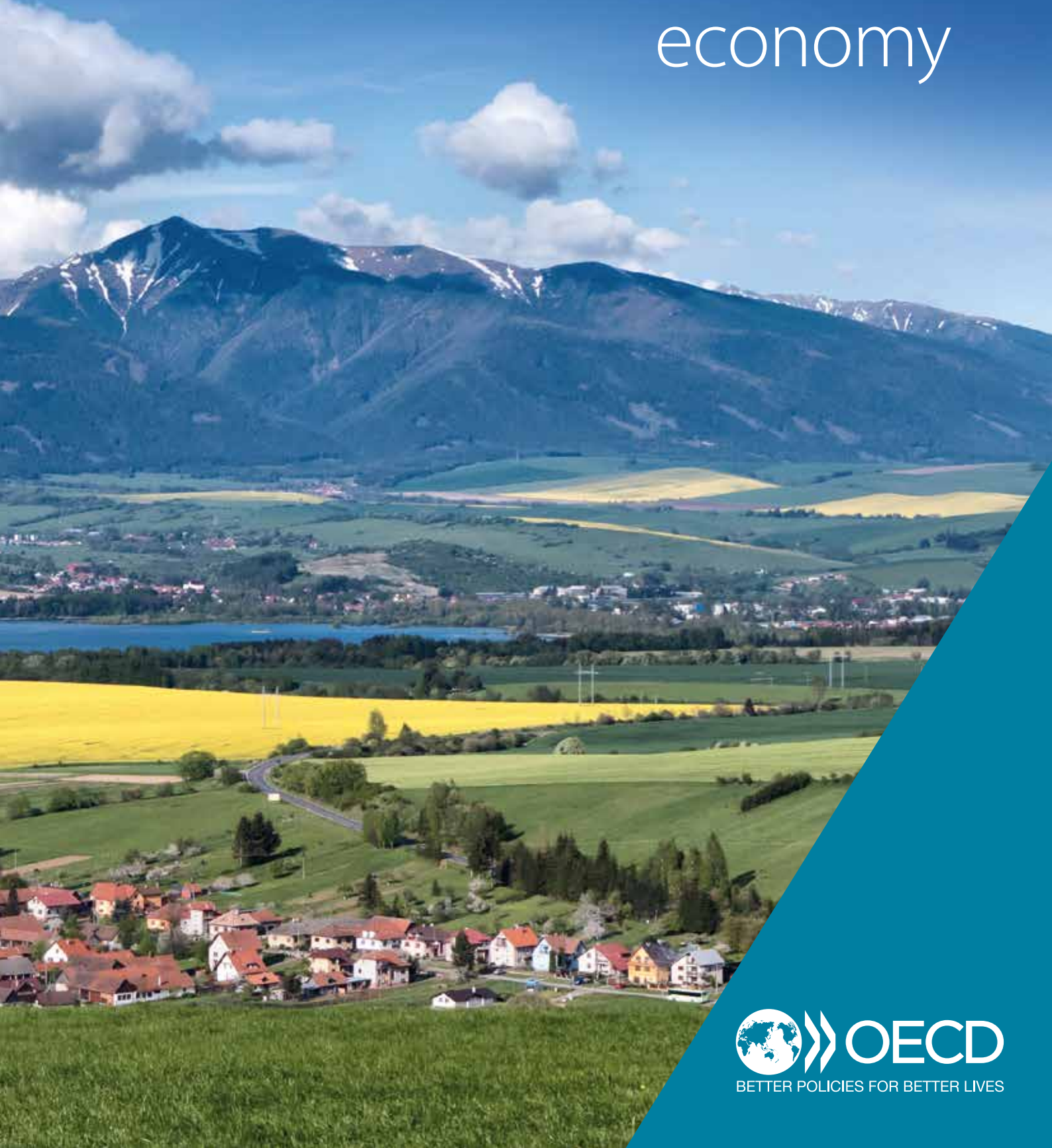


Making the Slovak Republic a more resource efficient economy



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Introduction

The Slovak Republic is a country with a limited natural resource base, an important manufacturing sector and rising materials consumption. Coherent policies that aim at increasing resource efficiency and achieving green growth are vital for sustainable growth and increased prosperity. Producing more and better with less has the potential to lower production costs, increase supply security and secure competitiveness in the long term, while at the same time alleviating pressures on the environment. The sooner the Slovak Republic implements such policies, the greater will be the economic and environmental benefits. The current strong economic growth offers a unique opportunity to make the necessary investments to facilitate the transition.

This policy brief identifies a number of options for improving resource efficiency in the Slovak Republic. Starting from the 2011 OECD Environmental Performance Review of the Slovak Republic, it builds on lessons from OECD work on sustainable materials management, resource productivity and green growth, developments in the European Union concerning the circular economy, and the outcomes of the 2016 high-level international Conference on “Transition to the Green Economy” (T2gE) organised under the Slovak EU Presidency. The aim of the brief is to contribute to a policy debate on the actions and decisions that are needed for a transition towards a green economy in the Slovak Republic.

The options for policy action were developed by a team of experts from the Institute for Environmental Policy of the Ministry of Environment of the Slovak Republic; and benefitted from expert advice from the OECD Secretariat. The development of the options was supported by a sector-oriented gap analysis, comparing value added and material consumption of individual industry branches in different countries. In the absence of data on material inputs by industry, this analysis focused on resource productivity in the forestry sector. As benchmarks, averages for the three Visegrad countries (V3)* and the OECD or the EU were used. For industry and households, OECD aggregates were used with Slovak micro-data on waste generation and energy consumption to identify the areas with the greatest potential for improvement and to propose relevant policy action. Further research could be carried out on the services.

The views expressed in this document are those of the author(s), and do not necessarily reflect the official views of the OECD or of its member countries.

* The Czech Republic, Hungary and Poland

Long-term challenges in increasing resource efficiency

The Slovak economy is characterised by a growing manufacturing sector, a rather low endowment in sub-soil assets, and a growing consumption of material resources. As a result, the country is highly dependent on external markets for both imports of raw materials and exports of manufactured goods. This is coupled with rising amounts of waste generated and increasing pressure on the environment. Improving resource efficiency and establishing a circular economy is thus of prime importance for the country's growth and development.

A growing economy with an important manufacturing sector

Over the past two decades, the Slovak Republic has been one of the fastest-growing transitional economies mainly thanks to export-oriented manufacturing, underpinned by the automotive sector. Until 2009, annual GDP growth reached double digit values. The global financial crisis slowed growth, but the economy has recovered relatively rapidly. GDP per capita is converging towards the OECD average. However, GDP per capita is still 25% lower than the OECD and EU averages (Figure 1) and regional disparities are important. Most economic activity is concentrated in western Slovakia (OECD, 2017).

