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## Greening Lithuania's growth

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**ECONOMICS DEPARTMENT**

**GREENING LITHUANIA'S GROWTH**

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By Hansjörg Blöchliger and Sigita Strumskyte

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**ABSTRACT/RÉSUMÉ****Greening Lithuania's growth**

This paper provides an overview on Lithuania's environment and environmental policy. Environmental performance has improved since the mid-2000s. Greenhouse gas emissions declined and decoupled from growth over the past decade, yet per capita emissions increased. Transport and energy are the main sources of emissions and pollution, followed by agriculture and industry. There was much improvement in waste management practices, with a significant reduction of landfills. Yet Lithuania has the highest mortality rate from exposure to air pollution in the OECD. Energy efficiency is a concern, particularly in the housing sector. Pricing of environmentally damaging activities is low. Lithuania sets no CO<sub>2</sub> tax, has one of the lowest excise duties on motor fuel, petrol and diesel in the OECD, and has one of the largest 'diesel differentials', the gap in the price of diesel versus gasoline. It also provides among the highest subsidies to fossil fuels. In 2020, the country introduced a purchase tax for passenger vehicles which takes into account emissions. Against this background, the country has scope for increasing fossil fuel taxes and removing subsidies, to reach its ambitious environmental and climate management objectives and the net-zero carbon emission target by 2050.

This Working Paper relates to the 2020 OECD Economic Survey of Lithuania (<http://www.oecd.org/economy/lithuania-economic-snapshot/>)

JEL classification: Q20, Q28, Q58

Keywords: Environmental policy; climate change, pollution; Lithuania, greenhouse gas emissions, transport, energy, carbon tax

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**Écologiser la croissance de la Lituanie**

Ce document donne un aperçu de l'environnement et de la politique environnementale de la Lituanie. La performance environnementale s'est améliorée depuis le milieu des années 2000. Les émissions de gaz à effet de serre ont diminué et se sont découplées de la croissance au cours de la dernière décennie, mais les émissions par habitant ont augmenté. Les transports et l'énergie sont les principales sources d'émissions et de pollution, suivis de l'agriculture et de l'industrie. Les pratiques de gestion des déchets se sont beaucoup améliorées, avec une réduction significative des décharges. Pourtant, la Lituanie a le taux de mortalité due à l'exposition à la pollution atmosphérique le plus élevé de l'OCDE. L'efficacité énergétique est préoccupante, en particulier dans le secteur du logement. Le prix des activités nuisibles à l'environnement est faible. La Lituanie n'impose pas de taxe sur le carbone, a l'un des droits d'accise sur le carburant, l'essence et le diesel les plus bas de l'OCDE et l'un des plus grands «différentiels diesel», c'est-à-dire l'écart entre le prix du diesel et celui de l'essence. Le pays fournit également l'une des subventions les plus élevées aux combustibles fossiles. En 2020, le pays a introduit une taxe d'achat pour les véhicules de tourisme qui prend en compte les émissions. Dans ce contexte, le pays a la possibilité d'augmenter les taxes sur les combustibles fossiles et de supprimer les subventions, pour atteindre ses objectifs ambitieux de gestion environnementale et climatique et l'objectif de zéro émission nette de carbone d'ici 2050.

Ce Document de travail a trait à l'Étude économique de l'OCDE de la Lituanie, 2020 (<http://www.oecd.org/fr/economie/lituanie-en-un-coup-d-oeil/>).

Classification JEL: Q20, Q28, Q58

Mots clés: politique environnementale; changement climatique, la pollution, Lituanie, émissions de gaz à effet de serre, transports, énergie, taxe carbone

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# Greening Lithuania's growth

By Hansjörg Blöchliger and Sigita Strumskyte<sup>1</sup>

Lithuania's environmental performance has improved since the mid-2000s. CO<sub>2</sub> emissions have declined in relation to GDP and remain under the OECD average, suggesting that emissions are decoupling from economic growth. Lithuania has succeeded in reducing energy intensity slightly below the OECD average, although efficiency remains a concern, particularly in the housing sector. Waste management practices have considerably improved, with a significant reduction of waste going to landfills. With around 35%, forests cover a high share of land, and forested land is growing, helping offset as much as half of national greenhouse gas emissions. The share of nature reserves and other forms of protected land is growing fast.

Environmental sustainability and reaching ambitious environmental and climate objectives, however, remain a challenge. Lithuania has the highest welfare costs among OECD countries due to fine particle air pollution. Its overall greenhouse gas emissions per capita have increased over the last decade, while they have declined in the OECD as a whole. While the share of renewable energy is growing, this is partly due to the expansion of biomass, which is a polluting fuel and contributes to carbon emissions. There is scope to strengthen efforts in tackling pollution and waste and to improve raw materials and natural resource use, including by reforming tax-subsidy policies and improving public awareness. Lithuania does not levy a CO<sub>2</sub> tax and boasts some of the highest subsidies to fossil fuel in the OECD. A CO<sub>2</sub> tax could be designed to efficiently harmonise the payment by each sector in line with their contribution to environmental degradation and climate change. Finally, environmental standards and performance can be improved, and economic opportunities of the transition towards a low-carbon, circular economy, including by environmental public R&D spending, can be better exploited.

The COVID-19 crisis presents challenges and opportunities for environmental policy reform. The pandemic and the ensuing economic slowdown have reduced energy consumption, resulting in a decline in both greenhouse gases and local air pollutants. The extent to which pollution and emission patterns will resume once the economy recovers is largely unknown. As such, the lasting environmental effects will depend on the policy response to the crisis. The fiscal stimulus package approved in March 2020, which amounts to around 10% of GDP, has accelerated some investment programmes with an environmental goal, such as the Climate Action Programme and the multi-apartment building renovation programme, similar to the European Union's recovery plan. About 15% of the total is dedicated to improving energy efficiency, promoting renewable energy and enhancing competitiveness and reliability of the energy sector (European Commission, 2020<sup>[1]</sup>).

Environmental policy affects economic performance and well-being and vice-versa. Pricing and regulating the environment is likely to impact growth, productivity and employment, but not uniformly across sectors,

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firms, and households (OECD, 2019<sup>[2]</sup>) (Albrizio et al., 2014<sup>[3]</sup>). While similar policies across countries and economic actors can create a level-playing field, tighter environmental standards can increase barriers to entry and distort competition. Environmental standards may also impose transaction and administrative costs related to permitting and licensing (Berestycki and Dechezleprêtre, 2020<sup>[4]</sup>). Environmental policies need to be designed in such a way so as to minimise costs, facilitate the joint achievement of both economic and environmental goals and address distributional effects.

## Mainstreaming environmental goals

Lithuania set up a range of environmental policy plans over the past few years. In 2019, the government presented its long-term National Climate Change Management strategy in line with EU regulations, setting a net-zero carbon emission target by 2050. To support implementation, medium-term (2021-2030) mitigation and adaptation measures were set in the integrated National Energy and Climate Plan, with a special ambition for transport and agriculture. The National Air Pollution Reduction Plan was adopted in 2019, while in 2016, the government approved the National Environmental Protection strategy. The strategy sets out a range of principles, objectives and targets until 2030 along four main axes: sustainable use of natural resources and waste management, improvement of environmental quality, maintenance of ecosystem stability, and climate change mitigation and adaptation. Finally, the government is currently developing a comprehensive territorial plan (CPTRL), a spatial planning document that aims to reconcile economic activities with the protection of the environment and cultural heritage, the development of infrastructure and other goals (Government of the Republic of Lithuania, 2019<sup>[5]</sup>).

A main concern in the planning process is the sheer number of concurrent strategies related to the environment. Currently, there are over 200 strategic planning documents with various time spans. Ensuring the consistency of all these strategies and aligning them with Agenda 2030 is a challenge. In principle, every agency is guided by overarching strategies, in particular the National Strategy for Sustainable Development (NSSD) and Lithuania's Progress Strategy 'Lithuania 2030'. However, the last update of the NSSD, Lithuania's main strategic document on the SDGs, dates from 2011, *i.e.* before the UN Agenda 2030 was established in 2015. The National Voluntary Review to the UN in 2018 found that most of the SDGs and their targets are reflected in Lithuania's existing strategic planning documents (UN, 2018<sup>[6]</sup>). However, the review did not identify environment as a priority, although it assessed progress on all SDGs, including environment-related ones. Finally, compatibility between the NSSD and the National Progress Strategy 'Lithuania 2030' is unclear. In 2018, the government announced that it would update Lithuania's Progress Strategy 'Lithuania 2030' in line with the 2030 Agenda, and the work is ongoing.

