Eco-innovation in Slovakia

EIO Country Profile
2014-2015
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“Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle”.

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Eco-Innovation Observatory

Country Profile 2014-2015: Slovakia

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A note to Readers

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Summary

Slovakia is in 23rd place among the 28 EU Member States in the 2015 Eco-Innovation Scoreboard (Eco-IS). This is a fair reflection of the current situation in Slovakia with respect to its innovation, environmental and circular economy performance. Although the situation has improved since 2013, the research and innovation policy framework remains fragmented and the private sector has low levels of innovation activity. The main source of innovation funding is the public sector, in particular EU funds (i.e. the Structural Funds).

The key strategy document that outlines the areas and measures to be adopted to support research and innovation in Slovakia is the Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3 SK), adopted in November 2013. Unfortunately, the expected 2014-2016 action plan stemming from this strategy has not yet been adopted and is still in the process of being agreed upon.

Further improvements are also needed with respect to intra-governmental cooperation between the ministries in charge of innovation, environment and energy matters, as cooperation and communication between these bodies is very irregular and dispersed. Cooperation between academia and the private sector also needs some support, as these usually function independently from each other.

With the upcoming Slovakian Presidency of Council of the EU in July 2016, the circular economy and eco-innovation in Slovakia should progress, at least from the policy perspective, as it has been listed as one of the priorities. Policy makers are focussed on trying to decrease the energy intensity of the Slovakian economy (as it is double the EU average) as well as improving waste management and decreasing the high landfill rate.
Introduction

The economy of Slovakia is highly integrated into global value chains, but production is concentrated in a few sectors and regions, namely the automotive sector in the western and northern regions of the country (SWD(2016) 93 final). Even though research and development (R&D) expenditure as a percentage of GDP has been steadily increasing in Slovakia, reaching 0.89% of GDP in 2014 according to Eurostat, this is still very low compared to the 2% EU average. The lack of a strong and coherent R&D and innovation (RD&I) policy framework is one of the main challenges to improving long-term growth prospects, and is a significant barrier to eco-innovation and the circular economy. R&D is also hampered by low public and private resources (low spending from industry), and inefficient public spending. Expenditure on R&D is highly dependent on EU funds (SWD(2016) 93 final). Cooperation between science and research educational institutions and the rest of the economy is very low. This lack of cooperation hampers the development and growth of industry, as they are failing to utilise the opportunities it offers for creating competitive innovative products, technologies and services (RIS3).

To date, there is no national policy outlining a coherent approach towards eco-innovation and the circular economy. A national-level working group has been set up to discuss the measures in the European Commission’s Circular Economy Package, however, no concrete strategies or action plans have yet been agreed upon.¹

Further challenges include low demand for eco-innovation products and services as well as low public awareness on this topic. One of the issues here is likely to be the fact that the Slovakian economy is currently dominated by small and medium-sized enterprises (SMEs).² SMEs often lack the financial and human resources to adopt or produce such technologies and products.

Low energy efficiency and under-pricing of environmental resources also remain challenges. Slovakia is a highly energy-intensive economy. The waste management framework has a poor track record, in part due to under-pricing of landfilling, while water charges do not sufficiently reflect environmental costs. High electricity prices, which incorporate several subsidies, represent an important challenge to Slovakian industry (SWD(2016) 93 final).

According to the Ministry of Environment, potential areas to develop further in this area include the following:

• Green economy – transition to green economy in all sectors, including social innovations
• Climate change – energy sector and renewable energy source (RES) use/production, adaptation measures
• Resource efficiency and circular economy – use of minerals and secondary raw materials, waste management
• Education and public awareness.

¹ Information provided during interview
² Presentation on Eco-innovation in Slovakia, given by Milan Chrenko, Ministry of Environment, 2015
1 | Eco-innovation performance

The analysis in this section is based on the EU-28 Eco-innovation scoreboard (Eco-IS) for the year 2015. Via its composite Eco-innovation index, produced by the Eco-Innovation Observatory (EIO), Eco-IS demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. Eco-IS is based on 16 indicators, aggregated into five components: eco-innovation inputs, activities and outputs, environmental and socio-economic outcomes.