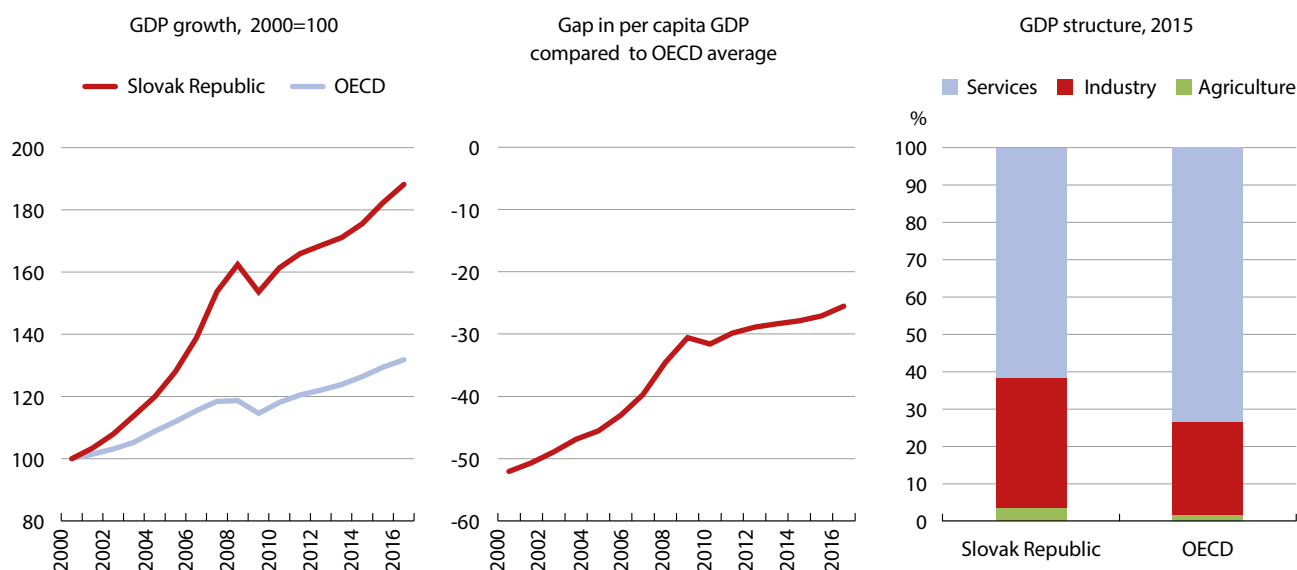
The transition from a centrally-planned to a market economy was accompanied by major structural changes, with the closure or modernisation of pollution- and energy-intensive manufacturing sectors. The Slovak economy nevertheless remains more industrial than most other OECD economies. Industry generates more than a third of the country's value added. The share of manufacturing has been growing and represents almost one fourth. The most important sectors include the automotive industry¹ and the manufacturing of basic metals and fabricated metal products.

The natural asset base is insufficient to satisfy demand

With the exception of magnesite and construction materials, domestic geological reserves are limited and the Slovak Republic is largely dependent on imports for the supply of fossil fuels and metals, mainly from Ukraine and Russia. Only 14% of fossil fuels and 1% of metal ores consumed in the country stem from domestic sources.

1. Car exports represented 27% of total exports in 2015. The automotive sector is expected to continue to drive export and production growth in the coming years. (OECD, 2017)

Figure 1. A fast growing economy, driven by manufacturing



Source: (OECD, 2017); OECD National accounts statistics (database), <http://dx.doi.org/10.1787/na-data-en>.

- Stocks of **metallic minerals** are estimated at 325 Mt, but only 26% are classified as economic reserves (mainly ferrosilicon, pig iron, crude steel, aluminium and copper, but also small stocks of lead, zinc, antimony, mercury, silver and gold). This is little compared to domestic demand, and most raw materials for industry have to be imported. In 2012, the trade balance of metal ores reached a deficit of EUR 501 million.
- Stocks of **industrial minerals** are estimated at 16 Mt of which 89% are classified as economically valuable. The country is particularly known for its production of magnesite whose reserves are estimated at about 1.6 Mt. Domestic production fully satisfies domestic demand, and an important share is exported to Ukraine (40%), Czech Republic (11%) and Russia (10%).
- **Construction materials**, (sand, gravel, limestone, gypsum) mainly come from domestic extraction, which satisfies demand.

primarily driven by demand for non-metallic minerals – construction materials – for transport infrastructure projects. In contrast, the consumption of fossil energy carrier's (hard, brown coal, lignite, oil and natural gas) has been decreasing since 2005 in line with total primary energy supply (TPES). Renewable energy represents 8.5% of TPES and 22.7% of electricity generation. These shares, although increasing, are among the lowest among OECD countries.

While the amount of material resources used per inhabitant is close to the EU average, Slovakia generates much less economic value per unit of materials used (1 EUR/kg compared to 2 EUR/kg for the EU). Hence material productivity, though improving, remains low.

Despite important progress, many environmental challenges remain

Environmental pressures remain high

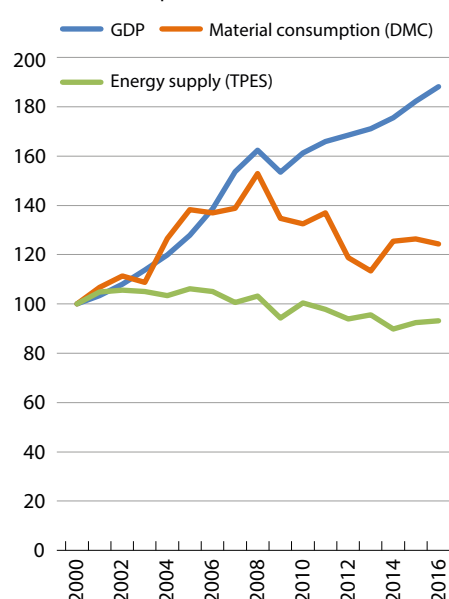
While the quality of the environment in the Slovak Republic is improving, environmental pressures from production processes, transport and waste management remain high. The integration into the European Union – the Slovak Republic became a member in 2004 – supported increased investment in environmental infrastructure, and an upgrading of environmental policies and institutions, though not at the same pace as economic development. (OECD, 2011).

Material productivity is rising, but remains low

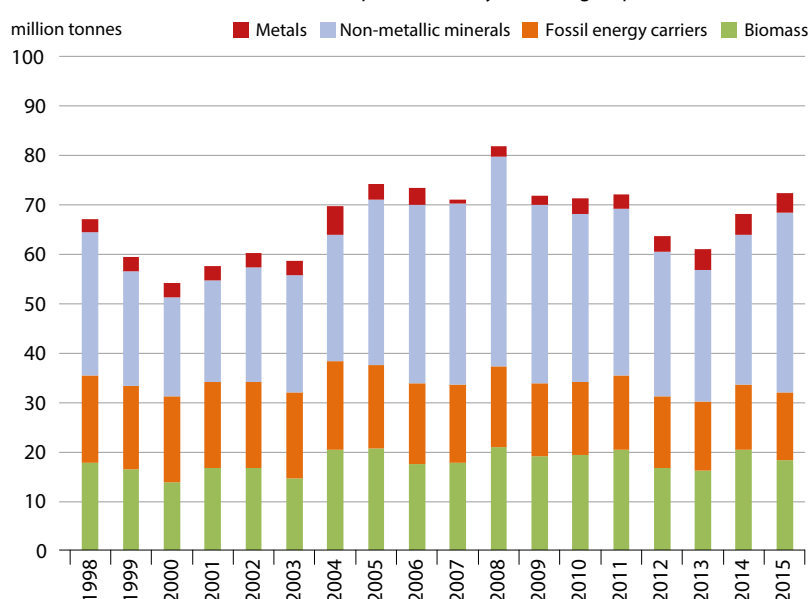
The domestic consumption of materials, with the exception of energy carriers, is rising, growing by 50% between 2000 and 2008. After a decrease following the global economic crisis, it grew again and is heading back to pre-crisis levels. The recent upward trend is