## Achieving environmental targets

### ***Per capita reductions in greenhouse gas emissions are falling behind the OECD***

Total greenhouse gas (GHG) emissions have decreased slightly in absolute terms since the mid-2000s, thanks to improved energy efficiency, increased use of renewables, and population decline, and have remained stable since 2010, in line with developments in other OECD countries (OECD, 2020<sup>[7]</sup>). Per-capita GHG emissions are lower in Lithuania than in the OECD average but have increased since 2010, while they have been on a slightly downward trend in the rest of the OECD (Figure 1A).

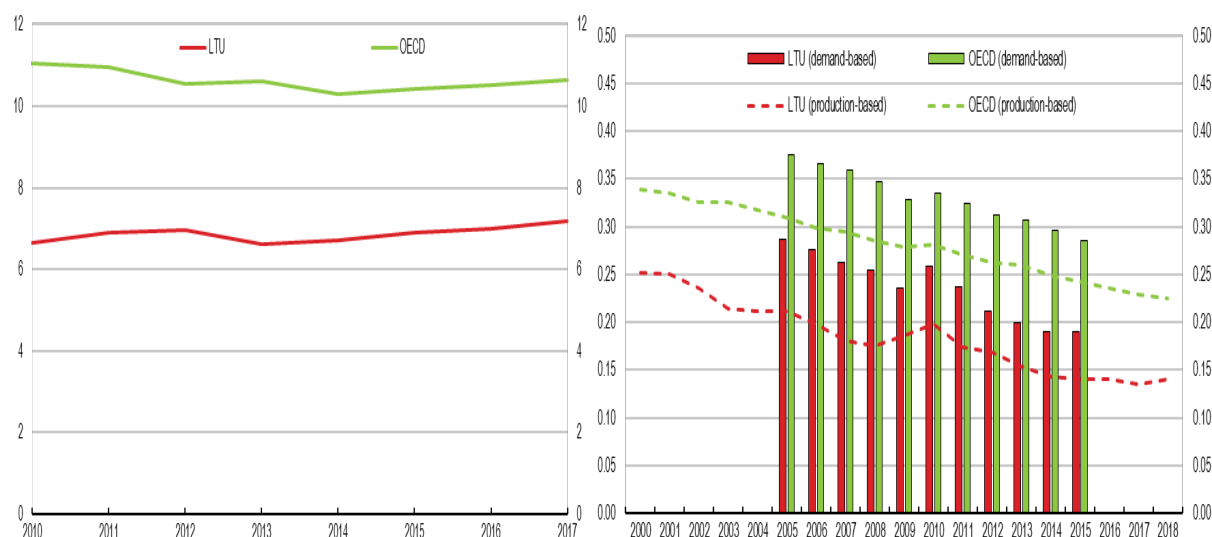
A similar picture emerges for CO<sub>2</sub> emissions from the combustion of fossil fuels and biomass, which accounts for the bulk of total GHG emissions. Lithuania's CO<sub>2</sub> emissions per-capita are amongst the lowest among OECD countries, but they have increased since 2010, and especially since 2013 (Figure 1B). In relation to value added, CO<sub>2</sub> emissions have been on a similar downward trend as in other OECD

countries, demonstrating some degree of decoupling of emissions from economic growth. However, large declines in the level of emissions are needed to meet 2030 climate mitigation targets.

**Figure 1. Overall greenhouse gas emissions are declining, but per capita values are increasing**

A. Total greenhouse gas emissions (kg) per capita

B. Kilograms of CO<sub>2</sub> per 2010 USD



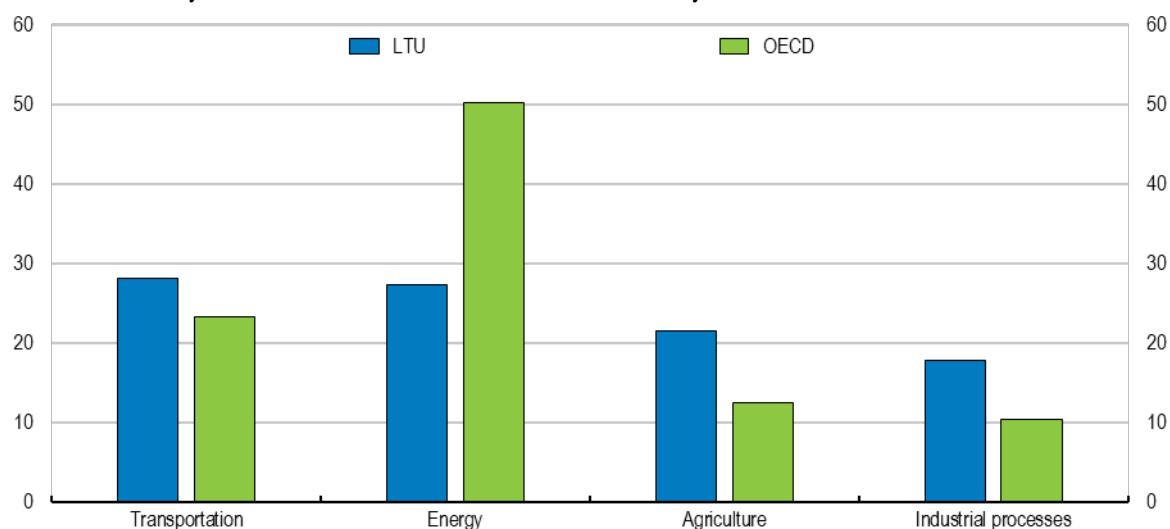
Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Green Growth Indicators; OECD Environment database; and OECD National Accounts.

The transport sector is the biggest source of GHG emissions, accounting for around 28% of the total in 2017, followed by energy with 27%, agriculture with 22% and industrial processes with 18% (Figure 2). The share of agriculture's emissions stands out, as it is nearly twice that of the OECD average, explained by the high share of agricultural production in Lithuania's economy.

**Figure 2. Transport is the main source of GHG emissions**

GHG emissions by sector as % of total emissions, 2017 or latest year



Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.



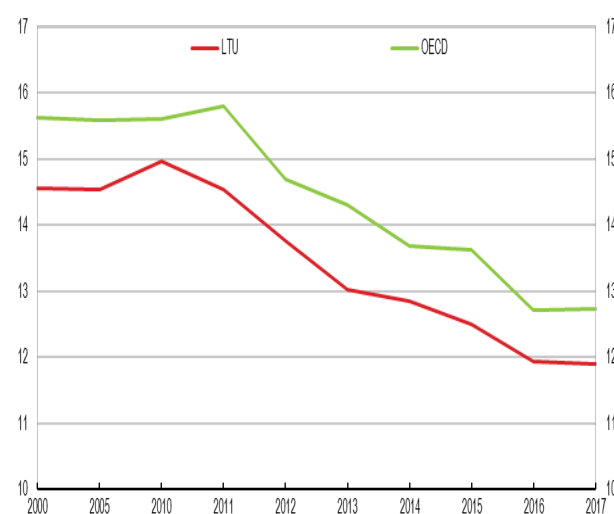
### ***The costs of air pollution are among the highest in the OECD***

Pollutants such as sulphur and nitrogen composites, ammonia, and particle emissions cause acidification of soil and water, which leads to severe environmental damage, and are a major health concern as they cause respiratory and cardiovascular diseases. They increase influenza susceptibility and exacerbate the impact of a pandemic, as shown during the COVID-19 crisis (Wu et al., 2020<sup>[8]</sup>). Small particles, so-called PM<sub>2.5</sub>, are by far the worst perpetrators from a public health perspective. For 2019, the European Environment Agency estimated that most deaths from air pollution in Lithuania were attributable to fine particulate matter concentrations (PM<sub>2.5</sub>), stemming primarily from residential heating and road transport, in particular from diesel engines (EEA, 2019<sup>[9]</sup>).

