The Eco-Innovation Observatory functions as a platform for the structured collection and analysis of an extensive range of eco-innovation information, gathered from across the European Union and key economic regions around the globe, providing a much-needed integrated information source on eco-innovation for companies and innovation service providers, as well as providing a solid decision-making basis for policy development.

The Observatory approaches eco-innovation as a persuasive phenomenon present in all economic sectors and therefore relevant for all types of innovation, defining eco-innovation as:

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

To find out more, visit www.eco-innovation.eu

Any views or opinions expressed in this report are solely those of the authors and do not necessarily reflect the position of the European Commission.
Eco-Innovation Observatory

Country Profile 2013: Slovakia

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A note to Readers

Any views or opinions expressed in this report are solely those of the authors and do not necessarily reflect the position of the European Union. A number of companies are presented as illustrative examples of eco-innovation in this report. The EIO does not endorse these companies and is not an exhaustive source of information on innovation at the company level.

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Summary

On the 2013 Eco-Innovation Scoreboard Slovakia is listed in 25th place, below the EU average, and is among the countries with a low eco-innovation performance. The country’s performance is 47% of the EU average achieving approximately one third of the performance level of the European leaders in Eco-innovation, while lagging behind the EU average in all 16 Eco-IS indicators. Its best performing indicator is Eco-innovation activities with 80% of EU average. Slovakia also has a relatively good position in material productivity and ISO 14001-registered organisations; however, it scores very poorly with regards to the group of eco-innovation input and output indicators.

Slovakia does not have any significant eco-innovation areas or markets. A promising area with certain prospects appears to be the sector of renewable energy sources (RES) and energy efficiency within the building sector. The country’s natural conditions make it particularly suitable for the development of hydro energy and the use of biomass. Appropriate resources for biomass are provided mainly by forestry. This area of emerging national eco-innovation faces some daunting challenges including the disposal of environmental burdens (contaminated sites), the reconstruction and modernisation of transport infrastructure, and expanding energy savings in the building sector.

In Slovakia’s case, a national policy outlining a coherent approach towards eco-innovation is still lacking due to a weak R&D and innovation policy framework. Although 2013 saw some steps taken that could see improvements in eco-innovation activities. First of all, a new law was passed in the parliament and signed by the government in waste management and environmental law was strengthened. Furthermore, the Slovak Government released during 2013 a new Research and Innovation Strategy for Smart Specialisation (RIS3 SK) and is the basic strategic framework document for support of research and innovation in the programming period 2014-2020.

Eco-innovation is not a topic that is explicitly included in strategic documents. The concept of eco-innovation is dominated by the consideration of energy savings or RES, hence public policy and the building of an institutional framework in this area are primarily orientated towards energy savings and the promotion of RES. Financial support depends predominantly on EU Structural Funds, and is fragmented into many Operational Programmes. Coherent implementation of policy measures in general have been badly affected by politicisation of civil service positions as incoming politicians have appointed people they know or support them. This has led to a high turnover of civil servants, making it difficult to create a ‘clique’ of experts within the administrations, even with regard to the implementation of Structural Funds.
1 | Introduction

Eco-innovation developments in Slovakia face challenges from an absence of a coherent national innovation system as well as a range of economic and environmental problems. In 2013, the development of the Slovak economy was still affected by the recession caused by the world financial crisis in 2008. The Slovak economy recovered at an above average pace in 2010 but has since then slowed from 4.0% to 1.8% in 2012, although still above the negative growth than the EU28 average. With the real GDP growth rate expected to remain below pre-crisis levels and persistently high unemployment, it must strengthen domestic production and diversify sources of growth, whilst building on progress made in terms of structural reforms and public finances (European Commission, Europe 2020).

Slovakia has been one of the most rapidly growing economies within the European Union. This growth was based on low taxes and salaries which has attracted large volumes of foreign direct investments (FDI) mostly made by multinationals. However, the foreign direct investments in Slovakia have not been accompanied by business investments in research and development (R&D). During the 2006-2011 period investment in R&D was less than 1 % of foreign direct investments (RIIS3 SK). Hence, R&D is underdeveloped in terms of expenditures (among the lowest in EU28), patent and publication performance, all of which are low. So far, the growth of labour productivity has been achieved mainly by transfers of technologies and organisational innovations in the framework of multinational companies. Furthermore, the Slovak business sector has shown a persistently low innovation absorption capacity, with demand for research and innovation solutions by small and medium-sized enterprises (SMEs) being particularly low. There have also been very low venture capital investments and weak cooperation between industry and academia.