Figure 2. Domestic material consumption heads back to pre-crisis levels

Material consumption trends and GDP, 2000=100

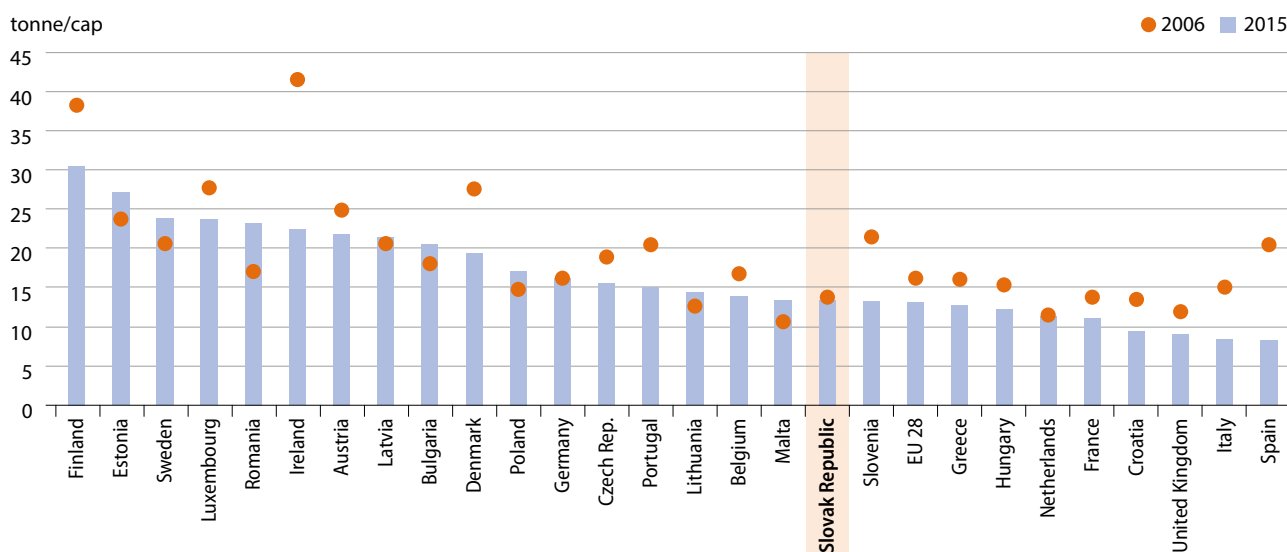


Material consumption trends by material group



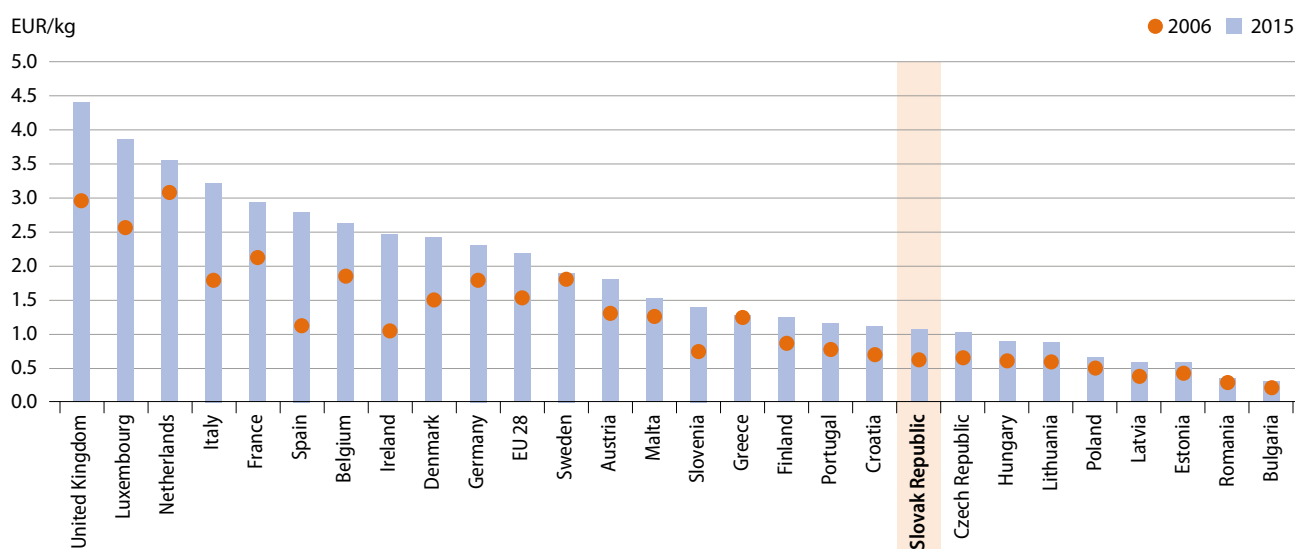
Source: OECD, Eurostat.

Figure 3. **Material intensity per capita is stable and close to the EU average**



Source: Eurostat.

Figure 4. **Material productivity is improving slowly, but remains low**



Source: Eurostat.

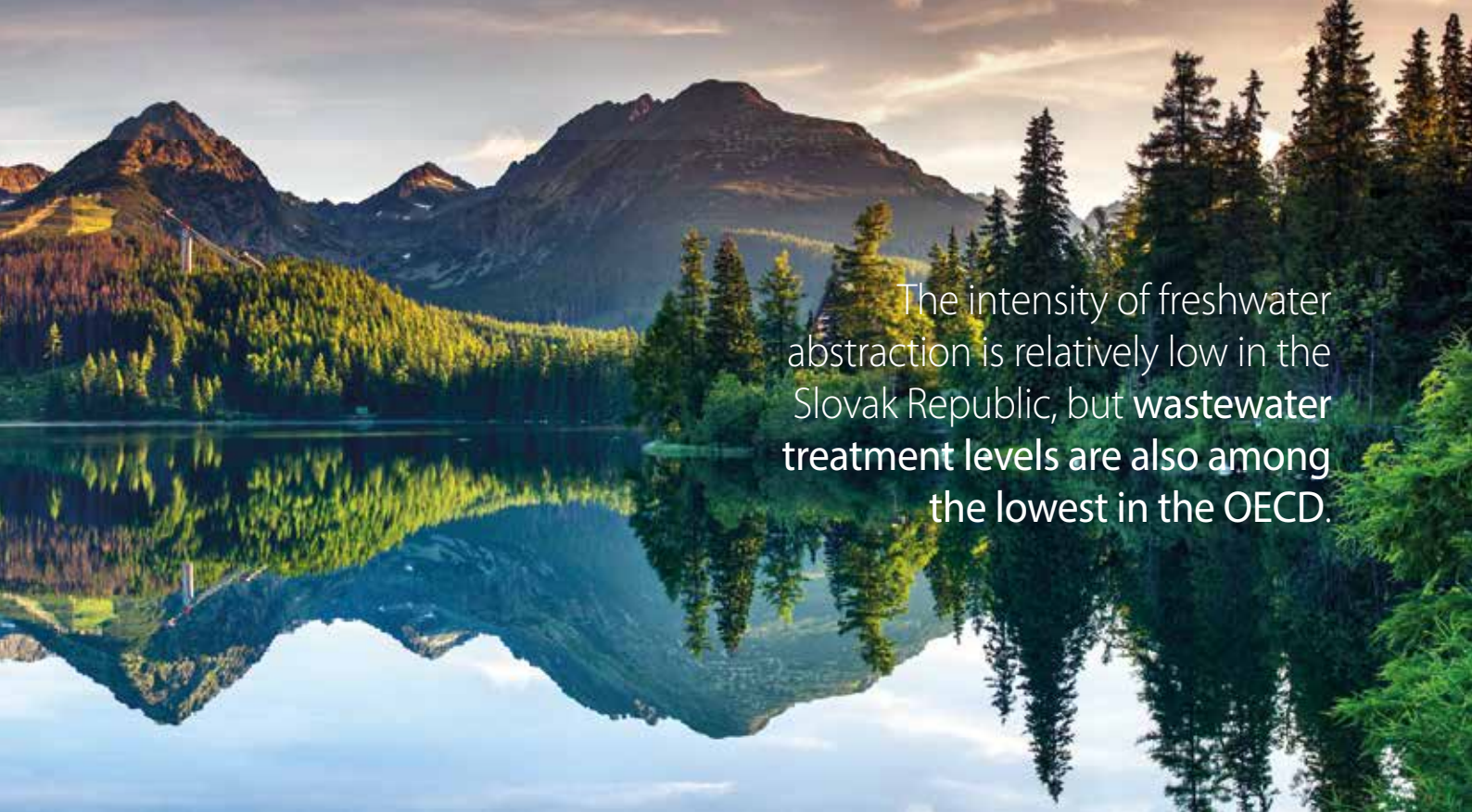
When looking at Slovakia's position with respect to aggregated environmental indices, such as the ecological footprint (EF) or the Environmental Performance Index (EPI), a mixed picture emerges. The Slovak Republic's demand for natural resources exceeds the capacity of ecosystems to supply these resources by 50% (Global Footprint Network, 2017). But the country has improved its score in the EPI by 10% over the past ten years, mainly thanks to progress in the areas of air and water quality (Hsu, 2016). The country has substantially reduced its greenhouse gas emissions and the energy intensity of its economy. The share of the population exposed to the worst level of air pollution is lower than the OECD average. At the same time air quality continues to suffer

from heavy use of brown coal in power generation, and air pollution remains one of the main environmental challenges². (European Commission, 2017), (OECD, 2017).