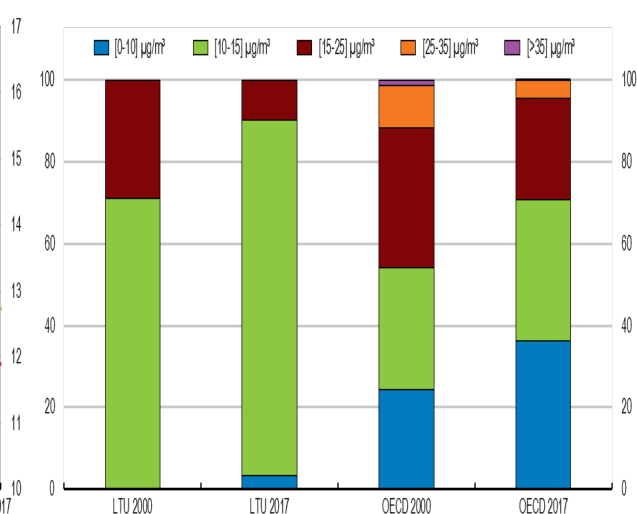
In 2017, the average pollution exposure to small particles in Lithuania was slightly below the OECD average, and it has declined over the past seven years, as in other OECD countries (Figure 3A). Also, the share of the Lithuanian population exposed to high levels of pollution (above 15 micrograms per m<sup>3</sup>) is relatively small with under 10%, especially when compared to the OECD average (Figure 3B), and very few people are exposed to very high levels, i.e. above 25 micrograms per m<sup>3</sup>. However, almost the whole population in Lithuania still lives in areas above the WHO guideline for small particles (more than 10 micrograms per m<sup>3</sup> of PM<sub>2.5</sub> particles), as against only two thirds in other OECD countries. As a result, Lithuania has the highest mortality rate from exposure to air pollution in the OECD and the highest welfare costs, equal to around 7% of annual GDP in 2017 (Figure 4).

**Figure 3. Exposure to PM<sub>2.5</sub> has declined over time but remains high**

**A. Exposure to PM<sub>2.5</sub>, % of population**



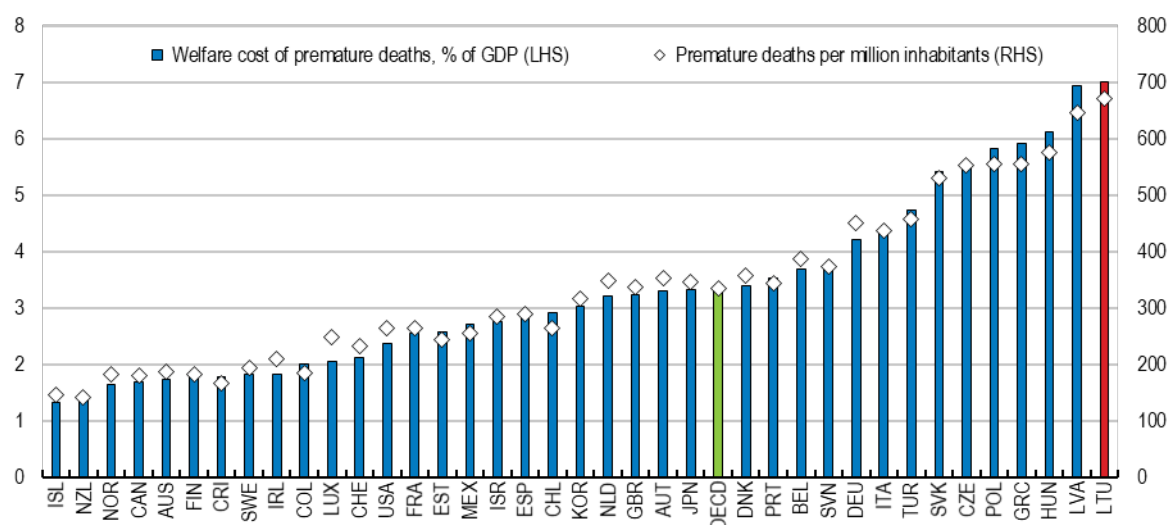
**B. Exposure to air pollution by degree of pollution**



Note: Panel A: Mean population exposure to PM<sub>2.5</sub> is calculated by weighting mean annual concentrations of PM<sub>2.5</sub> by population in both urban and rural areas. Panel B: Results show the share of population exposed to a given amount of PM<sub>2.5</sub> air pollution per cubic metre of air (µg/m<sup>3</sup>). OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

**Figure 4. Welfare costs from exposure to air pollution are the highest in the OECD**



Note: Data refer to 2017. Data on mortality and DALYs from exposure to environmental risks are taken from GBD (2017), Global Burden of Disease Study 2017 Results. Welfare costs are calculated using a methodology adapted from OECD (2017b), *The Rising Cost of Ambient Air Pollution thus far in the 21st Century: Results from the BRIICS and the OECD Countries*. OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

In line with EU regulations and UN agreements, Lithuania has set out ambitious pollution and emissions reduction targets in line with the new National Emissions Ceilings Directive (European Commission, 2019<sup>[10]</sup>). Achieving these goals will require a deepening of the ongoing transformation in the transport, energy and agriculture sector towards cleaner fuels based on renewable sources, eco-innovations and more sustainable, less polluting practices. In 2019 Lithuania also adopted the National Air Pollution Reduction Plan, containing measures, mostly focusing on switching towards cleaner technologies in the energy sector, raising public awareness and promoting public transport (European Commission, 2018<sup>[11]</sup>). The National Centre for Public Health, which is implementing the measures of the National Air Pollution Reduction Plan, is strengthening the monitoring of the impact of ambient air pollution on health and ecosystems and communicates its assessment to the public on a regular basis.

An area that requires specific attention is the control of industrial emissions, including hazardous chemicals, in line with the new, more ambitious best available techniques (BATs), especially in the energy sector and in the industrial rearing of poultry and pigs.

As in other countries, the mobility restrictions imposed as a result of the COVID-19 health crisis and the ensuing economic slowdown led to a reduction in emissions and air pollution. The Ministry of Environment reported a general improvement in air quality during the quarantine period.<sup>2</sup> During the March to May 2020 period, NO<sub>2</sub> pollution was down by about 20 % and the concentration of PM<sub>10</sub> by some 20-50%, compared to the previous year (EEA, 2020<sup>[12]</sup>).

### **Energy efficiency and the energy mix remain a concern**

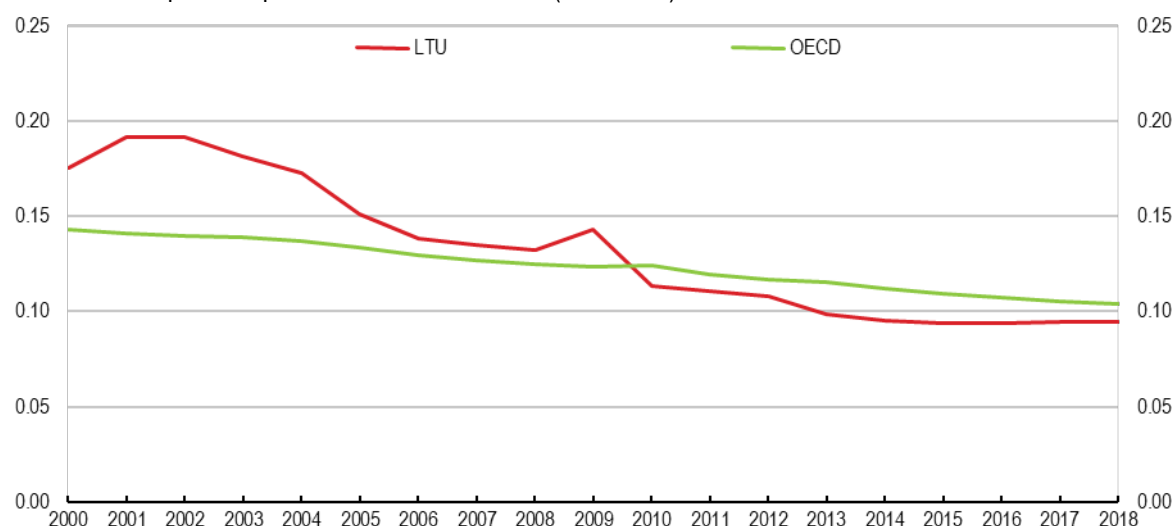
Over the past Lithuania has continued to reduce energy intensity, which is now slightly below the OECD average (Figure 5). However, energy efficiency remains a concern, particularly in the housing sector.