Regarding the environment, Slovakia has seen growing issues with generated waste and disposal. The major industrial waste producers are manufacturing, construction and the supply of electricity, gas, steam and air-conditioning. On the other hand, there has been an upward trend in municipal waste, though two thirds are still ending up on landfills. Motivation for recycling has been hampered by insufficient legislation support because processing of recycled waste is several times more expensive than handling general waste. Prices of raw materials are low and at the same time there are no fees for landfills. In addition, there are about 1,500 highly polluted sites including chemical, mining and metallurgical production sites, old dumps, former military sites and landfills, all of which have a potentially negative impact on the environment – specifically with regards to surface water, groundwater, soil, air and human health. Although during 2013 the government approved new legislation to tackle the issues mentioned above (see chapter 5) and there was a decrease of environmental infringements in the first half of 2013 by almost three percent over the comparable period in 2012 (Ministry of Environment).

The increase in motorised transport has also become a major challenge. It not only leads to the deterioration of the air quality in cities, but also increases public exposure to traffic noise, threatens human health and life, and demands more and more space for the building of transport infrastructure.

The major determinant of economic development is still industry, which, of course, also generates a high demand for energy and resources which will provide a major challenge in a transition to a greener economy. Slovakia has managed to significantly decrease its greenhouse gas (GHG) emissions since the 1990s; however, the level of emissions still remains high, a reflection of its high energy intensity. The share of renewable energy in gross final energy consumption has been constant between 2009 and 2011 (Eurostat). By 2015, Slovakia will face some major challenges, including providing wastewater discharge and biochemical sewage treatment in areas with a population of 2,000 or more, as well as optimising the use of fuel wood biomass from forestry. The strategic target is to reach a 14% share of gross consumption from renewable energy resources by 2020.
2 | Eco-innovation performance

The analysis in this section is based on the EU 28 Eco-innovation scoreboard (Eco-IS) for the year 2013. Eco-IS via its composite Eco-innovation index 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 which are aggregated into five components: eco-innovation inputs, eco-innovation activities and eco-innovation outputs as well as environmental outcomes and socio-economic outcomes.

With an overall index of 54, the Slovak eco-innovation performance ranks 25th place, the same as in 2012, before Poland (index 45), Cyprus (index 44) and Bulgaria (index 38). The closest countries above are Latvia (index 55), Hungary (index 61) and Romania (index 63). The top three countries are Germany (index 132), Finland (index 138) and Sweden (index 138) in the list of EU-28 Member States (EU average at 100), as illustrated below in Figure 2.1.

![Figure 2.1 EU28 Eco-innovation scoreboard 2013, composite index](image)

Source: EIO, 2013

Figure 2.2 illustrates the five main components behind the Eco-Innovation Scoreboard Index; Eco-Innovation Inputs, Eco-Innovation Activities, Eco-Innovation Outputs, Resource efficiency Outcomes and Socio-Economic Outcomes. For each of the five components of the composite index the country is below EU average level (see Fig 2.2.) with relatively better performance in Eco-Innovation Activities and Resource efficiency Outcomes, and amongst the lowest index for Eco-Innovation Inputs.

This comes as no surprise as the country struggles with general economic structural issues like a large productivity gap and comparatively low labour utilisation, with one of the weakest employment developments in Europe, as well as low Gross domestic expenditure on R&D below 1% and weak innovation performance.
**Eco-innovation inputs**

The eco-innovation input index is based on the government's environmental and energy R&D appropriations and outlays, the total number of R&D personnel and researchers, and the total value of green early-stage investments. The score for the composite eco-innovation input index for Slovakia is 29, which is significantly below the EU average of 100. In 2012, the proportion of the government's environmental and energy R&D appropriations and outlays was 0.9% of GDP (in comparison to the 4.3% EU average) and an index of 22. Slovakia ranked slightly better in the number of R&D personnel and researchers (share of total employment) in 2012 with 0.78% (index 65) compared to the EU average 1.21%. The absence of green early-stage investments in Slovakia (2010-2013) indicates that the Slovak economy is not an attractive destination for this type of investment. Slovakia has progressed slowly in advancing its domestic science, technology and innovation (STI) and some of the reasons are the underdeveloped capital market, lack of transparency in the case of public funds for venture capital, and weak cooperation between public and private R&D institutions and commercialisation of R&D. Furthermore, Slovakia needs to improve the governance of the innovation system (transparency, co-ordination, use and administration of EU funds, and institutional reforms of public research institutes and universities)(OECD).

