Eco-innovation in Slovenia

EIO Country Profile
2016-2017
The Eco-Innovation Observatory functions as a platform for the structured collection and analysis of an extensive range of eco-innovation and circular economy 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](http://www.eco-innovation.eu) and [ec.europa.eu/environment/ecoap](http://ec.europa.eu/environment/ecoap)

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Eco-Innovation Observatory

Country Profile 2016-2017: Slovenia

Author: Danijel Crnčec

Coordinator of the work package: Technopolis Group
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A note to Readers

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A number of companies are presented as illustrative examples of eco-innovation in this report. The EIO does not endorse these companies.

The report is based on an updated methodology for calculating the Eco-Innovation Index, which has also been applied retroactively to all previous years, hence the outcome in the Eco-Innovation Scoreboard (Eco-IS) for 2017 presented in this report can be compared with the analysis in the previous reports to a limited extent.

Comments and suggestions on this document can be sent to Asel Doranova asel.doranova@technopolis-group.com

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Summary

Slovenia is the third most forested country in Europe, abundant with natural capital, and endowed with a high level of biodiversity and rich natural habitats. There are numerous opportunities but also challenges in its transition towards a circular economy and in eco-innovation development. The overall Eco-Innovation Index 2017 for Slovenia is 115, placing Slovenia just behind the leading eco-innovative countries, with Sweden, Germany and Luxembourg at the forefront. Slovenia’s composite index has increased significantly compared to previous years and Slovenia’s rank increased from 15th in 2013, 13th in 2015, to 6th in 2017 respectively. However, a detailed view of the five components of the Eco-innovation composite index for Slovenia in years 2011-2017 reveals that the Resource efficiency outcomes component (material productivity, water productivity, energy productivity and GHG emissions intensity) continues to remain the greatest challenge for Slovenia.

In 2016 and 2017 the trends spotted in previous years intensified. The business sector remains to be the key generator of R&D in Slovenia and certain Slovenian, mostly large, companies continue to pave the way for eco-innovation and circular economy. The leading areas for eco-innovation e.g. remain automotive companies and electric mobility, sustainable mobility, energy efficiency in buildings and sustainable construction, efficient electric equipment, smart metering technologies and pharmacy. Besides these areas, where the focus of companies primarily rests on energy efficiency, also some other meaningful areas of circular economy need to be mentioned – developments towards circular transition in the agricultural and food sector, especially in relation to reducing food waste and sustainable/organic farming. Green, sustainable and responsible development has also become the pillar of Slovenian tourism.

The main drivers for eco-innovation and circular economy continue to remain private sector, non-governmental organisations and municipalities that promote a more sustainable lifestyle and develop eco-innovative and circular economy products and solutions. However, in the last two years the Slovenian Government significantly strengthened its support and activities related with circular change. Nevertheless, a lot of room for enhanced inter-ministerial coordination and cooperation remains in the adoption and implementation of anticipated measures, that would ensure more sustainable production and consumption patterns in Slovenia, i.e. by promoting sustainable and efficient exploitation of natural resources, accelerating research and innovations that also benefit the environment, improving sustainable mobility and increasing the competitiveness of rail transport, and improving the cooperation between sectoral policy areas to align their measures.
Introduction

Slovenia, one of the smallest countries in Europe with 2 million inhabitants, is tucked between Italy, Austria, Croatia and Hungary. It is characterised by a great diversity in landscape, flora and fauna because of different climatic and geomorphologic features of the Alpine, Mediterranean and Pannonian regions. Its most important natural resources are water, forests, karst landscape and biodiversity, representing an important advantage and opportunity for the transition towards circular economy. Since the 1980s, national campaigns have been focused on this potential, resulting in political awareness and engagement for a positive development model. Various Slovenian companies have developed new products and solutions to their manufacturing processes that represent good practices in green business. Besides innovative private companies, non-governmental organisations and municipal authorities, which increasingly promote a more sustainable lifestyle and eco-innovative development, remain important drivers towards a circular economy.

Nevertheless, Slovenia still faces numerous challenges in the transition towards a circular economy and development of eco-innovations. Gross domestic expenditure on R&D in Slovenia as a share of GDP continues to fall from 2013. Business enterprise sector remains the main driver of eco-innovation in Slovenia as government budget appropriations on R&D continue to decrease from 0.68% of GDP in 2009 to 0.40% in 2016 (SORS, 2018c). An important source of funding for R&D, especially for SMEs that often find it difficult to access much needed funds for R&D in general, are funds from abroad (mainly the EU funding), that accounted for more than 10% of gross domestic expenditure on R&D in 2016.