The results of the scoreboard show that the overall eco-innovation performance of Slovakia for the year 2015 has improved compared to 2013 and 2014, with an overall index score of 72 (compared to a score of 54 in 2013), ranking Slovakia 23rd among EU-28 countries (compared to 25th place in 2013 and 24th place in 2014). The score of 72 means that Slovakia’s overall eco-innovation performance is 28% below the EU average. This reflects the challenges Slovakia faces in terms of a lack of a coherent eco-innovation policy framework as well as low investment in R&D. The improvement in ranking and the overall score could have been caused by a data source change with regard to two of the socio-economic outcomes indicators (more on this later in the section), and hence the results for these indicators are not fully comparable with the data for 2013.

Figure 1 EU-28 Eco-Innovation Scoreboard 2015, composite index

Figure 2 illustrates the five main components of the Eco-IS index, i.e.: eco-innovation inputs, activities and outputs, and resource-efficiency and socio-economic outcomes. The only component in which Slovakia scores above the EU average is eco-innovation activities (with a score of 101), while the other four components score below EU average. Slovakia also performs relatively better in the resource-efficiency outcomes (score 78) and socio-economic outcomes.
(score 87) components. For all components, the relative performance has improved compared to 2013 (only resource-efficiency outcomes stayed more or less the same score as before).

**Figure 2 Components of the eco-innovation composite index for Slovakia, 2015**

Source: EIO, 2016

**Eco-innovation inputs**

This index component shows to what extent the government gives priority to investing in R&D in energy and what the R&D human resources in the country are. The low score reflects the situation as described in previous section. The eco-innovation input component has a score of 38 in 2015 compared to a score of 29 in 2013. This component is composed of three sub-indices: government environmental and energy R&D appropriations and outlays (as a share of GDP), total R&D personnel and researchers (as a share of total employment) and total value of green early-stage investments (in US$ per capita). For the latter, Slovakia’s score is 0, hence the data providers it is assumed that no such investments have taken place. There was no reporting on this in 2013. The EU average for this indicator is US$82 (approx. €74) per capita. Government environmental and energy R&D appropriations and outlays, as a share of GDP, were 0.2% in 2014 (compared to 0.4%, the EU average) with an index score of 54. This is an improvement from 2013 where the indicator scored only 22. The performance was slightly better for the share of R&D personnel and researchers out of total employment, with 0.74% in 2014 compared to an EU average of 1.25%, leading to an index score of 59. This is a slight deterioration compared to 2013, when Slovakia had an index score of 65.

**Eco-innovation activities**

This index component shows to what extent companies in Slovakia are involved in material- and energy-efficiency eco-innovation, as well as in observing environmental management. The Eco-
innovation activities component is also composed of three sub-indices. Two sub-indices – looking
at the percentage of firms having implemented innovation activities for the reduction of material
input per unit output and for the reduction of energy input per unit output – date back to 2008,
and the data has not been updated for the 2015 Eco-IS. Six EU Member States do not report any
data, so results must be interpreted with care. According to the 2008 data, 0.07% (index 75) of all
Slovakian companies have implemented innovation activities aimed at reducing materials and
8.54% (index 80) of companies have implemented innovation activities aimed at reducing energy input. The third sub-index of this component is the number of ISO 14001-registered organisations
per million inhabitants. Slovakia is doing well on this indicator and has improved compared to
2013 report. There were 333 ISO 14001 registered companies per million inhabitants in 2014,
which gives an index score of 149, which is well above EU average (compared to 264 companies
per million and an index score of 127 in 2012).

Eco-innovation outputs
This index shows to what extent Slovakia produces eco-innovation-related patents, publications
and media coverage. Eco-innovation outputs remain Slovakia’s worst-performing index
component, reaching an index score of 52. However, this is a significant improvement from 2013,
when Slovakia scored only 26 on this index component. The sub-index for eco-innovation-related
patents in 2012 was only 14 (2.62 patents per million population), compared to top performers
Finland and Germany, both with an index of 230 (42.3 patents per million population). This sub-
index had a score of 18 in 2013 report (2010 data), despite the number of eco-innovation patents
being only 1.89 per million inhabitants. The sub-index score is much better for eco-innovation-
related publications (per million population), having an index score of 93 according to 2014 data,
i.e. 15.14 eco-innovation publications per million inhabitants. This is close to the EU average (16.2
publications per million inhabitants). This is a substantial improvement from the previous year
(2013 report) where the sub-index scored only 33, i.e. 2.96 publications per million inhabitants.
The sub-index score for eco-innovation-related media coverage (per number of electronic media)
was 47 in 2015, i.e. 0.16 eco-innovation-related hits per electronic media, while this sub-index two
years ago was only 26.