Effective management of renewable natural resources remains a challenge

Renewable natural resources are abundant. Forests cover more than 40% of the land area (National Forest Centre), and timber from domestic extraction exceeds domestic consumption. The south-western part of the country (Žitný ostrov) is one of the biggest sources of drinking water in Central Europe. The intensity of freshwater

2. http://www.minzp.sk/files/iep/01_2017_tri-vyzvy_zivotneho_prostredia.pdf (in Slovak only).



The intensity of freshwater abstraction is relatively low in the Slovak Republic, but wastewater treatment levels are also among the lowest in the OECD.



abstraction as compared to GDP, population or internal resources is lower than in most other OECD economies; the reported abstraction per capita has been declining over the past 25 years (about 100 m³/capita in 2014).

Effective management of these resources remains a challenge. The generation of wastewater is relatively high and only a small share is “recycled”. Wastewater treatment levels are among the lowest in the OECD; only 65% of the Slovak population benefit from a connection to a wastewater treatment plant. Water use is under-priced; and the user pays principle is not applied to all types of users. Until 2017, water use in agriculture was free of charge; the current price is symbolic (0.001 EUR/m³) and does not cover all water abstracted. This points to room for further progress as regards water use efficiency, integrated water management and water pricing in line with the user pays principle.

The current policy framework is incomplete and lacks coherence

The resource management policies currently in place could be strengthened in order to provide more effective framework conditions for establishing a resource-efficient economy, upgrading resource- and pollution-

intensive sectors, and achieving green growth. The use of economic instruments lacks coherence and is not always in line with the polluter pays and the user pays principles.

Electricity prices are high compared to neighbouring countries and include several politically motivated price components, including a levy to support production from renewable resources, and a feed-in tariff for domestically produced but environmentally damaging lignite (OECD, 2017) (European Commission, 2017). Municipal waste management is underperforming and lacks appropriate economic signals that would divert waste from landfills and stimulate recycling and reuse. Questions remain as to the environmental and economic effectiveness of the generous subsidies and tax exemptions provided to wood production, coal mining, metal processing and electricity production. Policy measures supporting research and innovation are not effective and reforms are proceeding slowly. There is no national strategy with a coherent approach towards eco-innovation and the circular economy (European Commission, 2017). The new Government manifesto, adopted in April 2016, recognises a resource efficient low carbon economy as one of the priorities in the environmental agenda, but remains vague about the policies and the financial backing that are needed.

Higher resource efficiency to secure competitiveness and reduce environmental impacts

In countries with a limited natural resource base, such as the Slovak Republic, coherent policies that aim at increasing resource efficiency and achieving green growth are vital. Lessons from OECD work indicate that improved resource efficiency can result in lower production costs and hence secure competitiveness in the long term. Using materials more efficiently along their life-cycle and value chain helps to reduce both material consumption in the economy and the country's dependence on imports, while at the same time alleviating pressures on the environment and on natural resource stocks. (OECD, Policy Guidance on Resource Efficiency, 2016). The sooner the Slovak Republic implements such policies, the greater will be the economic and environmental benefits. The current strong economic growth offers a window of opportunity for encouraging such a transition through carefully selected policy reforms accompanied by the necessary investments.

The resource efficiency of the Slovak economy could be improved in several sectors

Building on sector-oriented gap analysis and Slovak micro data on waste and energy consumption, improvements in three areas appear to be instrumental to improve the overall resource efficiency of the Slovak economy:

- strengthening **waste management**, including food waste, that is underperforming;
- transforming and upgrading pollution and resource intensive **industries** such as metal processing, mining and electricity production; and
- improving productivity in the **wood production and processing sectors**.

Improvements in these areas require well designed and coherent policies that complement each other, and a balanced mix of policy instruments.

Box 1. Expected long-term benefits of improved resource efficiency in Slovakia

Preliminary results from analyses carried out by the Slovak Institute for Environmental Policy indicate that improved resource efficiency in the Slovak Republic could have many long-term benefits. These benefits vary among the different stakeholders – the government, businesses, including SMEs, large companies and corporations, and people.

The government is expected to benefit from lower expenditure on the remediation of environmental burdens, improved conditions for implementing international commitments related to climate change, and lower health-related costs due to improved environmental quality. Lower production costs and a lower dependency on imports are further expected to stimulate economic growth.

Companies are expected to increase their productivity and competitiveness thanks to lower dependency on virgin materials, more efficient production processes and lower input costs. Other benefits could include increased labour productivity due to better human health conditions. The uptake of resource efficiency measures and their effects will differ among companies and depend on their flexibility. While large corporations, small progressive enterprises and start-ups usually adapt rather easily to new conditions, this can be problematic for small and medium-sized enterprises (SMEs) especially in less-developed regions of the Slovak Republic. Greater communication, guidance and assistance will be needed to avoid weakening these already vulnerable locations and to support these companies that are vital for Slovakia's economic diversification.

Implementing resource-efficiency policies and circular economy models is in particular expected to help upgrading or transforming pollution and resource intensive industries. This is particularly important in regions where coal is mined. Combining the attenuation of mining with incentives for creating greener jobs could offset negative impacts on the local economy and contribute to its reconstruction.



Eco-innovation could play an important role and provide a means to address both Slovakia's economic and environmental challenges. Strengthening the basic innovation capacity – for example through more support for higher education, international co-operation on science and technology, and more engagement of the private and financial sectors – is a key prerequisite for boosting eco-innovation. However, in Slovakia much of environment-related government R&D goes to traditional environmental areas (air, water, waste) with low potential for inventive activities, rather than to emerging areas that could help boost Slovakia's long term competitiveness. (OECD, 2011)

The waste management system

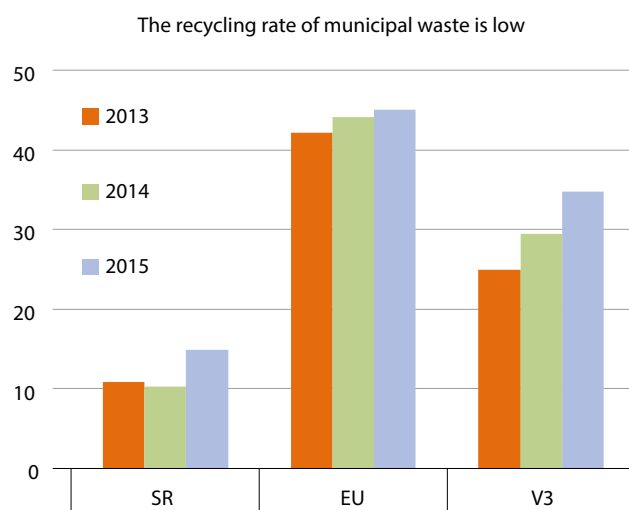
While the Slovak Republic does not generate more waste per inhabitant than similar economies, it is facing significant challenges in improving the way this waste is managed³. Almost 70% of municipal waste is currently still landfilled and almost 80% of landfilled municipal waste is mixed municipal waste of non-defined content.

3. The annual generation of waste (excluding major mineral wastes) per capita is below, but per GDP above EU average (1.17 versus 1.76 tonne/capita, 83.22 versus 67.87 g/EUR).