<sup>2</sup> For details on air quality in Lithuania, see [http://gamta.lt/cms/index?rubricId=6f9a0e2a-3e8a-43f9-9387-896918f00d4f&fbclid=IwAR0KspOgYaR4Mltx9M0JNe456CxBNOfUPOA3L\\_kSnzXprpXVPhVmHQqBV1k](http://gamta.lt/cms/index?rubricId=6f9a0e2a-3e8a-43f9-9387-896918f00d4f&fbclid=IwAR0KspOgYaR4Mltx9M0JNe456CxBNOfUPOA3L_kSnzXprpXVPhVmHQqBV1k).

According to Ministry of Environment's estimates, more than 90% of apartment buildings were built before 1993 and are energy inefficient. The Programme for Renovation (modernisation), launched in 2005, has helped improve energy efficiency in multi-apartment dwellings, and in September 2019, the Ministry of Environment and the Ministry of Energy commissioned a study to facilitate the cost-effective conversion of existing buildings into almost zero-energy buildings, including specific actions and targets (EIB, 2017<sup>[13]</sup>) (Ministry of Energy and Ministry of Environment, 2018<sup>[14]</sup>).

**Figure 5. Energy intensity hardly declined over recent years**

Tonnes of oil equivalent per thousand USD of GDP (2010 PPP)



Note: Results show the ratio of total primary energy supply in tonnes of oil-equivalent energy to one thousand USD of GDP (PPP-adjusted 2010 USD). OECD refers to an unweighted average of all OECD member countries.

Source: IEA World Energy Statistics and Balances; and OECD National Accounts.

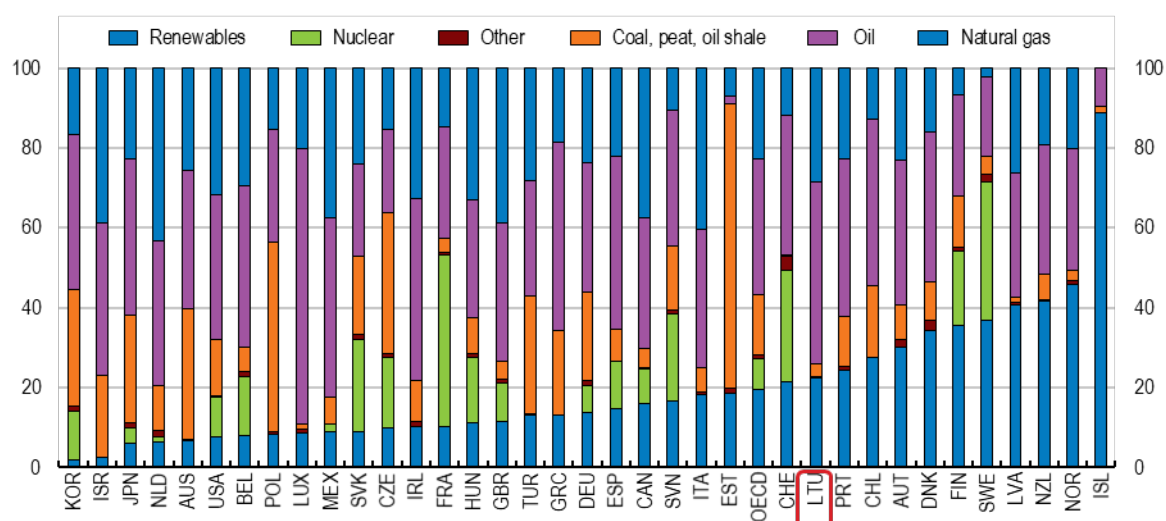
Efficiency in the electricity market has improved recently, with international interconnections being created with neighbouring countries such as Poland and Sweden. However, further interconnectors and the planned synchronisation with Central and Western Europe are needed for Lithuania to fully benefit from the integrated European electricity market. Lithuania has also begun a gradual phasing out of regulated retail electricity prices. The National Energy Independence Strategy, endorsed by the Parliament in 2018, has set a target of 45% for the share of renewable energy in electricity sector by 2030 (Ministry of Energy and Ministry of Environment, 2018<sup>[14]</sup>).

Lithuania's energy mix remains heavily reliant on fossil fuels, accounting for nearly 80% of total energy production in 2018 (European Commission, 2019<sup>[15]</sup>). The share of natural gas among fossil fuels has grown substantially, in large part because of the construction of the LNG terminal in Klaipeda, which is now expected to be operational until the middle of the century (European Commission, 2018<sup>[16]</sup>). There are also plans to build a gas interconnection with Poland in 2021.

The use of renewables has climbed rapidly over the past 10 years, accounting for 22.5% of the country's energy needs in 2018, compared to an average 10.5% in the OECD (Figure 6). The expansion has been led by wind power and biomass burning for heat and electricity. Though biomass burning has contributed to energy independence and diversification, it is also a major contributor to GHGs and air pollution (PM2.5). Renewables such as wind, solar and geothermal, have less environmental impact.

**Figure 6. Use of renewable energy could increase**

Primary energy supply, % of total supply, 2018



Note: Total primary energy supply (TPES) is made up of production + imports – exports – international marine bunkers – international aviation bunkers ± stock changes. Primary energy comprises coal, peat and peat products, oil shale, natural gas, crude oil and oil products, nuclear, and renewable energy (bioenergy, geothermal, hydropower, ocean, solar and wind). Electricity trade is included in total primary energy supply, but excluded from the calculation of the breakdown by source. OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment at a Glance database.

### ***The transport sector needs to become more sustainable***

With 28% of the total, transport is the main source of GHG emissions in Lithuania and the main source of air pollution, accounting for nearly half of NO<sub>x</sub> and PM<sub>2.5</sub> emissions (Ministry of Energy and Ministry of Environment, 2018<sup>[14]</sup>). The vehicle fleet has aged, and even new vehicles purchased in the country are among the least environmentally friendly in the EU, with average CO<sub>2</sub> emissions of 126.2 grams per kilometre, above the EU average of 118 grams in 2016 (European Commission, 2019<sup>[15]</sup>). The proportion of renewable energy-based fuels in transport was 3.6% in 2016, among the lowest in the OECD/EU. The Lithuanian rail network remains among the least electrified rail networks in the EU with only 8% of tracks electrified (European Commission, 2019<sup>[15]</sup>).

There are very few electric vehicles, largely because of their high cost compared to traditional vehicles and the fact that Lithuania does not have a dense enough network of publicly accessible recharging points. However, the infrastructure is rapidly improving. In Vilnius, there are currently over 130 electric vehicle charging stations, and along the main trans-European road network (TEN-T Core network), 25 charging stations have been installed approximately every 50 kilometres, while a website provides information on their type, status and real-time availability (European Commission, 2018<sup>[11]</sup>) (Ministry of Energy and Ministry of Environment, 2018<sup>[14]</sup>). At the end of 2020, 56 electric vehicle charging stations had been installed in 17 municipalities, and there are plans to further the network, with another 100 new electric vehicles charging stations to be installed in 39 municipalities by the summer of 2021.

In 2020, the government introduced a subsidy for the purchase of electric vehicles (EUR 4 000 for a new vehicle, EUR 2 000 for a used one). This measure has helped double the number of electric cars registered per month in the country. Ambitious goals also have been set to increase electric mobility in the country. By the end of 2030, 50% of all annual procurement transactions is to be ensured by electric vehicles. National targets and measures for the development of electric mobility are provided in the draft Alternative Fuels Act which is currently under preparation.

Fiscal measures (see below), can foster the move towards more sustainable, cleaner fuels and vehicles. The government also needs to lay out a national, regional and local transport and urban development strategy with clear environmental objectives, boosting the use of public transport, turning towards more sustainable, cleaner means of transport, and reducing urban sprawl (OECD, 2020<sup>[17]</sup>). Beyond addressing emissions and pollution, such policies would also help tackle the growing problem of traffic congestion.

In order to reduce pollution in the transport sector, the National Energy and Climate Action plan for 2021-2030 sets out the various measures to be implemented, including the electrification of rail and inland waterway transport, the development of electric mobility, the renewal of urban and suburban bus fleets, the promotion of natural gas-powered goods vehicles, and the restriction of internal combustion vehicles in urban traffic.