Resource-efficiency outcomes
This component measures material, water and energy productivity and greenhouse gas (GHG)
emissions intensity. The overall component score for Slovakia is 78, a slight improvement
compared to the previous report in 2013, where Slovakia scored 74. Material productivity
(GDP/Domestic Material Consumption, measured in EUR/kg) in 2013 improved from 2011,
reaching 1.73 EUR/kg with a sub-index score of 89 (compared to 1.34 EUR/kg and a sub-index of
77 in 2011). The water productivity sub-index (GDP/Water Footprint, EUR/m³) has not changed
from the previous 2013 report, as the data has not been updated (still based on data for 1996-
2005). Slovakia scored 59 (7.66 EUR/m³), compared to a sub-index score of 140 and 18.05 EUR/m³
for Ireland and the United Kingdom.

The energy productivity sub-index – GDP/gross inland energy consumption, measured in ‘tonnes
of oil equivalent’ (EUR/toe) – in 2013 has slightly improved compared to 2011, with Slovakia
scoring 80, i.e. 6.68 EUR/toe, compared to a score of 78 and 6.24 EUR/toe in 2011. In terms of
GHG emissions intensity, measured in kilogrammes of carbon-dioxide-equivalent relative to GDP
in euro (CO₂e/GDP), Slovakia has slightly improved this sub-index score, to 84 in 2013 compared to
80 in 2011, with a slight decrease in the indicator value, from 0.45 CO$_2$e/GDP in 2011 to 0.41 CO$_2$e/GDP in 2013.

**Socio-economic outcomes**

The overall component score for socio-economic outcomes for Slovakia in 2015 is 87. This is a considerable improvement from 2013, when Slovakia scored only 52 for this component. The exports of products from eco-industries (as a percentage of total exports) sub-index score has slightly deteriorated, from 52 in 2012 to 50 in 2014, despite the share of eco-industries’ products slightly increasing, from 0.31% in 2012 to 0.34% in 2014, as it is compared to the EU average, which reached 0.67% in 2014. The employment in eco-industries (as a percentage of total employment across all companies) sub-index score is slightly above EU average, 106 – i.e. 2.6% of employment in companies is in eco-industries in 2014. The top performers are the Czech Republic and Slovenia, both of which have a score of 183, i.e. 4.63% of employment in eco-industries. There was no data available for Slovakia in the 2013 report. In addition, please note that the data source for these indicators has changed. The Thomson One data used in the Eco-IS for 2013 has been replaced by Orbis data, because it has a larger coverage.

## 2 | Selected circular economy and eco-innovation areas and new trends

There have been some changes since 2013, which are mainly linked to the adoption of the Research and Innovation Strategy for Smart Specialisation (RIS3 SK) in November 2013. The Ministry of Economy is currently working on an action plan stemming from this strategy for the coming years. However, no plan has been approved yet. The process is very slow and has been hindered by other priorities.

From the environmental side, in Slovakia, the focus appears to remain on traditional environmental instruments, such as environmental management systems, environmental labelling and green public procurement (GPP). These voluntary instruments are well implemented and promoted by the Ministry of Environment. For example GPP accounted for 23.4% of the total value of public procurement in 2014.³

Some significant changes in this respect are expected to commence between July and December 2016, when Slovakia will hold the Presidency of the EU Council and is expected to have the following priorities related to this topic:

- Climate Change – the 2030 package and the aftermath of the COP21 in Paris
- Circular economy and waste package
- Biodiversity and ecosystem services – external and internal dimension
- Water management – in the context of climate change.