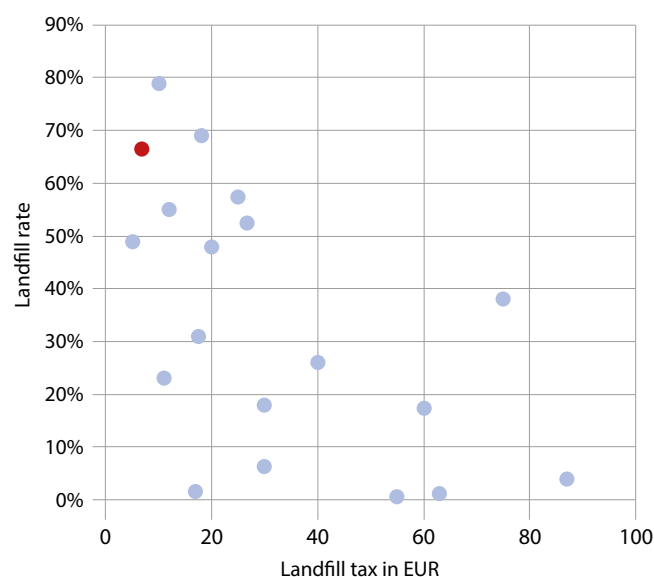
Only about 15% of the municipal solid waste is currently recycled, while other Visegrad countries (i.e. Czech Republic, Hungary and Poland) achieve one quarter and the EU more than one third on average. More progress has been achieved in the management of industrial waste, where 39% now goes for recycling, while only 36% is landfilled. As in other OECD countries, food waste remains a challenge, despite recent efforts.

A new law on waste entered into force on 1 January 2016. (Ministry of the Environment of the Slovak Republic, 2015) It has the potential to improve waste management and the circularity of the economy in the Slovak Republic, in particular via the strengthening of extended producer responsibility schemes.

Figure 5. **Municipal waste management lags behind**



Landfill taxes and landfill rates in various countries are correlated

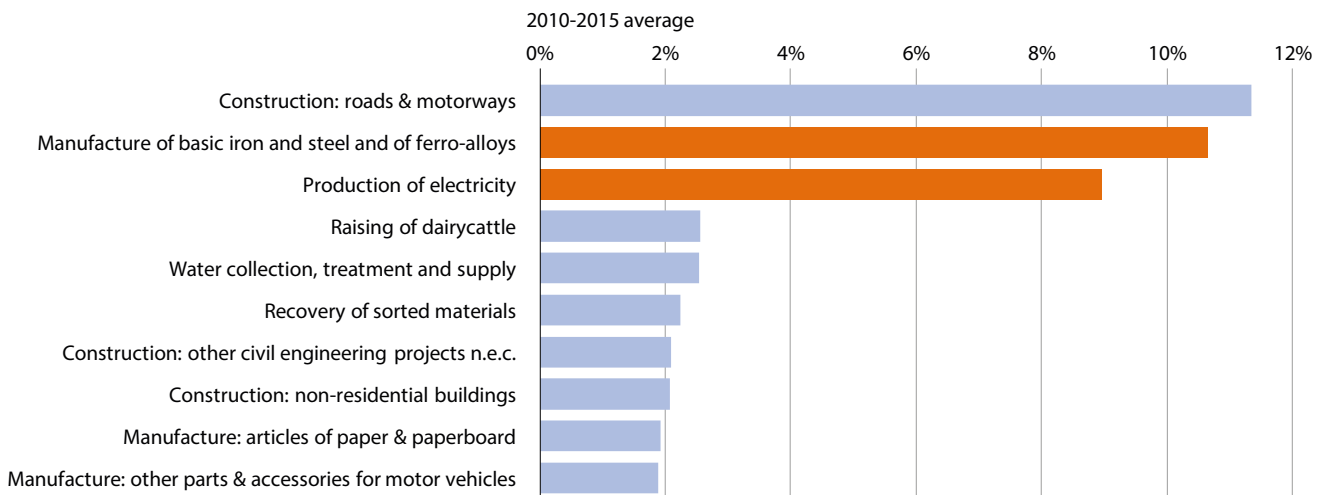


Source: Eurostat, EIONET.



Over the past 10 years, the metal processing sector consumed almost half of the fuel used in industry.

Figure 6. Waste by sector



Source: Statistical Office of the Slovak Republic.

The metal processing and electricity generation sectors

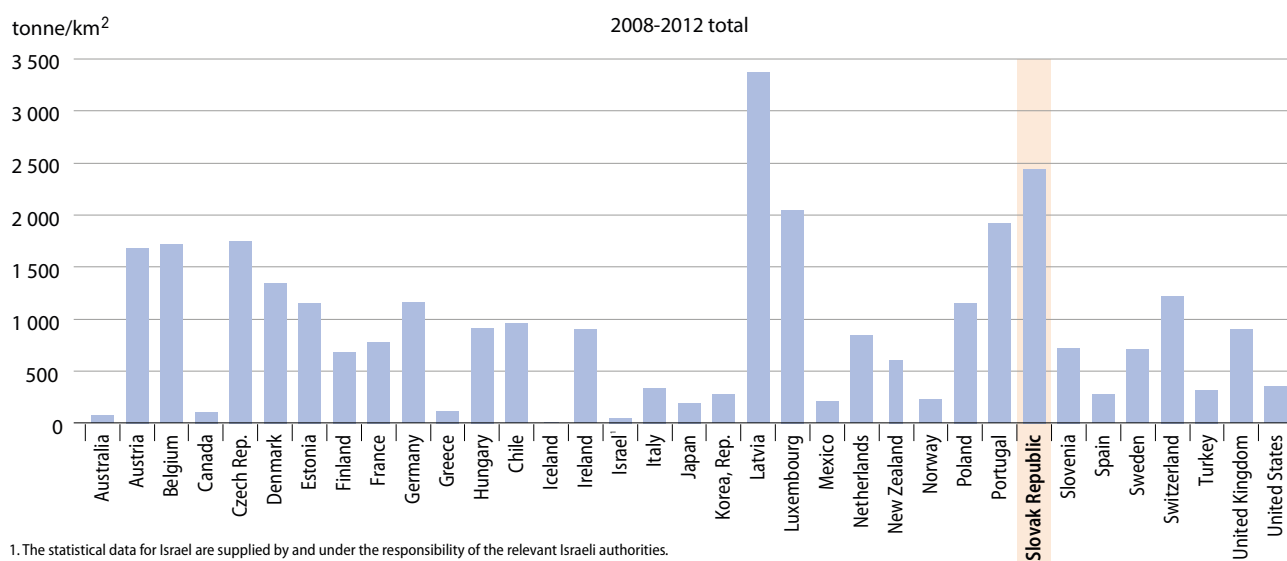
Increasing the efficiency of metal processing and of electricity generation from lignite could immensely increase the overall resource efficiency of the economy. These two sectors alone generate more than 20% of the country's industrial waste. Half of this waste (i.e. 11%) comes from the manufacture of basic iron and steel and ferro-alloys. Many of these wastes are landfilled, some of them being hazardous. Coal fired power stations produce only 10-12% of the country's electricity supply (Slovenské elektrárne, 2017), but generate more than 90% of all waste from electricity supply. Not to forget the waste from mining of lignite (about 1.5% of total waste generation).

These two sectors also consume two thirds of all fuel used in industry, the majority in the manufacturing of basic iron and steel and ferro-alloys. Over the past 10 years, the metal processing sector consumed almost half of the fuel used in industry, most of it in one factory (U.S. Steel Košice). Electricity production uses more than 15%.

Finally, these two sectors are big emitters of air and greenhouse gas (GHG) emissions. Two companies⁴ are the top two emitters contributing respectively to 20% and 6% of all GHG in the economy. One of these companies, a steel company, is also by far the greatest emitter of particulates contributing to 50% of all emissions from industry; this is ten times more than the second greatest emitter.

4. U.S. Steel Košice and Elektrárne Nováky.

Figure 7. Domestic wood extraction used per forest area



1. 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.