**Eco-innovation activities**

The eco-innovation activities index is based on the statistics of companies with ISO certification and firms that have implemented innovation activities aimed at a reduction in energy and material sources. The data and trends of this indicator must be examined with caution as two of the three sub indicators date back to 2008, and for six countries there is no data available. Even if Slovakia’s overall performance for eco-innovation activities is below EU average with an index of 80, it is the best result so far the country since 2010. According to the Community Innovation Survey (2011) 0.07% (index 56) of all Slovak companies have implemented innovation activities aimed at reducing materials and 8.54% (index 59) of companies have implemented innovation activities aimed at reducing energy input. As mentioned above, both indicators are based on 2008 data, so no changes have been recorded since then. Slovakia has a better position in the number of ISO 140011 registered organisations per million inhabitants. For 2012 it reached an index of 127 or 264 companies per million inhabitants, while the EU average was...
208. This placed Slovakia in eighth place amongst the EU28 countries. The three top scoring countries are Sweden (index 197), Romania and Spain (both at index 199).

**Eco-innovation outputs**

The eco-innovation output index is based on three indicators: eco-innovation related patents, eco-innovation related publications, and eco-innovation related media coverage. This is clearly Slovakia’s worst performing indicator 2010-2013. For the overall indicator Slovakia (index 26) came second last before Czech Republic (index 22). This is one place down from the 2012 ranking. The index for eco-innovation related patents (per mln pop) in 2010 was only 18 (1.89), compared to the top performer Denmark and Germany, both with an index of 299. Slovakia obtained a slightly better result in eco-innovation related publications (per mln pop) with an index of 33 (2.96, EU average 7.60), compared to the top performer Sweden and Finland, both with an index of 267 (22.75, EU average 8.84). In terms of eco-innovation related media coverage (per number of electronic media), Slovakia scored an index of 26. Top performers are Latvia, Lithuania and Spain, all with an index of 231.

The significantly weak patent performance in Slovakia has many causes, particularly bureaucratic and financial barriers and the weak involvement of business R&D. The reason for the unsatisfactory number of eco-innovation related patents is the relatively poor quality of Slovak universities. The score of eco-innovation outputs index is also a result of the complete absence of eco-innovation related media coverage.

**Resource efficiency outcomes**

Based on the aggregate statistics for domestic material productivity, domestic water productivity, inland energy productivity and GHG emissions intensity, Slovakia scores 74 in the resource efficiency outcomes indicator. This ranks Slovakia in 21st place, down from 20th in 2012 and down from 17th place in 2011. Material productivity (GDP/Domestic Material Consumption, EUR/kg) is below the EU28 average (1.74 EUR/kg) reaching only 1.34 EUR/kg and an index of 77 in 2011. Top performers are Luxembourg and Malta, both with 3.16 EUR/kg and index 182. In water productivity (GDP/Water Footprint, EUR/m³) Slovakia has an index of 59 (7.66 EUR/m³), less than half of the two top performers Ireland and United Kingdom (both index 140 and 18.08 EUR/m³), although it must be mentioned that these figures are based on data for 1996-2005. In energy productivity (GDP/gross inland energy consumption, €/toe), 2011, Slovakia is also lower than the EU28 average (8.00 EUR/ton of oil equivalent) with a result of around 6.24 EUR/tonne, giving an index of 78. In terms of GHG emissions intensity (CO2e/GDP) Slovakia reached 0.45 CO2e/GDP in 2011 and an index of 80, compared to the best performing countries France and Sweden, both at 0.28 CO2e/GDP and an index of 127. Slovakia has nuclear and hydro power, which means that with not too much effort it could place itself above EU average by transforming parts of its economy to renewables.

**Socio-economic outcomes**

Socio-economic outcomes are measured by exports of eco-innovation products, aggregate statistics on employment in eco-innovation industries, and turnover in eco-industries. Despite achieving a lower score of 52 than in 2012 (53), it claimed a 16th place amongst EU28, up from 23rd the year before. Exports of products from eco-industries (% of total exports) in 2012 was 0.31% (EU average 0.59%) with an index of 52, compared with the two top performing countries Luxembourg and Denmark, both at 0.98% and with an index of 167. The relatively low performance in this indicator is due to the commodity structure of exports in which machinery and transport equipment, chemical products and intermediate goods have predominated. It should also be noted that the indicator exports of products from eco-industries and employment in eco-industries do not include renewable energy companies. For the other two indicators there is no data for Slovakia. The previous figures from the 2010 EIO Slovak country report were (for 2008) 1.06% of the total workforce was employed in eco-innovation industries, and turnover in eco-industries was 1.86% of GDP. The EU average was 1.49% for workforce and 2.63% for turnover.
3 | Selected eco-innovation areas and new trends