³ Presentation on Eco-innovation in Slovakia, given by Milan Chrenko, Ministry of Environment, 2015
There will also be an eco-innovation event organised in Slovakia in autumn 2016 by the Slovak Environment Agency in order to raise awareness on eco-innovation, circular economy and other environmental policy instruments.⁴

As a response to the adoption of the EC’s Circular Economy Package in 2015, a working group on this topic has been set up. There have been some discussions between the Ministry of Economy, Ministry of Agriculture and the waste department of the Ministry of Environment, but no action plan or strategy has been set up yet.⁵

With regards to energy policy, the focus remains on energy efficiency improvements and renewable energy. The existing incentive schemes are still in place and some new ones have been adopted (see Section 4). EU funds play a major role in this. Further investments are needed in energy infrastructure, energy efficiency and renewable-energy capacity to further improve the progress towards the 2020 target. Some of these investment needs will be covered by EU funds in the 2014-2020 programming period, with an overall allocation of €1 billion (SWD(2016) 93 final).

Energy efficiency is improving but the energy intensity of the economy still ranks among the highest in the EU (221 kg of oil equivalent per €1,000 of GDP in 2014 compared to the EU average of 122 kg of oil equivalent per €1,000) according to Eurostat. One important challenge is the creation of investment conditions that can mobilise support for the energy services market, with the active engagement of financial institutions, and ensuring an increased allocation and use of financial instruments – mostly EU funds for the programming period 2014-2020 (SWD(2016) 93 final). The evidence shows that some available EU funds are not used to the full extent and significant funds are available but not used.⁶

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**Waste recovery in the cement industry**

Ecorec is a company from Pezinok, Slovakia, which treats different types of waste to transform them into fuel (waste-to-fuel) and supplies them to the cement industry. The waste material and products that can be used include: tyres, waste oil and sludge, waste from recycled paper, different kinds of agricultural biomass, and biogas, as well as alternative fuels and so-called solid recovered fuels from industrial and municipal waste. Use of municipal waste has the highest potential. This is in many cases non-recyclable waste.

Energy recovery from this type of waste avoids further landfilling and provides an effective regional solution to replacing resources in industrial production.

Key words: waste recovery, cement industry, waste-to-fuel, waste-to-energy, solid recovered fuels

Link: [http://www.ecorec.sk/](http://www.ecorec.sk/)

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⁴ Presentation on Eco-innovation in Slovakia, given by Milan Chrenko, Ministry of Environment, 2015
⁵ Information provided by the interviewee
⁶ Discussed more in the next sections, see for example renewable energy vouchers
Processing and reusing textile waste from the automotive industry

STERED technology, developed by PR Krajné Ltd., located in the small village of Krajné in the western part of Slovakia, is based on processing mixed textile waste from the automotive industry and from old vehicles. Thanks to the new STERED Technology, the first technological production line has been designed to process this valuable textile material and transform it further to create new products. A complex production line contains a recycling and evaluating portion, and production units for complex products.

The technology consists of a complex production line, with two separate lines: STERED ID for producing insulating boards and STERED SD for producing construction board. The energy use associated with the textile material processed via STERED is up to 3-5 times lower than for insulation material produced from stone or glass.

Key words: textile waste, automotive industry, recycling and processing

Link: http://www.stered.sk/uvod?lang=en

Organic farming goes circular

A Slovakian eco-entrepreneur, Jan Šlinský, wants to promote for export a system for the mechanical cultivation of agricultural soils that can work entirely without oil as an energy input, through the development of the AGROKRUH, or Agro-circle, system. This is an electronically controlled gantry that rotates around a central point, and can be fitted with different implements to turn and cultivate the soil, and to water the crops.

AGROKRUH cultivates the soil in a spiral pattern, though planting of crops still needs to be done by hand. Because the gantry control system is very precise, high yields of about 30 tonnes of vegetables from 2 hectares can be achieved.

A full analysis of the relative environmental benefits of AGROKRUH has yet to be done, but it has been calculated that the production of 21 tonnes of vegetables, requires an input of about 4,000 kWh of electricity – significantly less than greenhouse production. The vegetables grown using the system meet high organic standards, and are not damaged by soil compaction or emissions from agricultural machinery. Furthermore, if the electricity comes from renewable sources, AGROKRUH can offer entirely “green” production.