Twenty Lithuanian municipalities are already implementing their sustainable urban mobility plans, which include measures to promote sustainable mobility (pedestrian walkways, bicycle paths, etc.) and reduce pollution by both public and private transport vehicles by using cleaner fuels. While these are welcome ambitions, there will be a need to closely engage local authorities. For instance, one of the main EU Covenant of Mayors projects in Lithuania is the replacement of fossil fuels by biomass in the Kaunas District Heating system (Lithuanian Energy Institute and PP9, n.d.<sup>[18]</sup>), which although renewable is a polluting fuel and GHG emitter.

### ***Making agriculture more sustainable***

In addition to being the third source of GHG emissions in the country, the agricultural sector has contributed to a growing concentration (leaching) of organic carbon in soils, high levels of acidity and the general deterioration of their biological quality (UNFCCC, 2017<sup>[19]</sup>). According to the National Environmental Protection Strategy, nearly 20% of agricultural areas are acid (Ministry of Environment of the Republic of Lithuania, 2016<sup>[20]</sup>). Farmers compensate lower fertility of the soil with fertilisers, which in turn causes soil and water contamination. Lithuania has joined a number of EU countries in declaring the whole country as a Nitrate Vulnerable Zone and by establishing a national action programme. This requires measures to limit the application of fertiliser and livestock manure. Still the nitrogen balance in Lithuania actually declined 2010-15 and – as 25 kg per hectare - was among the lowest in the OECD (OECD, 2018<sup>[21]</sup>). The phosphorus balance is also low. Soil erosion in Lithuania is similar to the EU average (Panagos et al., 2015<sup>[22]</sup>).

Support to farmers is partly based on production volume, which encourages overproduction, with a potentially negative environmental impact. Organic agriculture has been growing in recent years and covered around 7% of the agricultural surface in 2019 (International Federation of Organic Agriculture Movements and Forschungsinstitut für biologischen Landbau, 2019<sup>[23]</sup>). Organic farmers benefit from a number of measures, including compensatory payments, set out in the Organic Farming Development Programme approved in 2017. The approved national rural development programme (EARDP) has a budget of EUR 1.6 billion but less than 15% is dedicated to agri-environment-climate measures and organic farming (European Commission, 2011<sup>[24]</sup>). Out of EU rural development funds, 30% of Lithuania's 2015-2020 budget for direct payments are being allocated to practices beneficial to the environment (European Commission, 2017<sup>[25]</sup>). Linking subsidies to the development of sustainable farming practices, including green innovations and modernising the tractor fleet to be powered with cleaner fuels would foster sustainability. Technological innovations, such as the use of sensors, geographical information systems (spatial data) and nature-based solutions can help reconcile agricultural productivity with environmental goals (Lowenberg-Deboer and Erickson, 2019<sup>[26]</sup>).

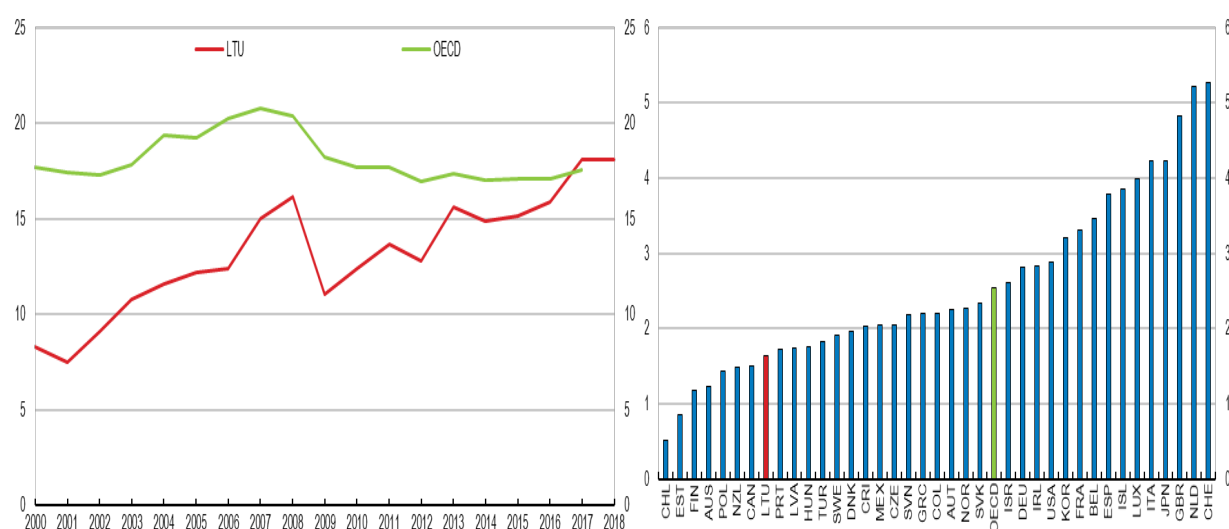
## Reducing material use and improving waste management

Lithuania has yet to design and implement a national strategy or roadmap on the circular economy, which would include targets and policies to reduce the volume and increase the reusability of materials in both industrial production and consumer behaviour. Currently, the government's focus is mainly on waste management. The Research Council of Lithuania is preparing an analysis on policy measures to promote the circular economy in Lithuania, which should be finished by spring 2021. An ongoing project aims at developing a Roadmap for Lithuania's industrial transition to a circular economy. Already, Lithuania performs above the OECD/EU-28 average in terms of the number of people employed in the circular economy (2.7% of total employment in 2016, compared to 1.7% EU-wide) (OECD, 2019<sup>[27]</sup>).

Materials consumption per capita has more than doubled over the last two decades. It increased by 20% between 2015 and 2018 reaching, 18 tonnes per person, surpassing the OECD average of 17.5 tonnes, which has itself declined over the last decade (Figure 7A). Non-energy material productivity, that is the value created per unit of material resources, was USD 1.6 per kg in 2018, below the OECD average (USD 2.5), and has remained roughly constant since 2000 (Figure 7B).

**Figure 7. Domestic material consumption is growing rapidly, and productivity is low**

A. Material consumption intensity, tonnes per capita    B. GDP per kg of domestic material consumption



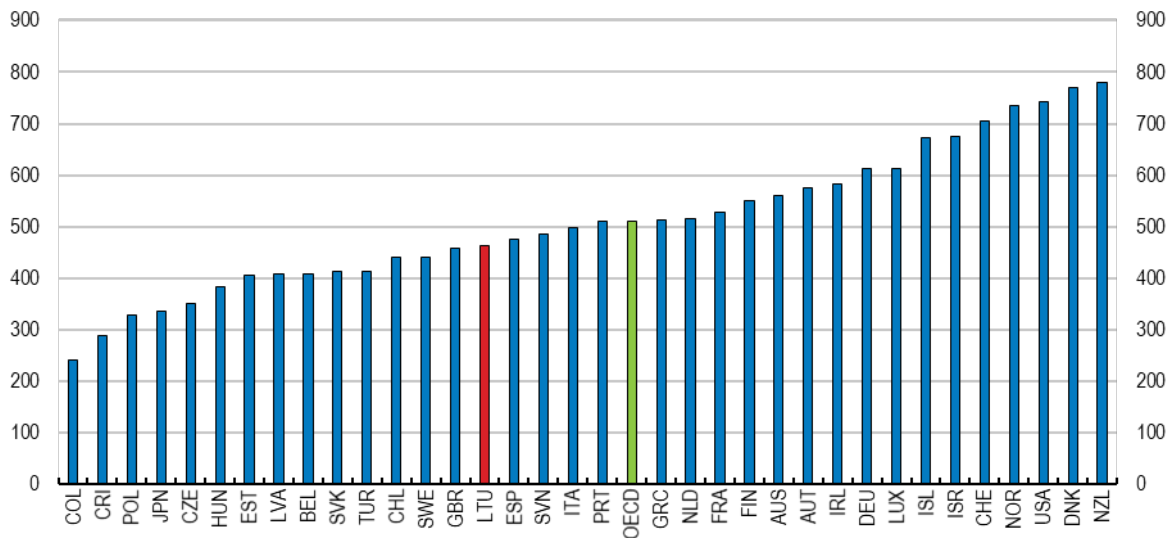
Note: Panel A: OECD refers to an unweighted average of all OECD member countries. Panel B: 2010 PPP-adjusted USD, 2018 or latest year. Domestic extraction used (DEU) refers to the flows of raw materials extracted or harvested from the environment and that physically enter the economic system for further processing or direct consumption. Imports and exports are major components of the direct material flow indicators DMI (domestic material input) and DMC (domestic material consumption). Domestic material consumption (DMC) refers to the amount of materials directly used in an economy. DMC is computed as DEU minus exports plus imports. OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

Compared to other OECD countries, Lithuania ranks relatively low on both total and municipal waste generation, but waste generation has been increasing in recent years, while it has stabilised in the OECD on average (Figure 8). In 2018, municipal waste generation in Lithuania (464 kg per capita) remained below the OECD average (525 kg). New targets on waste will be integrated into the National Waste Prevention and Management Plan for the period 2021–2027 (European Commission, 2019<sup>[10]</sup>).