Not much has changed in terms of eco-innovation areas compared to the 2011 EIO Country profile, although there might be significant improvement in the coming years as a result of new legislation in environmental protection and in waste management. There is great potential in waste management, and Slovakia faces huge challenges in this area. In addition the Slovak government released during 2013 a new Research and Innovation Strategy for Smart Specialisation (RIS3 SK) that identifies a number of potential areas of specialisation (see below), although the strategy has yet to be implemented and take effect. Hence, as there has been little support during the last two years to promote eco-innovation, it appears that activities in the coming year will continue concentrating on development of renewable energy technologies and improvement of energy efficiency. Other areas are on the rise include the construction sector, which is seeing the introduction of low-energy, passive and zero emission houses; public transportation, where innovative activities are improving the transport fleet and vehicles operating on alternative fuel sources are being introduced; and the automotive industry.

The RIS3 SK presents the result of an analysis made on the development of the Slovak economy and identified a number of areas of specialisation based on traditional sectors and prospective areas of specialisation in fast growing sectors. The sectors in terms of economic specialisation are:

• Automotive and mechanical engineering industries;
• Consumer electronics and electrical equipment;
• ICT and Services;
• Production and processing of iron and steel.

This seems to be much in line what the Slovak Investment and Trade Development Agency (SARIO) states where current foreign R&D investments have been oriented: automotive, mechanical engineering, electro-technical industry, ICT, pharmaceutics and energetics.

In terms of prospective areas of specialisation RIS3 SK identified following sectors:

• 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.

A third group was presented taking into account available scientific and research capacities:

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

It is interesting to note that there is a discrepancy between what is the current economic specialisation and what is considered as prospective areas of specialisation on one hand while the available scientific and research capacities on the other hand seem to point to capacity for
Eco-innovation. It is clear that the first category reflects the prioritisation of macroeconomic policies of economic growth while at the same time it shows the need for stronger political guidance and action towards more environmental friendly legislation and regulation to create a framework that promotes eco-innovation both from the supply and demand side.

**Hydro energy** is the most used renewable energy resource in Slovakia, contributing with 90% of all energy produced from renewable resources. There are 25 large water plants and more than 200 small water plants. The big hydro plants can produce up to 4500 GWh running at around 75% capacity. Small hydro plants are built on rivers and have potential to produce 1000 GWh, running only approximately 25% capacity (Sustainable-event-alliance.org).

When it comes to development of other energy sources progress is slow in certain areas. In **wind energy** there are only 3 wind parks in Slovakia with 5.1 MW, which can cover the energy consumption of 3000 households. The reasons for such low wind energy production are missing suitable locations or such locations in protected areas. **Solar energy** is another player in energy production in Slovakia. It is not widely used due to high primary investments and insufficient governmental support. Surveys reveal that the amount of solar energy falling on the area of the country is 200 times bigger than the current consumption.

On the other hand **geothermal energy** seems to have high potential as Slovakia has large geothermal resources. According to research, the potential of geothermal energy production is 5,500 MW, although less than 3% is currently being used. The biggest project of geothermal energy is currently processed in the Košice basin on a 200km² area where the production of energy is due in 2012. **Biomass** is widely used for heat production. Currently, 2% of all heat production is produced from biomass while the plan is to raise it to 20% in five years of which 39% of the resources come from wood.

**4 | Eco-innovation barriers and drivers in Slovakia**

Despite being one of the fastest-growing economies in Europe, attracting significant foreign direct investment, Slovakia has progressed slowly in advancing its capabilities in research, development, technology and innovation. It lags considerably behind the EU average in terms of innovation performance. To continue to sustain productivity gains and develop new sources of growth, Slovakia needs to improve its innovation performance by strengthening its innovation support framework. The main barrier to eco-innovation is that the elementary organisation and structure of research and innovation in Slovakia is fragmented and inefficient.

The legislative environmental policy framework is not particularly strong and the government has not made it a main priority, as is the case in many other EU countries. Although in 2013 there were signs in the change of policy and political will to address environmental issues as well as the presentation of a **new Research and Innovation Strategy for Smart Specialisation** (RIS3 SK). The latter recognises that there is insufficient support of eco-innovation and that steps will be taken to promote the realisation of eco-innovation (RIS3: 64). **New environmental legislation** and the new innovation strategy can be what Slovakia needs to spur eco-innovation as a way of addressing and solving many of the country’s environmental problems. For instance, the new legislation on **waste management** and the creation of waste addresses the low levels of recycling and growing numbers of black landfills.