Key words: organic farming

3 | Barriers and drivers to circular economy and eco-innovation in Slovakia

There are several barriers to circular economy and eco-innovation in Slovakia. On the one hand, there are economic and financial barriers, i.e. lack of financial resources and high costs of innovation (RIS3). In particular, there is still a significant lack of funding for research and innovation in Slovakia. The reason behind this is that R&D has become a less common practice since the privatisation of large companies in the 1990s, and the multinational companies that drive the economic performance of the country (mainly automobile industry) do their R&D in their home countries. Public sector and EU structural funds are the main sources of R&D funding in Slovakia, rather than companies (RIS3). Certain regions, i.e. Slovakia’s central and eastern regions, do not attract private investment at all, mainly due to infrastructure problems such as poor roads (SWD(2016) 93 final). The Slovakian economy is also characterised by a predominance of SMEs, i.e. 99.9% of total enterprises, with 96% consisting of micro-enterprises (fewer than 10 employees) mostly in the services sector (RIS3; Chrenko 2015). In general, SMEs have difficulty in accessing finance due to, for example, lack of knowledge and balance sheets that are not attractive to lenders.

The lack of market demand for innovation and low level of public awareness on this topic are also barriers.

Another major barrier is the regulatory and policy framework for innovation, which is highly fragmented and insufficient to promote environmentally friendly behaviour in Slovakia (SWD(2016) 93 final; RIS3). According to the RIS3 SK and the country report for Slovakia produced under the European Semester, cooperation between competent ministries is not optimal, and strategic quality control for R&D projects is hampered by eight different government agencies being responsible for supporting R&D and innovation. The fragmented administrative framework and the lack of coordination and thematic concentration may partly explain the low levels of research performance and the low participation of domestic firms in R&D. Another example of the sub-optimal level of cooperation is the creation of working groups to discuss these topics, which are ineffective, meet irregularly and appear to cease to exist before they have achieved their objectives. These issues contribute to very slow implementation of R&D policies and action plans. For example, an action plan to implement the RIS3 SK strategy is still pending, and this is delaying effective implementation of some measures under the Operational Programme for Research and Innovation (2014-2020). The foreseen transformation of numerous funding agencies has been slow. The Research Agency and the Technology Agency were created in 2015 through transformation of two existing institutions. The planned transformation of the Slovak Academy of Sciences from a state organisation into a public research institution to facilitate cooperation with the business sector has been postponed to 2016 (RIS3).

Better inter-institutional cooperation and communication between the different ministries is needed to move things forward in the eco-innovation field. This situation should improve with the

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7 Information provided by the interviewee
adoption of recent strategic and policy documents, such as the Research and Innovation (R&I) Strategy for Smart Specialisation in 2013, outlining the support of R&I for the period 2014-2020, the new waste prevention programme for 2014-2018, the Slovak Waste Plan (2016-2020) and the new Act on waste (no. 79/2016), which entered into force on 1 January 2016.\(^8\) These policies are described in more detail in the next section.

Better cooperation between academia and industry is also needed, as this is almost non-existent. One of the main reasons appears to be the fact that industry has a low level of confidence in the quality of services offered by universities and research institutes (RIS3).

One of the main drivers to support eco-innovation and the circular economy could be the automotive industry, as it is one of the main industries in the Slovakian economy. This industry has the opportunity to take the lead in moving things forward. Another driver could be a good incentives framework to promote innovation among companies and academics. As an example, the use of innovation vouchers to financially support companies has been launched in 2013 and showed some success. In 2015, under the third call, 70 applicants received financial support totalling €365,000. In addition, a National Office for Technology Transfer was established and will now work more intensively with offices located within universities. To date, researchers have predominantly been evaluated on their publication record and teaching achievements, with the commercialisation of research outputs playing little role in their career advancement (SWD(2016) 93 final).

### 4 | Policy landscape: towards circular economy in Slovakia

**Circular economy**

To date, there has been little activity related to the circular economy in Slovakia. A working group has been established to discuss the measures presented in the European Commission’s Circular Economy Package, but no action or strategy has yet been set up and agreed upon. This should change with the upcoming Slovakian Presidency of the Council of the European Union between July and December 2016.

**Eco-innovation and innovation**

In November 2013, the Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3) was adopted. RIS3 is the basic strategic framework document for supporting research and innovation in the programming period 2014-2020 and is the basis for the creation of the Structural Funds’ Operational Programmes. RIS3 is a key document aimed at sustainable economic growth and increased employment in Slovakia through targeted support of research and innovation and achieves critical mass in each of the strategic priorities, taking into account regional differences.

