sustainable forest/timber certification, green public procurement for timber).
- Strengthen the link between agricultural support and environmental performance by, for example, decoupling payments to farmers from production requirements; efficiently use agricultural inputs; promote organic farming to achieve the national 2030 target.

- Collect information related to tourism in natural areas; pursue measures to mitigate the impact of tourism on biodiversity; identify areas with high tourism potential and develop eco-tourism in protected areas; consider introducing fees for tourism operators in protected areas.

Notes

[1] This directive, which aims to achieve good environmental status of EU marine waters by 2020, requires countries to prepare an initial assessment, including economic and social analyses, of their marine waters; to develop and implement a marine strategy; and to co-operate with other EU countries to ensure strategy coherence (EC, 2017a).

[2] MAES was established at the EU level to reach an objective of the EU Biodiversity Strategy to 2020. Countries are required to map and assess the state of national ecosystems and their services, assess the economic value of such services and promote the integration of this information into accounting and reporting systems at the EU and national levels by 2020.

[3] Developed in accordance with the Maritime Spatial Planning Directive (2014/89/EU).

[4] Green infrastructure is a strategically planned network of natural and semi-natural areas with environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas.

[5] SCIs are established under the Habitats Directive and Special Protection Areas (SPAs) under the Birds Directive. Once SCIs are approved, countries must designate them as Special Areas of Conservation (SACs) as soon as possible, within six years at the most. Adequate designation of protected sites as SACs and SPAs is a key milestone towards meeting the directives' objectives. SACs and SPAs generally correspond to Natura 2000 sites.

[6] Article 6 is one of the most important articles in the directive, as it defines how Natura 2000 sites are managed and protected. Paragraphs 6(3) and 6(4) lay down the procedure to follow when planning new developments that might affect a Natura 2000 site. Any plan or project likely to have a significant effect on a Natura 2000 area, either individually or in combination with other plans or projects, must undergo an appropriate assessment to determine its implications for the site.

[7] OECD Council Recommendation C(2004)81 – Recommendation of the Council on the Use of Economic Instruments in Promoting the Conservation and Sustainable Use of Biodiversity.

[8] Identification of key woodland habitats takes into consideration specific criteria, including minimum diameters of tree species, presence of old living trees, snags and logs, as well as animal and plant species (Timonen et al., 2010).

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LATVIA

Latvia has come a long way in improving its environmental performance and the well-being of the population. Large amounts of investment have helped increase the use of renewables, improve energy efficiency of homes, reduce greenhouse gas emissions and extend access to water and waste services. However, convergence with more advanced OECD economies is far from being accomplished. Forestry and agriculture play a key economic role, but exert increasing pressures on biodiversity. Mainstreaming biodiversity considerations into economic development policies should be a priority. Accelerating the transition towards a low-carbon and circular economy will require major investment in sustainable infrastructure, more waste prevention and recycling and stronger economic instruments.

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