Another factor that contributes to the low level of eco-innovation activities is the ineffective use of financial sources in science in Slovakia and the precondition for their higher volume through public and private partnership in the Slovak innovation environment. The critical mass of human and material potential for innovation in the Slovak economy through solution networks has not
been created. Priorities are split, personal motivation and the atomization of financial sources without ensuring direct synergic effects.

Slovakia is the third most specialised economy in this area in the EU. Almost 65% of the country’s production comes from motor vehicles and spare parts. No other country in the EU has such a high share in the production demanding medium-high technologies. The share of research and development services in knowledge-intensive services related to high technologies is 5.2% in the EU27, while in Slovakia it is only 1.7% (RIS3 SK). So here is room for improvement and opportunities for eco-innovation.

Per capita funding of education favours quantity over quality and the share of funding allocated to teaching activities (teachers, material, and equipment) is low. Improving the quality of higher education and the cooperation between businesses and education institutions would help developing a well-functioning knowledge triangle, greater effectiveness and attractiveness of investment in R&D, and enhancing the innovation capacity of the Slovak economy.

In the area of preconditions for innovation development environment the strengths of Slovakia includes a high share of PhD graduates, but with insufficient representation in the technical and natural science fields, and the share of young people who have completed secondary education. Slovak science is considerably closed and its rate of involvement into the international research context is low.

In the area of funding innovation, Slovakia can be characterised by insufficient use of risk capital. Furthermore, expenditures on research and innovations, Slovakia permanently provides insufficient resources in this area. One of the reasons has been the selected form of privatisation of large companies when research and innovation departments have been separated and privatised which has led to their separation from practice.

The Research and Innovation Strategy for Smart Specialisation summarises the critical issues:

- inappropriate structure of PhD graduates (insufficient share of technical and scientific fields);
- low number of excellent research teams;
- low amount of total R & D expenditure and orientation of the R & D;
- insufficient innovation activity of SMEs;
- insufficient cooperation among innovation stakeholders (especially as regards companies; R & D departments);
- low representation of knowledge-intensive activities in the economy, and
- low patent activity.

The Slovak economy remains too dependent on exports and foreign investments, which have been promoted through low taxes and wage prices. It is overly specialised in assembly (notably of cars and consumer electronics) reflecting Slovakia’s position in the downstream activities of global value chains.

Slovakia needs to find new domestic drivers of growth and to upgrade and diversify its participation in the global value chains. This implies investing in human capital and skills, improving the business environment and the quality of institutions and government, as well as strengthening its innovation performance (OECD).
5 | Eco-innovation policy landscape

Even if Slovakia has been one of the most rapidly growing economies within the European Union fuelled by heavy FDI by multinationals, there has been very little investment in research and innovation in general – not to mention eco-innovation specifically – and most of the Innovation Strategy measures have been focused on co-financing from EU Structural Funds. Compared to the 2011 country report, eco-innovation policy still plays an insignificant role in Slovakia’s overall policy, although during 2013 there were some signs that the Slovak government is taking action on environmental policies to strengthen its legal base. These are not directly addressing eco-innovation but can become a starting point and future drivers. Furthermore, Slovakia is slowly building up its innovation framework thanks in part to the Europe 2020 Strategy. At the end of 2013 the new Slovak Research and Innovation Strategy for Smart Specialisation (RIS3 SK) was presented which sets a more focused policy approach to innovation while at the same time acknowledge short comings in eco-innovation policy:

“There is an insufficient extent of application and support of eco-innovations and social innovations in Slovakia, including ICT innovations. Systemic supportive tools will be created to increase their applicability in practice with a positive impact on economy and society.” (RIS3, p48)

Changes in the environmental policy framework

The national waste management plan had set to reduce the landfill waste down to 13% by 2010. However, the country is far behind the average of EU countries. Only 3% of the waste is being recycled while 83% of all waste is landfilled, 10% burned and 5% composted. The number of ‘black landfills’ is also growing – there are around 20,000 black landfills around cities. Since 2010 each municipality is obliged to do the minimal waste recycling of plastic, glass, metal and paper. Mandatory separation of biological waste was moved to 2013. A lack of motivation for recycling is caused by insufficient legislation support because processing of recycled waste is several times more expensive than handling general waste. Prices of raw materials are low and at the same time there are no fees for landfills. (Sustainable-event-alliance.org)

In December 2013 the Slovak government approved a new programme with the aim to reduce the creation of waste. To change this, the first ever programme on waste management has been approved for the period 2014-2018. This strategic document was prepared by the Ministry of Environment and approved by the government. Its main aim is to shift from material recovery, as the only declared priorities in the waste management SR 2010 to waste creation prevention.