The identified areas of economic specialisation in Slovakia include:

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\(^8\) Presentation given on Eco-innovation in Slovakia, by Milan Chrenko, Ministry of Environment, 2015
• automotive and mechanical engineering industries;
• consumer electronics and electrical equipment;
• ICT and services;
• production and processing of iron and steel.

Energy efficiency and renewable energy development trends are to a small extent relevant to these four areas.

Available scientific and research capacities were found in the following areas of specialisation:

• Research of materials and nanotechnology
• Biomedicine and biotechnology
• Environment and agriculture
• Sustainable energy.

These areas are highly relevant to eco-innovation and the circular economy.

The main goals listed under the RIS3 SK are the following:

• Further integration and anchoring of key industries (increase the proportion of companies that are shifted to a higher level in the supply chain).
• Increase the contribution of research to economic growth (increase the share of R&D spending to 1.21% of GDP by 2020, increase the proportion of private/public funding to 2:1).
• Create dynamic, open, inclusive and innovative companies (improve conditions for increasing innovation performance, knowledge-intensive services, creative industries).
• Improve the quality of human resources (increase the employment of graduates of secondary schools and universities, and improve links with educational system practice).

Slovakia was supposed to prepare an action plan for RIS3 Implementation 2014-2016, which should include:

• integrated institutional governance of the public administration of R&D, as an essential element of overcoming the fragmentation;
• changes in legislation related to the objectives of RIS3;
• financial frameworks and their consistency with the priorities and objectives of RIS3;
• strict financial parameterisation expenditure for R&I, and promoting competitiveness within the RIS3. 9

However, the preparation of the action plan, including background material is still in process.

One of the existing initiatives of the Ministry of Economy, established in 2013, and still in operation, is the support offered to entrepreneurs to develop their products, services and technologies through innovation vouchers (see box below) (SIEA Innovation vouchers).

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9 Presentation by Martin Svoboda (March 2015) Ministry of Economy Slovak Republic
In the second half of 2015, a new funding programme was launched under the EU Structural Funds, called ‘Zelena domacnostiam’ (Green for households) where households can apply for vouchers to co-fund the installation of renewable energy technologies (SIEA Zelena Domacnostiam). Up to 50% of the eligible cost can be refunded through these vouchers. In total, €45 million is available from 2015 till 2018. Despite a significant initial demand, the use of these vouchers declined in the first and second call rounds. There have been 4,699 vouchers issued with a value of more than €10 million, but almost 1,000 vouchers are still available, with a value of more than €2 million.\(^\text{10}\) The main bottleneck seems to be that the voucher is only valid for 30 days after the date of issue, and can only be redeemed after the installation. These requirements have led to many vouchers becoming invalid.

**Waste management and recycling policies**

Since 1 January 2016, *a new legal act on waste* entered into force (Act no. 79 of 17 March 2015), which governs several aspects of waste management, including waste prevention, extended producer responsibility, management of municipal waste, and the operation of the Recycling Fund. Parts of this act are relevant to improving circular economy, in particular the extended producer responsibility scheme, where the producers of specified products must bear all the financial costs associated with the collection, transport, preparing for reuse, recovery, recycling, processing and disposal of separately collected waste. The act imposes the responsibility to collect and send for waste treatment on holders of packaging waste who are not part of the municipal waste system and do not produce the waste themselves.

*The Waste management plan of the Slovak Republic for 2016-2020* was also adopted in 2015. It evaluated performance between 2011 and 2015 up to 2013. The results showed that several objectives had not been reached, including the targets set for municipal waste – in particular recycling targets.

The plan also states the new objectives up to 2020, including:

- implementation of the extended producer responsibility scheme;
- improvements to the separate collection and recycling of waste, including construction and demolition waste;
- setting up a support scheme to use recycled waste as a resource for products, and the improvement of the market for such materials;
- supporting financing of reused products and materials within municipal waste;
- raising awareness on recycling, reuse and remanufacturing.

The latter three of these objectives are particularly strong signals of support to the implementation of a circular economy.

In addition, there is a Waste Prevention Programme for 2014-2018 that aims to ensure that Slovakia’s waste management practices will be in line with the waste hierarchy.