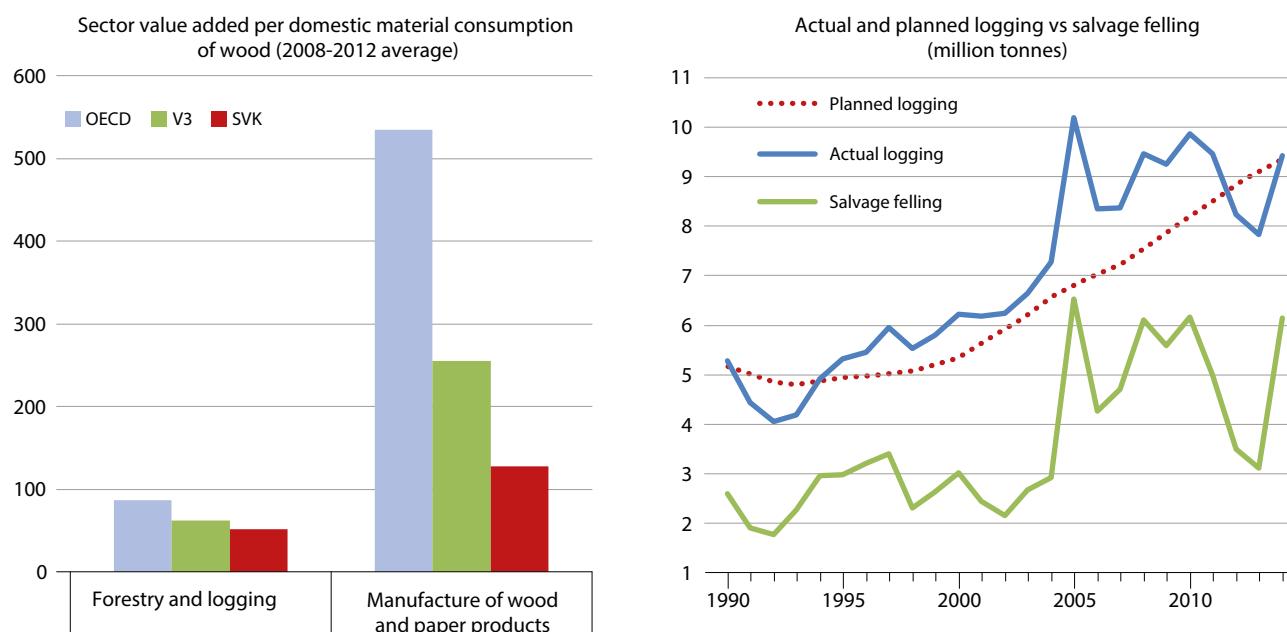
Source: OECD, FAO.

The wood production and processing sectors

According to OECD data, the Slovak Republic has been logging more wood, more intensively and with lower value added than other OECD and V3 countries. With a few exceptions (in 2012 and 2013), the volumes of wood salvaged from natural losses (salvage fellings) consistently represent more than half of total fellings (actual logging) and have continuously increased since 2000, in line with planned logging that increases on average by 4% annually.

The material productivity of the wood production and wood processing sectors (forestry, manufacture of wood and paper products) measured as valued added per unit of harvested or consumed wood appears to be low in international comparison. Moreover, according to older estimations by the WWF, the average level of illegal harvesting in the Slovak Republic used to be high. The share of wood of unknown origin represented 10% of annual total consumption and export in the early 2000s. The actual intensity of use of forest resources may thus be higher (Marušák, Horvát, Laš, & Marhefka, 2005).

Figure 8. Material productivity in the wood production and processing sectors



Source: OECD.

Waste generation per capita is relatively low, but only about 15% of municipal waste is currently recycled.



Strengthen waste management and move towards a circular economy

The 2011 environmental performance review of the Slovak Republic identified waste management as an important challenge for the country. Despite some advances, further progress is still needed in Slovakia to reach the average EU performance. At the same time, the European Union is discussing significantly more ambitious waste management objectives in the framework of its circular economy package, which, if adopted, would mark the beginning of a major transformation of the region's economy, towards much increased levels of resource efficiency. In this context, further reform efforts are becoming more urgent. In the following a number of key options that would allow the Slovak Republic to transition towards a more resource efficient economy are outlined. They are structured into measures that can support better waste management and instruments that can help to prevent waste from being generated in the first place.

Key measures for improving waste management

Gradually increase the landfill tax

The landfill tax⁵ in the Slovak Republic is among the lowest in the EU, which deprives the economy of sufficient incentives to manage waste more in line with the objectives set-out by the waste hierarchy, where reuse and recycling are prioritised over incineration and landfilling. In order to comply with the polluter pays principle, landfill taxes and fees should reflect the full cost of building, operating and closing such facilities at

5. Although in Slovak Republic it is called "landfill fee", it is de facto landfill tax.

the end-of-life, as well as other environmental costs that occur, but are not properly priced by the market.

In order to achieve the EU's 2020 50% target for the recycling of municipal solid waste, a key reform option that the Slovak Republic may pursue is to gradually but significantly increase the landfill tax. Substantial increases in the landfill tax are one of the policy measures that, in combination with other measures, have proven to be an effective policy instrument that leads to the diversion of waste from landfilling. To illustrate this, an increase of the average landfill fee from 7 to 42 euros per tonne⁶ is estimated to decrease the landfill rate from 66% to 52% between in 2016 and 2023. In order to minimise the costs to the economy, the increase should be gradual and predictable, similar to the British landfill tax escalator (Talbot, King, Radevsky, Rainsford, & Smith, 2014). Landfill bans for certain non-hazardous municipal wastes, as they exist in some countries (e.g. Germany and Austria) are not perceived to be as economically efficient as a tax (DEFRA, 2012).

Furthermore, the revenue from the landfill tax should not be directly allocated to municipalities, as is currently the case, in order to avoid a conflict of interest that can negatively impact the effectiveness of the measure. Municipalities are often the owners and/or operators of landfills and may have an incentive to maximise revenue from landfill taxes rather than diverting waste into other waste treatment options.

6. This estimate is based on Slovak micro data, a short term demand elasticity of -0.11 according to (Fogarty, 2014) and a 50% higher long-term elasticity (according to the DEFRA landfill tax model. The following assumptions (based on past trends) were made: a 2% annual average increase of waste generated over the period 2019-2023; and a 1% increase in landfilled waste.

Make pay-as-you-throw schemes obligatory

The introduction of pay-as-you-throw schemes and extra charges for special types of waste such as bulky municipal waste is another policy measure that has proven to be effective in improving separate collection and recycling rates. While households are currently mostly charged through a flat fee that is disconnected from actual waste generation, pay-as-you-throw (PAYT) schemes link waste management fees to the amount of waste produced by each household. As PAYT fees are linked to the weight or volume of different waste fractions, households have an incentive to minimise their waste management costs by better separating and minimising their waste (e.g. by composting heavy organic waste in their yards rather than having it collected from the curbside).

For instance, in Belgium households are required to use differently coloured bags to dispose different types of waste. The bag for “mixed” or “residual” waste is the most expensive one, up to five times the price of a bag for recyclable waste. There is ample empirical evidence from a range of countries that shows how PAYT leads to increased recycling and decreased waste generation. According to one source, recycling rates are on average 2.49% higher in cities with variable fees compared to cities without such policies (Folz & Giles, 2002). Research also indicates that this effect is maximised when PAYT is combined with other policies, such as curbside, separate collection of recyclables (Blackmer & Criner, 2014). In this context, a key policy option for the Slovak Republic would be to make the introduction of PAYT schemes obligatory in all municipalities. In the current system, where the introduction of PAYT at municipal level is voluntary, the use of this promising approach has not taken off.

Fight illegal dumping and strengthen the enforcement of existing laws

Increases in the landfill tax (Bartelings, van Buekering, Kuik, Linderhof, & Oosterhuis, 2005), as well as the more widespread use of PAYT schemes are likely to create incentives for households to seek ways to bypass official waste management systems and dump waste illegally. Illegal dumping, therefore, needs to be effectively addressed in parallel to these measures.

Illegal dumping can be addressed in three different ways: (i) by making it more difficult to dump waste (physical barriers, lighting, landscaping etc.), (ii) by increasing the risks of getting caught (surveillance, partnerships, compliance campaigns or by publicizing the successes), and (iii) by increasing the costs to

convicted offenders (fines, require clean-up of dump sites). Effective communication of waste policies and information campaigns are also crucial (Department of Environment and Climate Change NSW, 2008). Rising income and better education on the contrary, do not seem to lead to a decrease of illegal dumping in the Slovak Republic (Šedová, On causes of illegal waste dumping in Slovakia, 2016), underlining the need for stronger prevention and enforcement measures.