Recycling centres should also be established for items such as furniture, electronics, textiles, books, CDs and sports equipment. Support to home composting should be given, for example through a reduction of local waste collection fees. The programme intends also to tackle waste generated by paper. The aim is to reduce the amount of waste from promotional material through the introduction of a ban on advertising material to be thrown in piles on top of shells or post boxes and only be sent out if someone has signed up for it. The legislation will also cover economic responsibility for the collection and disposal of paper advertising materials.

In November 2013 the Slovak Parliament approved an amendment on waste management. The new amendments will come into force January 2014 and will introduce in some cases higher prices for waste disposal on landfills. The idea is to encourage waste producers to recycle so that less is going in landfills. The second novelty concerns the collection of batteries and accumulators in municipalities. Their manufacturers will have to bear the costs associated with collection, treatment and recycling of used batteries.
Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3)

As part of its obligations under the National Reform Programme and to be able to meet the objectives of the Europe 2020 strategy, the Slovak government adopted in November 2013 a new research and innovation strategy for smart specialisation SR (RIS3 SK). RIS3 is the basic strategic framework document for support of research and innovation in the programming period 2014-2020 and is the basis for the creation of 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 strategic priority, taking into account regional differences.

To fulfil the RIS3 objective, changes will be made to the current system of science and innovation management that has been fragmented and inefficient without a focus on key areas of development that are of strategic importance for the country. The RIS3 defines the vision, objectives and measures on the basis of a comprehensive analytical and prioritisation of economic specialisation and research and development in Slovakia, and it will take into account the principles of smart, sustainable and inclusive growth to strengthen the competitiveness of the Slovak Republic. To drive a structural change of the Slovak economy towards growth based on increasing innovation capability and R&D excellence to promote self-sustaining growth in income, employment and standard of living.

The vision of this strategy will be accomplished through strategic objectives:

1. Deepening integration and anchoring of key major industries sectors that will provide added local value, through the cooperation of the local supply chains and turning local supply chains and the support of the development networks.
2. Increased contribution of research to the economic growth via global excellence and local relevance.
3. Creating a dynamic, open and inclusive innovative society as one of the preconditions to increase standard of living.
4. Improving the quality of human resources for an innovative Slovakia.

As mentioned above, the document acknowledges the need to address the insufficient level of policy measures and support in eco-innovation.

Slovak Innovation and Energy Agency (SIEA) has been established by the Ministry of Economy and gathers, processes and disseminates information related to the increase of energy efficiency, using of renewable energy sources, combined heat and power and the development of innovation activities. Amongst its responsibilities are to collect and assess the Slovak innovation activities to support innovation as well as to implement the innovation strategy.

SIEA cooperates with a wide range of stakeholders: SIEA mainly cooperates with universities, research and development institutions, organisations operating in the area of technical standardisation and testing, Ministries, Regulatory office for network industries, State energy inspection, Municipalities and Upper territorial districts, non-governmental organisations as well as energy agencies abroad (IEA, EnR, etc.)

Slovak Investment and Trade Development Agency (SARIO)

SARIO supports activities for building, development and promotion of Slovakia as a location for R&D, to attract foreign direct R&D investments and creates close relationships with domestic firms and established foreign companies in terms of opportunities for building own corporate R&D capacities. Among the companies that have invested in R&D in Slovakia are Johnson Controls, ON Semiconductor, Leoni, BSH, ThermoSolar, Sauer Danfoss, Krauss Maffei, Ness, Siemens, Alcatel-Lucent, Mühlbauer, Continental Automotive Systems and Elastogran.

Slovak organization for R&D activities (SOVVA)

Slovak Organization for Research and Development Activities (Slovenská organizácia pre výskumné a vývojové aktivity – SOVVA) was founded to help R&D institutions to obtain additional
competitive funds for their activities and to build working relations with other sectors of society and economy. SOVVA provides assistance in promoting the image of science in society by improving the conditions of R&D institutions through implementation of a wide range of activities.