**Figure 8. Municipal waste generation could be reduced**

Kilograms of waste per capita, 2018 or latest year



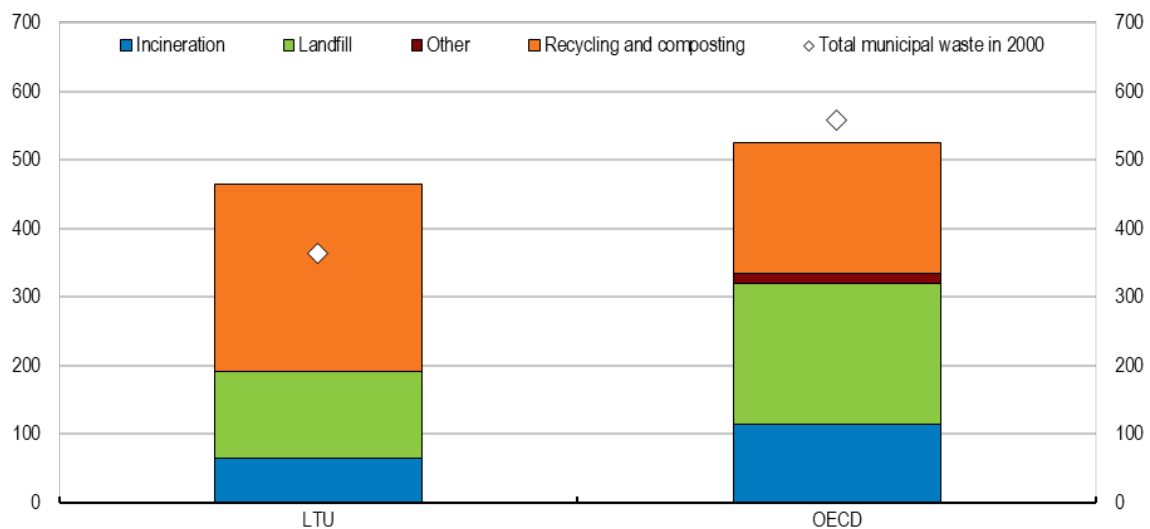
Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

Waste management practices have improved substantially in recent years. In 2018, recycling and composting (53%) was the main treatment option, above the OECD average of around 36%, and in line with the 50% recycling 2020 target (Figure 9). This development is in large part due to the increase in composting, to 28%, more than doubling since 2015, and well above the EU average of around 17%. Following the National Waste Management Plan, the opening of free of charge, green waste composting sites has been a major factor behind the growth in composting. Municipalities have to ensure that food waste and other biodegradable waste separated at the source by households be collected separately. The Ministry of Environment also recently launched a public awareness campaign targeting businesses and households to promote responsible consumption, waste prevention, and separate waste collection.

**Figure 9. Municipal waste is growing, but increasingly recycled or composted**

Kilograms per capita, by type of waste treatment, 2018



Source: OECD Environment database

Other policies, such as the introduction of a deposit-refund system for single-use plastic and glass bottles and metal cans, have also been very successful in increasing recycling, so much that Lithuania achieved its 2020 objective of 90% collection rate already in 2017.

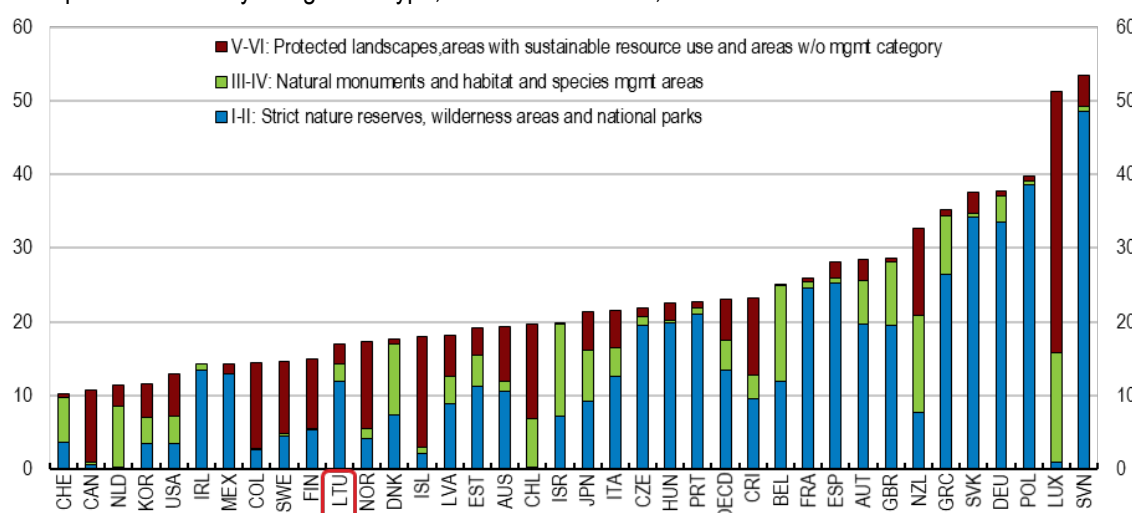
Lithuania has also achieved significant progress in reducing dependence on landfills as a waste management tool, halving its landfilling rate since 2014 to 25 % in 2018, although it remains above the EU average (23%). This has been achieved by improvements in primary sorting of waste, awareness raising campaigns, increased recycling and composting, as well as increased incineration. A landfill tax was introduced in 2016 but set very low, at 5 EUR/t. Plans to progressively increase the landfill tax for non-hazardous waste were postponed for the second time at the end of 2018 (European Commission, 2019<sup>[10]</sup>). An amendment to the Law on the Pollution Tax was approved by the parliament in June 2020, raising the landfill tax from 10 EUR/t in 2021 to 25 EUR/t in 2024. The Ministry of Environment has proposed to further increase the tax to 50 EUR/t.

### **Protecting natural amenities: forests, biodiversity and water**

In 2016, forests covered around 35% of the total land area, placing Lithuania above the OECD average (31.4%). The country narrowly meets the 2020 Aichi targets for protected areas (17% of terrestrial and inland water areas), as nature reserves and national and regional parks represent 12% of land area, while an additional 5% of land is under some form of protection (Figure 10). Lithuania had one of the fastest increases among OECD countries in natural and semi-natural vegetated land over the period 2004-15 and displays a relatively high net growth in forest cover, which helps offset as much as half of its greenhouse gas emissions (Varnagiryte-Kabašinskienė et al., 2019<sup>[28]</sup>) (Ministry of Environment of the Republic of Lithuania, 2016<sup>[20]</sup>). In 2018 the government decided to increase the yearly quota for cutting state forest, including protected areas, for the years 2019-2023 by 6% (European Commission, 2019<sup>[10]</sup>). There are, however, requirements for reforestation of felled areas, which should help rebalance the forests' GHG removal capacity.