While some efforts have already been undertaken in the framework of the new Slovak Republic Waste Law (in force since January 2016), which has led to significantly increase the fines for illegal dumping of waste, these fines are rarely enforced (Šedová & Haluš, Hory nelegálnych smetí, 2016). A key focus will need to be on construction waste, which is currently the largest source of illegally dumped waste. Further progress can be achieved in this area.

Stimulate the use of recycled construction materials

The construction sector is the largest producer of industrial waste in Slovakia. At the peak of the building-boom in 2010 and 2013, the construction of roads and motorways on its own accounted for more than 16% of total industrial waste generation. Currently, all industrial construction activities combined (i.e. roads and motorways, other civil engineering projects and non-residential buildings) account for about the same share. On top of this there is construction waste from building and reconstruction of private houses, which is also where most illegal dumping occurs. Construction waste should therefore be a major target for landfill diversion efforts as the use of recycled material can also help to reduce pressure on scarce natural resources, save energy and decrease pollution.

Stimulating the use of recycled construction materials requires a combination of measures, including increased landfill taxes for such waste, the provision of information and guidance on how to reduce construction waste, as well as the use of taxes on virgin construction materials such as sand and gravel.

Taxes on virgin aggregates have proven to be an effective policy tool in countries such as Sweden and Denmark. If appropriately priced, such taxes can divert consumption from virgin aggregates towards recycled materials. In the case of Denmark the virgin materials tax was introduced in parallel with a requirement to sort construction and demolition waste at source (Söderholm, 2011).

Strengthen efforts to prevent the generation of waste

Active prevention of waste is an important complement of waste management policies and ranks above recycling in the waste hierarchy. Effective prevention saves costs downstream in waste collection and treatment by reducing capital and operational costs of related infrastructure. (BioIntelligence Service S.A.S., 2012).

The Slovak Republic developed a waste prevention plan, in line with EU obligations, for the period 2014 to 2018 (Ministry of the Environment, Slovak Republic, 2013). This plan aims at a wide range of waste streams but has a particular focus on biodegradable municipal waste for which quantitative targets have been set: (i) a 40% reduction of the amount of landfilled biodegradable municipal waste compared to 1995, (ii) increasing the share of municipalities that use house and community composting to 54% of municipalities larger than 1,500 inhabitants. The implementation of food waste prevention objectives set-out in the plan could be further strengthened by banning the landfilling of retail food waste and re-considering legislation on the durability of food.

Consider banning landfill of retail food waste

One option that could help to further strengthen the implementation of food waste prevention is the introduction of a landfill ban for food waste originating from the retail sector. This measure has been implemented successfully in a number of OECD member countries (e.g. Scotland, France, Germany, Korea, Massachusetts and Norway) and produced positive results, by encouraging retailers find ways to give food away that has reached the expiration date to charities and producers of livestock feed. There is also a possibility to extend the measure to cover restaurants, food producers and agricultural sector.

In Ireland, retailers use an app called FoodCloud⁷ that allows holders of food waste to connect with potential users through a smart phone based app. Local charities connected to the retailer through the app receive a notification about food available for collection at a given time. In Germany, supermarkets that specialise on selling food waste have developed⁸.

7. <https://www.thinkbusiness.ie/articles/foodcloud-in-ireland-opel/>

8. <http://www.dw.com/en/first-german-supermarket-sells-waste-food-only/a-37426777>



The possible introduction of a landfill ban for retail food waste would need to be preceded by a number of other measures and reforms, including proper quantification of food waste and losses, investments in infrastructure and the removal of administrative obstacles to the effective allocation of food waste to charities and other potential users.

Remove date of minimum durability and review legislation concerning food

Although the EU explicitly allows products to be sold after the “best before” date that they carry, the Slovak Republic is one of few member states where this practice is illegal (European Court of Auditors, 2016). Food that is past the “best before” date may not have quality of fresh food, but it is usually still edible – a fact that is unknown to most consumers and leads to confusion and unnecessary food waste. According to Aschemann-Witzel et al. date labelling legislation and food producer’s usage of it can be improved to better match how consumers perceive date labelling (Aschemann-Witzel, de Hooge, Amani, Bech-Larsen, & Oostindjer, 2015)

Other obstacles to reducing food waste are linked to the criteria that charities that wish to receive food that is past its “best before” date need to fulfil. A review of legislation that addresses food security would be useful and could lead to lifting some of these obstacles, where food security is not compromised.

Box 2. Improving food waste data in the Slovak Republic

Current food waste data are relatively rough estimates with significant margins of error. The Slovak Republic thus lacks reliable data on food waste, especially concerning landfilled municipal waste, given that almost 80% of municipal waste is identified as mixed waste. Yet, the OECD identifies good data as one of four key conditions for the design and implementation of successful food waste policies (Parry, 2015). The clear identification of where in the value chain food waste occurs (i.e., at the farm, in food processing, retail or at the level of consumers) and of the major causes is an important prerequisite for policy making in this field.

The Ministry of Agriculture and Rural Development of the Slovak Republic is currently developing a methodology to assess food waste at each step in the food supply chain. An agreed methodology is expected by the end of 2017 and an improved dataset by 2020.

Upgrading material and energy intensive industries

Metal processing and electricity generation from lignite are important sources of waste and emissions. Industries in these sectors are significant employers in the Slovak regions, but they lack competitiveness and their economic performance is decreasing. Today they largely depend on subsidies and tax exemptions, which are disincentives to invest in resource efficiency and new technologies. There is a need for a comprehensive strategy for the transition of these industries and the creation of greener jobs in the regions concerned. Public employment services, requalification trainings and life-long learning will have to play a key role in these transitions.

Phase out government support to coal mining

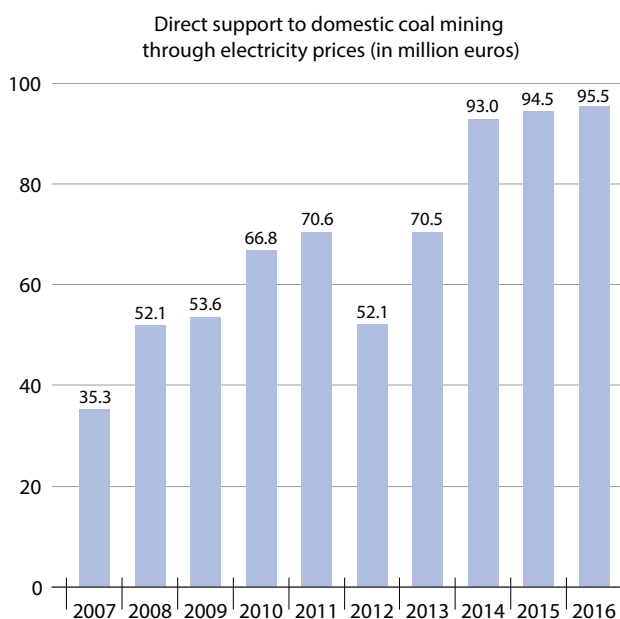
Electricity generation from domestic lignite has been supported to reduce dependency on energy imports and for social reasons, encouraging the use of this relatively more polluting energy source. (OECD, 2011). In 2015, government support to domestic coal mining accounted for almost EUR 120 million.