The Recycling Fund was set up in 2001 to support the concentration, recovery and processing of several types of wastes. It will be abolished on 31 December 2016 without a legal successor (Act no. 79 on waste of 17 March 2015).

**Environmental management**
As mentioned in the previous sections, several environmental instruments to promote eco-innovation are well established in Slovakia. These include:

- the EU Eco-Management and Audit Scheme (EMAS) and Environmental Management System under ISO 14001 (EMS);
- environmental labelling of products, implemented through the European and national eco-labelling schemes EU Ecolabel and Environmentally Friendly Products;
- green public procurement (GPP), with the current National Action Plan for GPP 2011-2015 (NAP GPP II) set up by the governmental decree 22/2012. NAP GPP III has been prepared recently, and is awaiting governmental approval.

### Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3)

The Slovak Government passed the Smart Specialisation Strategy for the Slovak Republic (RIS3) via the Government Resolution no. 665/2013 on 13 November 2013. The document identifies four key areas of economic specialisation:

1. Automotive and mechanical engineering industries;
2. Consumer electronics and electrical equipment;
3. Information and communication technologies and services;
4. Production and processing of iron and steel.

The document also lists ‘prospective areas of specialisation’, such as:

- automation, robotics and digital technology;
- processing and increasing the value of light metals and their alloys;
- production and processing of plastics;
- creative industry;
- increasing the value of domestic raw material base.

The RIS3 document also presents several far-reaching reforms:

1. merging the current eight research and development and innovation (RD&I) government agencies into two: the Science Agency and the Technology Agency;
2. changing the split of support between basic and applied research from the current ratio of 2:1 to 1:2 by 2020;
3. introducing ‘mandatory indicator of the state support to R&D as percentage of GDP in the State Budget Law’;
4. re-organising higher education institutions (HEIs) and transforming the Slovak Academy of Sciences.

Keywords: Research and innovation, smart specialisation, Slovak Republic

Innovation vouchers to support enterprises in developing technologies and innovative services

The Ministry of Economy has been supporting entrepreneurs with so-called innovation vouchers since 2013. These (non-reimbursable) vouchers are financed from the state budget and have a value of €5,000 per voucher for SMEs up to 250 employees, and €10,000 per voucher for large companies. The beneficiaries of these vouchers can use registered research facilities to support their activities.

These vouchers are not specifically aimed at eco-innovation, but for innovation as a whole. Nevertheless, circular economy and eco-innovation technologies are within the scope of these vouchers. In 2014, 45 companies and seven industry cluster organisations received support from vouchers, with a total sum of €360,000. For 2015, €370,000 was allocated for the vouchers.

Keywords: innovation voucher, business support, Slovakia

Link: https://www.siea.sk/inovacne-vouchre/

12 Presentation by Martin Svoboda (March 2015) Ministry of Economy Slovak Republic
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ANNEX: Policy measures addressing circular economy and eco-innovations in Slovakia