**Figure 10. Lithuania protects a relatively small share of its land**

Terrestrial protected area by designation type, % of total land area, 2019



Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

Water stress is very low compared to other OECD countries, and is not considered a natural resource at risk in Lithuania. Water abstractions have decoupled from economic growth, with per capita abstractions

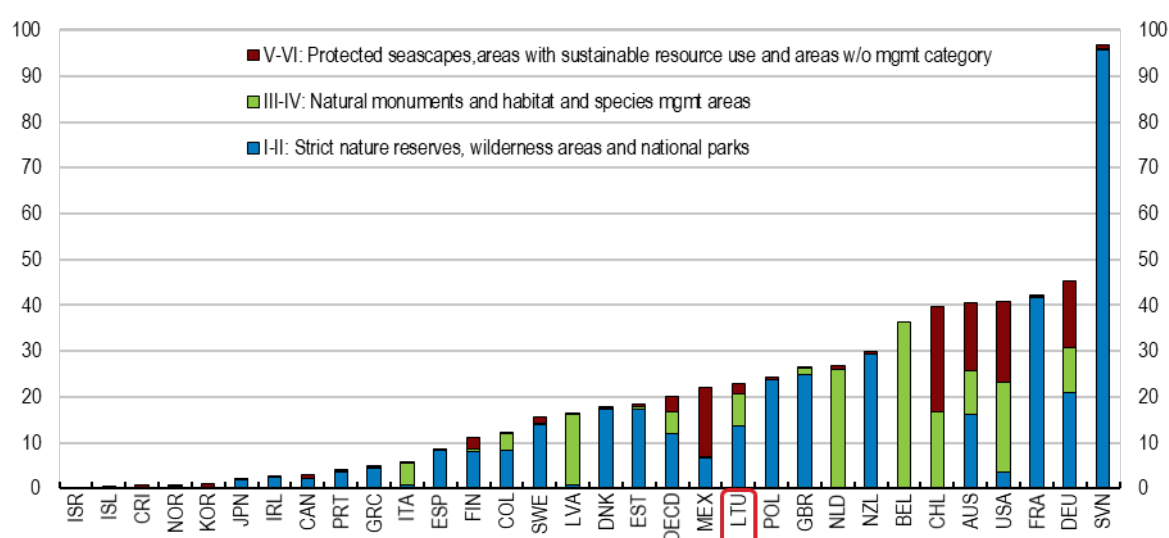


very low and declining since 2000. About 18% of coastal and marine areas are protected, which is above the 10% Aichi target (Figure 11). Yet, according to the Lithuanian Ministry of Environment (2016), the coastal zone of the Baltic Sea, more than two thirds of Lithuanian rivers and about one third of lakes fail to rate as “good” water quality.

Efforts to protect Lithuania’s biodiversity are hampered by limited resource availability. The annual budget from all sources (EU, national, regional, etc.) for the management of protected areas and for broader biodiversity conservation efforts, including for the control of invasive alien species and for investments in ecosystems restoration measures, is around EUR 29.2 million, which is very low by international standards (European Commission, 2020<sup>[29]</sup>).

**Figure 11. Lithuania protects a moderate amount of its marine area**

Marine protected area by designation type, % of total marine area, 2019



Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Environment database.

Treatment of household wastewater has improved radically since 2000, moving from only half of wastewater receiving adequate treatment to almost 100% coverage, but there are questions on the quality of water infrastructure. Over the last decade, Lithuania has established river basin management systems to better manage risks, including flooding. The first river basin management plan was adopted in 2010, and was followed by a second one in 2017 (European Commission, 2019<sup>[30]</sup>). Wastewater discharges and diffuse pollution from agriculture exert increasing pressures on water bodies.

## Environmental taxation, spending and regulation

### **Environmental taxes are low**

Environmental taxes are an efficient policy to help reduce environmental degradation and address climate change. Environmental taxes accounted for around 2% of GDP in 2018, below the 2000 level and less than the 2.2% OECD average (Figure 12). Almost all environmental taxes (90%) are excise duties on oil and oil products, with pollution and natural resource use taxes accounting for the remaining share. Recently, the government has taken action to increase pollution taxes. A number of modifications were

made to the Law on the Pollution Tax – which is actually a set of taxes on polluting products - in January 2020, which came into force in January 2021. They include increases in tax rates for most pollutants discharged in the air and for some pollutants discharged into water bodies and into the soil from stationary sources. Tax rates were increased threefold on average and even more for certain pollutants (for instance, VOC and PM), but remain low compared to the costs of pollution.

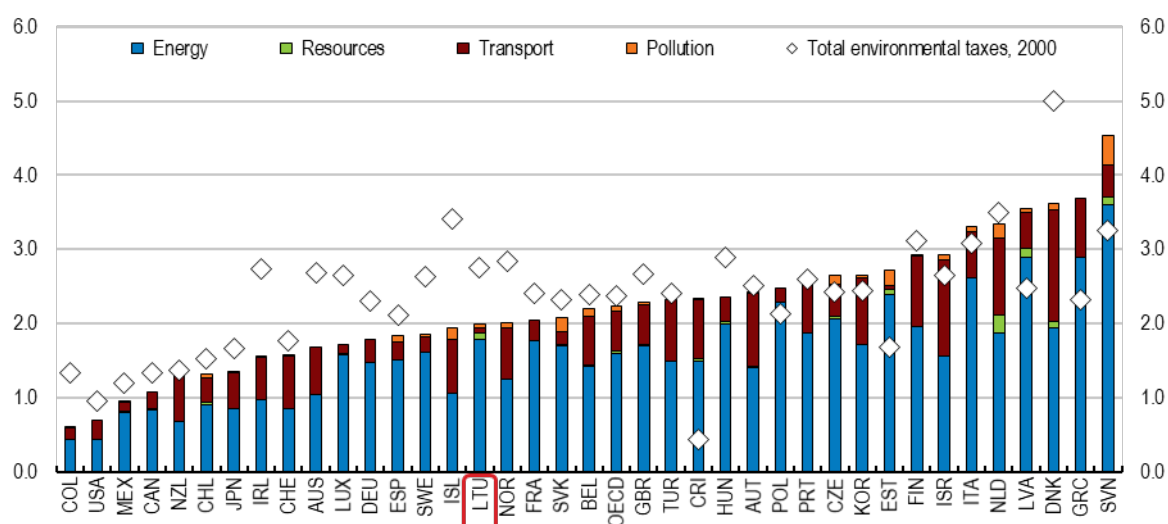
Lithuania has one of the lowest excise duties on motor fuel, petrol and diesel in the OECD, and one of the largest ‘diesel differentials’, i.e. the gap in the price of diesel versus gasoline. A Law on Motor Vehicle Registration Tax entered into force on 1 July 2020 (Parliament of Lithuania, 2020<sup>[31]</sup>), thereby introducing a tax on private cars for the first time. The tax rates are based on CO<sub>2</sub> emissions and the type of fuel used and applied to all cars with emissions exceeding a threshold of 130 g/km of CO<sub>2</sub>. An environmental bonus was also introduced for cars purchased with emissions below this threshold (EUR 1,000 per car, and a requirement to send the old car for scrappage).

Fossil fuels used in agriculture and fisheries are subject to a reduced excise duty. In particular, the fuel excise duty applied to diesel in this sector is less than 16% of the amount applied to road and residential use. Some fiscal measures related to the environment have been introduced recently. For instance, newly purchased widely used products, such as tyres and batteries, which account for a large portion of waste, were added to the products subject to increased pollution tax rates.

Lithuania does not yet levy a carbon tax, although it participates in the EU emissions trading system. A CO<sub>2</sub> tax efficiently taxes different forms of energy in line with their contribution to climate change. Political economy considerations might call for directly reimbursing all or a part of carbon tax proceeds to households. The impact of a carbon tax might differ across income groups or regions (Flues and Thomas, 2015<sup>[32]</sup>), hence the design of reimbursement systems could take into account of such effects.

**Figure 12. Environment-related taxation is below the OECD average**

Environment-related taxes, % of GDP, 2018



Note: OECD refers to an unweighted average of all OECD member countries for 2018 or the latest available year.

Source: OECD Environment database.