Government support to coal mining includes:

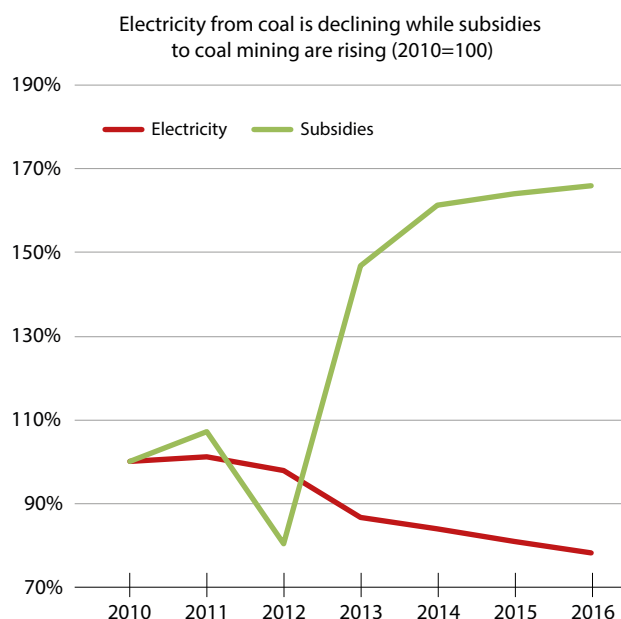
- **Direct support** through higher electricity prices. A special fee to support domestic coal mining is included in all electricity bills. While electricity production has been decreasing, revenues from this fee have been rising, up to a total of EUR 95.5 million in 2016.
- **Indirect support** through exemptions from the excise duty tax for electricity production from coal. According to estimates by the Ministry of Finance, these exemptions amounted to EUR 15 million in 2015.
- **Other forms of support**, including direct subsidies from the Ministry of Economy for closing down mines.

Coal mines only operate thanks to this generous support scheme; they are not competitive, nor economically viable. Phasing out support for brown coal mining has been repeatedly recommended by the OECD and the European Commission, together with higher environmental taxes, which would help reduce pollution and waste landfilling. (OECD, 2017) (OECD, 2011). It is expected that domestic pressures for making the Slovak tax system more environmentally friendly by removing these subsidies will also grow, in particular in the

Figure 9. Coal mining: Rising subsidies and decreasing production



Source: RONI



Source: IEP, SEAS.

context of the country’s commitments under the Paris climate agreement. Doing so however raises difficult social questions. For example, 90% of the revenue of Hornonitrianske bane Prievidza (HBP), a coal mining company in the Nitra region, comes from coal sales. Stopping government support that has been increasing since 2010, would probably cause the closure of the mine whose profits are declining and which employs 3486 persons (2015 data) (HBP, a.s. , 2016).

A similar situation is found in the *metal processing sector*, where a steel company, a key employer in the Slovak Republic, has benefited from various subsidies, including exemptions from energy and environmental taxes. Despite this government support, the company reported a loss of EUR 370 million in 2013, more than its cumulative profit since 2009, and the number of employees has been declining from around 14 thousand in 2003 to only 10 thousand employees in 2015.

Strengthen public employment services, requalification trainings and life-long learning

Supporting the reallocation of workers in industries that undergo difficult transitions requires flexible labour markets, high work force mobility, low tax burden on low-paid workers and adequate support to green innovation and new technologies. According to the OECD, the mobility of workers in pollution intensive industries in the Slovak Republic is relatively low, and the share of low-skilled employees facing above average displacement costs

in these industries is significantly higher than the EU average. (OECD, 2012). Low mobility is however not specific to pollution intensive industries in Slovakia; it is a more general problem. (Andrews & Saia, 2016).

An essential precondition for the effective reallocation of employees is the existence of well-functioning public employment and re-employment services that provide proper counselling and succeed in re-integrating and requalifying jobseekers as quickly as possible (OECD, 2012). Yet, Slovak public employment services often lack resources and expertise, especially in regions with high unemployment rates, and current employment policies do not succeed in helping long-term unemployed find a job. The lowest success rates are found in districts like the Prievidza District, where coal mines are located (3.5%) and the Košice District⁹, where the steel industry is located (around 11%). Only 40% of the resources for active labour market policies are spent on long-term unemployment that is a major issue in these districts. As a result training and education for job seekers is underfinanced, jobs subsidisation prevails, and counselling is insufficiently supported (Hidas, Vaľková, & Harvan, 2016).

A coherent multi-year plan is required for reintegrating employees from these industries in the labour market. For this, the government could use some of the support money to finance requalification courses, training or other types of support schemes for workers, including

9. District located in eastern Slovakia (Východné Slovensko), which is the least developed region in terms of regional income, employment and wage levels.



special schemes for former employees of the mining or steel industries. Continuous learning during the whole working life is of prime importance to prevent long-term unemployment as it helps workers to maintain their learning skills and adapt to new tasks. (Mayhew & Rijkers, 2004). Moreover, the tax system should not be an obstacle for rehiring these low-paid workers; the current tax and social security burden on labour is particularly large for low income earners (OECD, 2017). Some re-orientation from mining to other business concepts that could provide alternative job opportunities has already started (e.g. using heat from the mines to grow vegetables and fish).

Box 3. Innovation as a key for a competitive steel industry

With strict European environmental regulations and concurrently generous funding for research, it is crucial to be able to participate in innovative processes. Arcelor Mittal in the Belgian Ghent has been granted EUR 10 million of EU research funding to implement a microbial process for transforming carbon monoxide into bioethanol, instead of carbon dioxide as it is common in steel processing (Clark, 2015). Voestalpine in Austria has won an EUR 18 million EU contract to develop an electrolysis pilot plant that will turn water into hydrogen in Linz. The hydrogen is expected to be used as a replacement of coking coal used to reduce iron ore into molten metal. Both investments aim at reducing carbon emissions.

Improving productivity in the wood production and processing sectors

The wood production and processing sectors are characterised by a rather low material productivity, generous government support and insufficient public information on forest resources and their management. Subsidies to forestry and to wood and paper manufacturing should be reviewed and the transparency of forestry statistics increased.

Provide better and more transparent information on forest management

The data that are publicly available are rather aggregated; they do not enable third party assessments, nor the monitoring of trends over longer periods. The National Forest Centre carries out forest inventories, and maintains a geographic information system and a forest portal. However, detailed data, maps and time series on individual forest units, on species composition, age class structure, actual and planned harvest, salvage felling, growing stock and forest conditions¹⁰ are not accessible to the public, nor to government agencies other than the Ministry of Agriculture and Rural Development and its subsidiary bodies. The same applies to information on the costs of forest care programmes, logging plans and other forest activities that are funded from the state budget and should thus be made public.

In the past, there has been a lot of controversy and polarized debates on the state of forest resources and the sustainability of their management between environmentalists and the National Forest Centre or the Ministry of Agriculture and Rural Development. Making more data publicly available and being more transparent on government actions and spending would help avoid such debates. Better and more transparent information could also help fighting illegal harvesting and lead to more efficient management practices. It would enable other government agencies and NGOs to prepare their own analyses and contribute in a constructive manner to the policy debate.

A better monitoring of long-term developments in the use of forest resources and logging is also needed. In their 2008 and 2009 Green reports, the National Forest Centre and the Ministry of Agriculture and Rural

10. The forest geographic information system (LGIS) includes data on the composition of and logging in individual forest units. But, time series are not made public for the smallest units (components), nor is information on logging plans.



Development recommended that wood removals should not exceed 60% of the annual productive capacity. At that time, the harvesting intensity was about 80%. Since then, no update of this indicator has been made available (Ministerstvo pôdohospodárstva Slovenskej republiky; Národné lesnícke centrum – Lesnícky výskumný ústav, 2008).

Review government support to wood production and use

Sectors that use wood enjoy generous direct and indirect subsidies. The electricity price includes a feed-in tariff to support production from renewable energy sources, including biomass. The total revenue from this feed-in-tariff has been rising from year to year and exceeds EUR 50 million, which are allocated to circa 30 companies. As a result, the amount of wood used for energy purposes has almost doubled between 2005 (0.76 million tonnes) and 2015 (over 1.45 million tonnes). And employment in the wood and paper production sectors is heavily subsidised.

A review of the effectiveness and coherence of these government support schemes, especially the feed-in tariff, would be beneficial. Although having a specific purpose, the combination of various types of subsidies could have negative effects on the economy and the environment. By distorting markets and diverting wood from other, potentially more efficient uses¹¹, subsidies may encourage over-logging and discourage efficiency improvements in wood-related sectors. Subsidies should only be kept when no other, market based solutions exist for promoting renewable resources or other policy aims.

11. There are cases where heating plants used higher quality wood instead of low-quality wood chips.

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