<table>
<thead>
<tr>
<th>Group of policy measures</th>
<th>Type of policy measure</th>
<th>Specific measure</th>
<th>Focus of policy measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity/business support</td>
<td>Publicly co-funded venture capital funds</td>
<td>- JEREMIE Holding Fund (promotion for small and medium-size enterprises for the application of progressive (environmental) technologies and possibly eco-innovations)</td>
<td>Circular economy</td>
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<tr>
<td></td>
<td>Public guarantee funds</td>
<td>-</td>
<td>Generic focus on eco-innovation</td>
</tr>
<tr>
<td>Support for R&amp;D in public sector and industry</td>
<td>R&amp;D funding</td>
<td>- Several innovation funds from the Ministry of economy (e.g. innovation vouchers)</td>
<td>Resource efficiency improvement</td>
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<tr>
<td></td>
<td></td>
<td>- Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3)</td>
<td>Energy efficiency improvement</td>
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<td></td>
<td></td>
<td>- R&amp;D funds from the Operational Programmes of Structural funds:</td>
<td>Reduction of emissions incl. CO2</td>
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<td></td>
<td></td>
<td>- vouchers for renewable technologies installation (2015)</td>
<td>Other relevant areas (e.g. renewable energy, etc)</td>
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<td></td>
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<td>- reduction of energy intensity in public buildings (2016)</td>
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<td></td>
<td>Collaborative grants</td>
<td>-</td>
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<td></td>
<td>R&amp;D infrastructure</td>
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<td></td>
<td>Circular economy</td>
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<tr>
<td>Fiscal measures</td>
<td>Tax incentives for R&amp;D and start-ups</td>
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<td></td>
<td>Tax incentives for R&amp;D personnel</td>
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<tr>
<td>Education, training and mobility</td>
<td>Tailored training courses for companies, entrepreneurs</td>
<td>BUILD Up Skills initiative has one SK ongoing project (STAVEDU) and one Horizon 2020 construction skills project (iNgRes)</td>
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<tr>
<td></td>
<td>Advise/consulting for start-ups, companies, entrepreneurs</td>
<td>Slovak Innovation and Energy Agency provides support/ consulting</td>
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<td></td>
<td>Placement schemes for students</td>
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<td></td>
<td>Support for R&amp;D workers recruitments</td>
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<tr>
<td>Networks and partnerships</td>
<td>Competence centres, clusters, science-technology parks</td>
<td>There are several industry clusters but not specifically on eco-innovation/circular economy <a href="http://www.siea.sk/klastre-na-slovensku/">http://www.siea.sk/klastre-na-slovensku/</a></td>
<td></td>
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</tbody>
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<tr>
<td></td>
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<td>Please provide reference to or brief summary of specific measures (national, regional)</td>
<td>Circular economy</td>
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<tr>
<td>Technology platforms and innovation networks</td>
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<td>Foresight and common vision building</td>
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<td>Market intelligence and other forms of information sharing</td>
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<td></td>
<td>“Green” public procurement of goods and services</td>
<td>Green public procurement (Ministry of Environment)</td>
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<td></td>
<td>R&amp;D procurement</td>
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<td><strong>Circular economy</strong></td>
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<td><strong>Technology Transfer</strong></td>
<td>Pre-commercial procurement</td>
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<td>Advisory support for technology adopters</td>
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<td></td>
<td>Financial or fiscal support for technology adopters (e.g. grants for purchasing new technology)</td>
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<tr>
<td><strong>Support of private demand</strong></td>
<td>Tax incentives for consumers (e.g. for purchasing environmentally efficient products)</td>
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<tr>
<td></td>
<td>Tax reductions for products and services (e.g. VAT reductions)</td>
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</tbody>
</table>
|                           | Demand subsidies (e.g. eco-vouchers, consumer subsidies) | Innovation Vouchers (2014) to support entrepreneurs to develop their products and technologies. [http://www.siea.sk/inovacne-vouchre/](http://www.siea.sk/inovacne-vouchre/)
Renewable energy technology vouchers (2015) to support the installation of renewable energy technologies at household level (up to 50% of the cost) [http://zelenadomacnostiam.sk/sk/](http://zelenadomacnostiam.sk/sk/)
Act No. 172/2005 Coll. on Organisation of State Support for Research & Development (as amended) – provides grants
<p>|                           | Recycling Fund (subsidies or credit schemes oriented on protection of the environment and waste processing) – to be abolished end 2016 |                      |                  |                          |                          |                          | x | x | x | x | x |</p>
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<td>Slovak Innovation and Energy Agency (<a href="http://www.siea.sk">www.siea.sk</a>)</td>
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<td>Enviroportal.sk – Enviroportal is a platform to publishing information from a number of different of information systems, to provide authorised and verified information on the environment in Slovakia and abroad. <a href="http://enviroportal.sk/">http://enviroportal.sk/</a></td>
<td>x</td>
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<td>EurActiv Slovakia (<a href="http://www.euractiv.com/">www.euractiv.com/</a>) – provides EU news</td>
<td>x</td>
</tr>
</tbody>
</table>
About the Eco-Innovation Observatory (EIO)

The Eco-Innovation Observatory (EIO) is the initiative financed by the European Commission’s Directorate-General for the Environment. The Observatory is developing an integrated information source and a series of analyses on eco-innovation trends and markets, targeting business, innovation service providers, policy makers as well as researchers and analysts.

Visit EIO and DG ENV Eco-innovation Action Plan (EcoAP) website and register to get access to more information and to access all EIO reports, briefs and databases.

www.eco-innovation.eu
ec.europa.eu/environment/ecoap