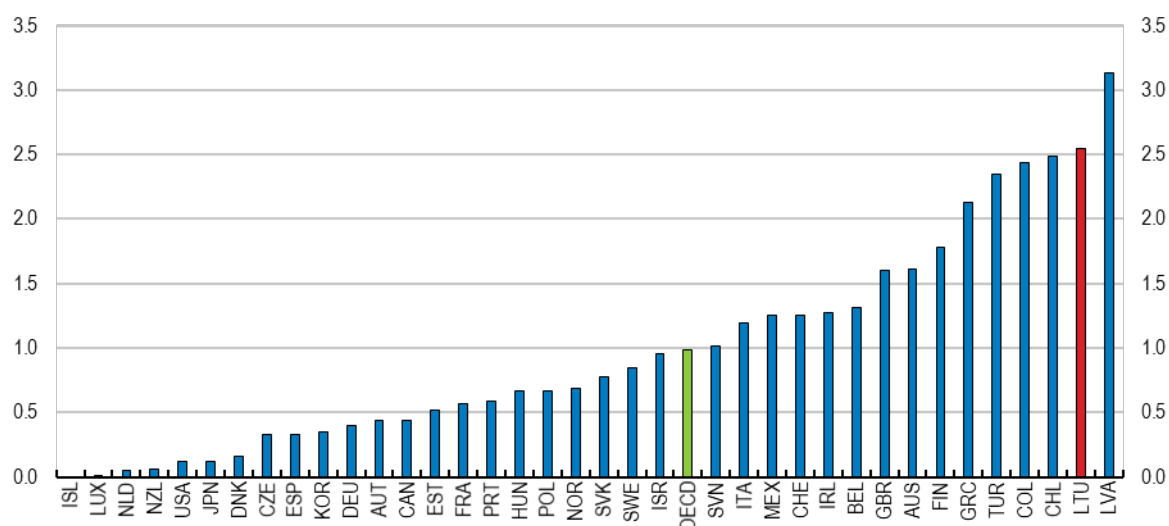
### ***Fossil fuels are highly subsidised***

Fossil fuel subsidies are amongst the highest in the OECD, equivalent to 2.5% of total tax revenue, compared to 1% on average OECD-wide (Figure 13). These subsidies undermine efforts to reduce local

pollution and mitigate climate change, and they public budgets considerably. They also tend to hamper green innovation. To address distributional consequences, reducing and eventually abolishing fossil fuel subsidies could be accompanied by more targeted support to low-income households.

**Figure 13. Fossil fuel subsidies are amongst the highest in the OECD**

Total fossil fuel support, % of total tax revenue, 2017



Note: OECD refers to an unweighted average of all OECD member countries.

Source: OECD Green Growth Indicators.

The savings from lower fossil-fuel subsidies could help boost Lithuania's domestic environmental spending. The funding for most environmental protection spending in Lithuania comes from the EU, around 25% of which is dedicated to waste management. There is much scope to increase domestic spending on environmental protection, especially in more effective controls of pollution and hazardous chemicals from industry and farming and in protecting the country's biodiversity and ecosystems. The Lithuanian government could also further strengthen environmental criteria for public procurement, currently covering only 50% of spending.

### ***The burden of environmental regulation is low***

While regulation is a basic policy to ensure the achievement of environmental goals, it is not without costs. In particular, very stringent or badly designed policies and regulations generate a burden on firms and hamper market entry and competition. More stringent environmental policies observed in OECD countries over the past decade have had little effect on aggregate productivity growth, trade or competitiveness (Koźluk and Timiliotis, 2016<sup>[33]</sup>). However, there is evidence of differentiated effects within the economy, increasing the gap between the most and least productive firms. More stringent environmental regulation, as measured by the OECD Environmental Policy Stringency (EPS) indicator, is also associated with a competitiveness loss - and lower exports - in the most polluting sectors and a competitiveness gain - and export growth - in less polluting industries<sup>3</sup>.

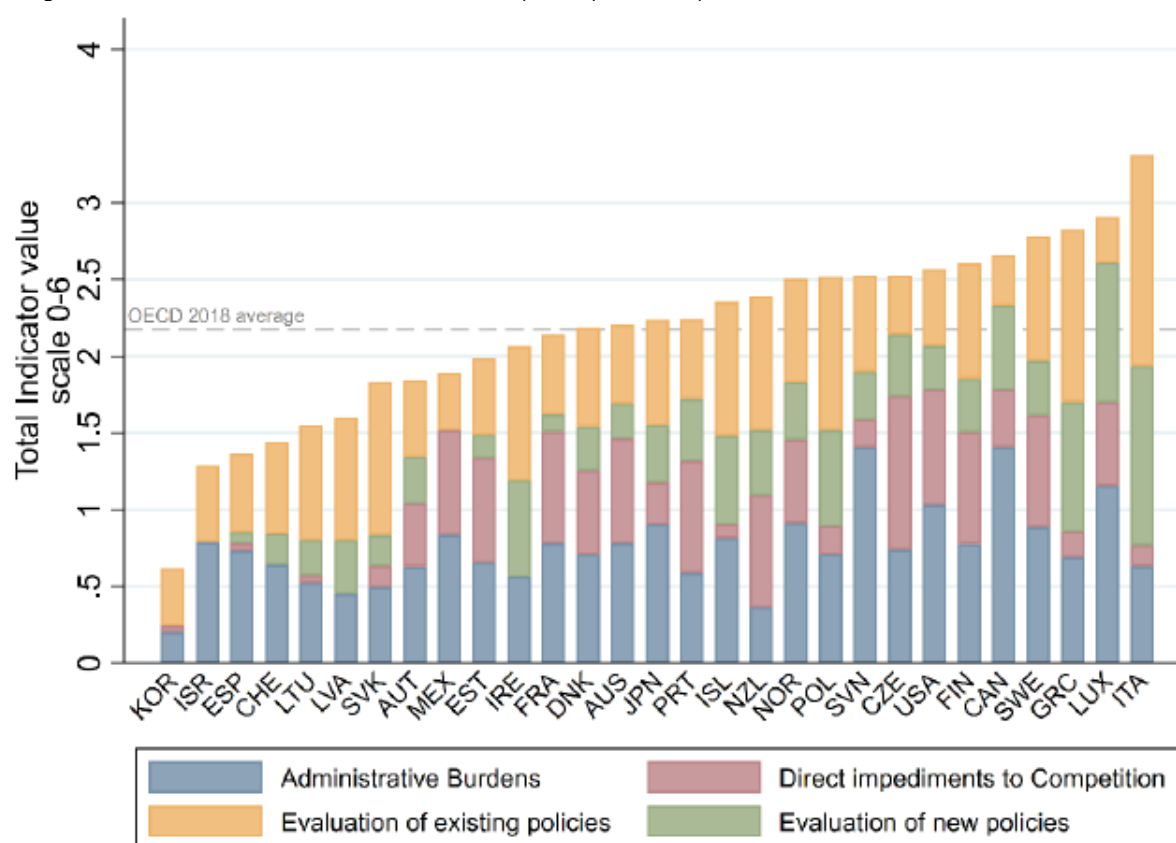
<sup>3</sup> The EPS indicator focuses on air and climate pollutants in largely upstream activities such as electricity production and transport, limiting its scope for an overall impact analysis.

The OECD indicator of Design and Evaluation of Environmental Policies (DEEP), relaunched in 2018, provides a broad assessment of environmental regulations, measuring two potential market burdens generated by environmental policies and the extent to which policy evaluation takes such burdens into account (Berestycki and Dechezleprêtre, 2020<sup>[4]</sup>). One part of the indicator measures the administrative costs associated with environmental policies and the extent to which they inhibit competition. The second part of the indicator analyses the quality of ex-ante and ex-post environmental policy evaluation, in particular whether the impact on markets is taken into account.

Figure 14 represents the ranking of countries according to their 2018 DEEP score for 29 OECD countries. The index is broken down by sub-indicator for each country and has a scale from 0 (best) to 6 (worst). The distribution of scores is relatively tight: almost 70% of countries score between 1.50 and 2.50. Lithuania's DEEP score (1.55) is at the lowest end of this range, and well below the OECD average (2.20), suggesting that its environmental standards present relatively low economic burdens, compared to other OECD countries. In particular, Lithuania has a fast permit delivery system, second only to Korea. The DEEP score is also not correlated with the EPS indicator, suggesting that it is possible to have high environmental standards while ensuring a low economic burden.

**Figure 14. The economic burden of environmental policies is relatively low**

Design and Evaluation of Environmental Policies (DEEP) indicator)



Source: Berestycki and Dechezleprêtre (2020).

## Environmental innovation and green jobs

Environment-related inventions represent a relatively high share of total inventions, at about 12% between 2014-16, above the OECD average (10%). 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, total environment-related public R&D spending remains very low, at less than 0.1% of total public R&D spending in 2018 versus 2% OECD-wide.

A number of financial and non-financial support schemes have been put in place to support eco-innovation since 2008, and most notably since 2016. Efforts to promote environmental related inventions could be further strengthened, including by promoting green public procurement, relying more on R&D grants than tax credits for green technologies, and raising public investment in education and environmental research at academic and research centres.

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