SOVVA provides opinions on policy documents, including in the field of innovation, and works to identify and settle issues that may appear during the dialogue with R&D institutions and government institutions responsible for the respective regulations. SOVVA's areas of expertise include:

• science and technology policy legislation;
• innovation policy legislation;
• conceptual documents on science and technology policy;
• conceptual documents on innovation policy;
• concept documents on R&D financing through grants from the EU;
• documents setting rules for administration of the EU structural funds.

National Business Award for the Environment

One way of promoting progress in eco-innovation is to award and showcase projects in the field. For instance, the Ministry of Environment and the Association of Industrial Ecology in Slovakia (ASPEK) organise the National Business Award for the Environment. The contest is the national round of the prestigious international competition European Environment Awards in Business (EBAE - European Business Awards for the Environment). In 2013 (for 2012), in the category ‘processes’ and ‘business and bio diversity’, Volkswagen Slovakia won the first place for its project in sustainable water management and wastewater treatment process at its VW Slovakia plant as a fundamental pillar to protect and conserve biodiversity. In second place in the category process was another renowned player from the automotive industry - PSA Peugeot Citroen Slovakia. It received the award for process optimisation in the automotive body painting shop in terms of reducing emissions of volatile organic compounds.

In 2012 Slovenské elektrárne, a.s. won the EBAE award in the Business & Biodiversity category. The award was given for its corporate social responsibility programme, which includes the Energy for Nature project. The project covers activities designed to protect nature and the environment by combining biodiversity support and stabilisation (European Commission, Environment).

ASPEK is a non-governmental, independent, non-profit association established to find solutions to its activities with the aim to reduce the impact of manufacturing and other activities on the environment.

The Ministry of Economy Award “Innovative Action of the Year”

As part of the effort by the Slovak Government to encourage and develop innovation activities it has called for the creation of appropriate support instruments. One of them is the “Innovative Action of the Year” award granted by the Minister of the Economy and is organised by the Slovak Innovation and Energy Agency (SIEA). The award is granted in the following categories:

• Product Innovation;
• Technology Innovation;
• Service Innovation (non-technology process);
• International Cooperation.

A winner in each category will be awarded the prize and a financial award of EUR 3300.

One of the six evaluation criteria concerns environmental impacts (less adverse environmental impacts, lower input consumption, use of new materials and alternative energy sources).
6 | Good practice examples

**Wireless heating control system**

IQRC is a wireless heating control and building automation system. It can control more than 1000 end devices, such as wireless thermostats, controllers, temperature sensors, switching units, electric heaters and the like. The IQRC application system can, for example, regulate the heating of large buildings such as schools, hospitals, hotels and office buildings.

Wireless communication allows a simple and affordable system installation, which does not require structural modifications. The application can save 10% percent on heating costs.

**Key words**: efficient heating, automation, building

**Link**: [www.iqrc.sk](http://www.iqrc.sk)

**Ecological and self-sustaining sewage wastewater treatment plant**

ECOWA has developed a simple and independent sewage wastewater treatment plant that does not need to be connected to the public sewerage system. The wastewater treatment plant from ECOWA uses biological and physical principles, strengthened by a unique construction and design. The basic principle of ECOWA treatment process is a living microbiological culture in activated sludge. The sludge is made of a mixture of bacteria and microorganisms and during its lifetime it only needs nutrients from wastewater. The sludge treats the wastewater by consuming the nutrients. The purification/treatment process is intensified by air, which is blown into the plant by a blower.

The plant is ideal when there is no possibility of public sewerage connection, or when the building is located in such a location where the connection to public sewerage is technically and financially demanding. It is a modern alternative to sump, because it is economically and also environmentally much more advantageous.

ECOWA won the National Business Award for the Environment 2013 in the category Products and Services (aspek.sk) and received a special price in 2012 from the Ministry of Economy Award “Innovative Action of the Year”.

**Key words**: waste water, treatment plant, ecological solution, self-sustaining.

**Link**: [www.ecowa.eu](http://www.ecowa.eu)
New life for residues and old textiles from the car industry

The manufacturing of new cars and the recycling and scrapping of old cars generates a large amount of textile material. The material consists of synthetic textiles normally used for manufacturing textile parts in the automotive industry and are certified to be hygienic. The material is obtained in the form of scissile pieces, cuttings, and damaged parts that come from processing the primary material, i.e. finished pieces of car carpets, upholstery, or car covers from old unused automobiles. Some of the material may also include textile fibres produced from tire recycling.

It is difficult to separate the different types of fibres and the various recycled material is considered to be unusable to be reused in textile manufacturing. Based on the type of material, it either ends up in landfills or is taken to special incinerators, and is not used for further processing.

STERED has developed a new technology and built a production line to process this type of textile material and to transform so that can be used in new products. A complex production line contains separation, recycling, homogenisation and output.

The energy load of textile material processed via STERED is up to 3-5 times more efficient than producing insulation material on stone or glass basis, which means that it is fully compliant with European standards for energy efficiency.

STERED also offers products used in building (construction), i.e. heat retention in buildings. Thanks to its unique acoustic attributes, STERED products fulfil EU regulation 2013/10/EC regarding noise.

Key words: recycling, car industry, textile, fibres

Link: www.stered.sk
References


Ministerstva hospodárstva SR


## ANNEX 1. Policy measures addressing 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 (tick if relevant)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equity/business support</strong></td>
<td>Venture capital funds</td>
<td>JEREMIE Holding Fund (promotion for small and medium-size enterprises for the application of progressive environmental technologies and eco-innovations)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Public guarantee funds</td>
<td>Innovation Vouchers. Value of a voucher are for SMEs € 3500 and for businesses employing 250 to 500 inclusive, it is € 10,000. <a href="http://www.siea.sk/inovacne-vouchre/">http://www.siea.sk/inovacne-vouchre/</a></td>
<td></td>
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<tr>
<td><strong>Support for R&amp;D in public sector and industry</strong></td>
<td>R&amp;D funding</td>
<td>Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3)</td>
<td>X</td>
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<tr>
<td></td>
<td>Collaborative grants</td>
<td></td>
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<tr>
<td></td>
<td>R&amp;D infrastructure</td>
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<td></td>
<td>Tax incentives for R&amp;D and start-ups</td>
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<tr>
<td><strong>Fiscal measures</strong></td>
<td>Tax incentives for R&amp;D personnel</td>
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<tr>
<td><strong>Education, training and mobility</strong></td>
<td>Tailored training courses for companies, entrepreneurs</td>
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<tr>
<td></td>
<td>Advise/consulting for start-ups, companies, entrepreneurs</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>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Competence centres, clusters, science-technology parks</td>
<td>Slovakia has a number if clusters but none of them directly linked to eco-innovation: <a href="http://www.siea.sk/klastre-na-slovensku/">http://www.siea.sk/klastre-na-slovensku/</a></td>
<td></td>
</tr>
</tbody>
</table>

### Focus of policy measure

- **Generic focus on eco-innovation**
- **Resource efficiency improvement**
- **Energy efficiency improvement**
- **Reduction of emissions incl. CO2**
- **Other relevant areas (e.g. renewable energy, etc)**
### Innovation Networks
- Foresight and common vision building
- Market intelligence and other forms of information sharing

### Regulations and Standards
- **Regulations, targets, cap & trade schemes**
  - New Environmental Protection Law (approved 2013) valid as from 1 January 2014
- **Performance standards, labelling, certification**
  - Act No. 491/2005 on environment verification and registration of organizations and the Ministry of Environment Decree No. 606/2005

### Public Procurement
- **“Green” public procurement of goods and services**
  - Green public procurement – educational activities for public administration
- **R&D procurement**
- **Pre-commercial procurement**

### Technology Transfer
- **Advisory support for technology adopters**
- **Financial or fiscal support for technology adopters**
  - (e.g. grants for purchasing new technology)

### Support of Private Demand
- **Tax incentives for consumers**
  - (e.g. for purchasing environmentally efficient products)
- **Tax reductions for products and services**
  - (e.g. VAT reductions)
- **Demand subsidies**
  - (e.g. eco-vouchers, consumer subsidies)

### Demand Side Focus
- **Support of private demand**
  - State aid within Operational Programmes:
    1. Programme for higher use of biomass and solar energy in households;
    2. Establishment and modernisation of public lightening for towns and villages;
| Awareness raising and information provision | municipalities and consultancy providing in the field of energy sector;  
3. Increasing energy efficiency both on the side of generation and consumption and introducing advanced technologies in the energy sector.  
Environmental Fund (subsidies or credit schemes oriented on protection of the environment and waste processing)  
Recycling Fund (subsidies or credit schemes oriented on protection of the environment and waste processing)  
State Housing Development Fund | X | X | X |
The Eco-Innovation Observatory (EIO) is an initiative financed by the European Commission’s Directorate-General for the Environment. Since 2009 the Observatory has been developing an integrated information hub on eco-innovation addressed to business, policy makers, innovation service providers and researchers. The EIO supports the implementation of the European Eco-Innovation Action Plan of the European Commission.

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