Another important barrier remains the lack of green budget reform. Several attempts to initiate green budget reform have taken place in recent years, however, unsuccessfully. This indicates a lack of political will or decision-making competences of Slovenian governments. Slovenia already has, however, a large share of green taxes, which flow directly into the state budget and only part of this financial flow is then allocated to green policies. The development in Slovenia fails to take (fully) into account externalities, resulting in a situation, where many eco-innovations (or circular economy approaches) fail to penetrate the market as their price for the final consumer proves to be higher than of similar, but environmentally less friendly products or technologies. Similarly, the Chamber of Commerce and Industry of Slovenia highlights that some recycled materials hardly compete with primary resources solely based on price. Besides this, there is no (real) market for certain recycled materials, especially recycled plastics. Moreover, companies often point out as an important barrier the lack of appropriate quality standards for recycled plastics (Rataj and Božič Cerar, 2018).

An important barrier remains also the “rule of the lowest price” in public procurement, which favours price over quality and in majority of cases rules out green and sustainable solutions since they cannot compete solely based on price. A valuable tool for the attainment of circular economy objectives should be also the policy of green public procurement adopted in 2011, however, it was never successfully implemented in practice. A new decree on green public procurement came into force in January 2018. An important barrier remains also multitude of adopted documents, specific area strategies and action plans, which prove to be sometimes incoherent or even partially inconsistent. Certain developments have been made with the adoption of the Slovenian Development Strategy 2030, nevertheless, a lot of room for enhanced inter-ministerial coordination and cooperation remains in policy formation and its implementation for the transition to circular economy. Besides this, Slovenia still lacks an integrated policy or framework focusing on eco-innovations.
An important issue in the transition to circular economy remains access to sources of financing. Long and often inefficient administrative procedures and sporadic financial incentives only partially encourage a systematic and comprehensive transition to the circular economy. Slovenia would thus benefit from a central system of financing incentives that would enable continuity in funding circular economy development in a simple, transparent and efficient manner (Godina Košir, 2018).

Despite some positive developments, an important barrier remains inefficient transfer of knowledge from higher education to the private sector. The system of higher education in Slovenia is considered as insufficiently adapted to the needs of the private sector. Slovenia also has an above-average number of employees engaged in eco-industries, but their activities and investments do not produce results in terms of successful eco-innovations.

Nevertheless, some positive regulatory and political developments took place in the last two years. A clear collective political action towards more green and circular economy policies has been initiated by the Slovenian government. Aside from Smart Specialisation Strategy, the Slovenian Development Strategy 2030 was adopted in 2017 and the transition to circular economy has been proclaimed for a strategic priority of Slovenia. In the last two years Slovenia succeeded to rally nation-wide support of manifold and various stakeholders within the Partnership for Slovenia’s Green Economy to elaborate and adopt a Roadmap for Slovenia's Transition to a Circular Economy. Thus, Slovenia will join those EU member states that lead the in the transition towards a circular economy.

Finally, a look back reveals that Slovenia has managed to consolidate public finances, overcome the persisting financial and economic crisis and achieve positive legislative developments. The Slovenian economy continued to grow in 2016 (3.1%) and 2017 (5.0%) (SURS 2018) and the country started catching up with the rest of the EU. However, after the early elections in May/June 2018 the new government will need to continue the efforts that have been done in the policy formation and implement these policies to fully realise the potential that Slovenia undoubtedly has in the transition to circular economy, i.e. by promoting sustainable and efficient exploitation of natural resources, accelerating research and innovations that also benefit the environment, improving sustainable mobility and increasing the competitiveness of rail transport, and improving the cooperation between sectoral policy areas to align their measures.
1 | Eco-innovation performance

The overall Eco-innovation Index 2017 for Slovenia is 115 (see Figure 2.1 below), placing Slovenia just behind the leading eco-innovative countries, with Sweden, Germany and Luxembourg at the forefront. Slovenia’s composite index has increased significantly compared to previous years, when Slovenia performed below the EU average with an index of 99 in 2016, 93 in 2015 and 2014, or even 71 in 2013 respectively. Slovenia’s rank increased from 15th in 2013, 13th in 2014 and 2015, and 10th in 2016 to 6th in 2017 respectively.

The analysis in this section is based on the EU 28 Eco-innovation Index (Ecol Index) for the year 2017. The Eco-innovation index demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. Ecol Index is a composite index that 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.

Figure 2.1 EU28 Eco-innovation Index 2017, composite index

The Eco-innovation composite index 2017 for Slovenia reveals that Slovenia performed quite well and above the EU average in all index components except in the Resource efficiency outcomes component with an index 66. The latter is the 8th worst in the EU, well below the EU average and three times worse than in the case of leading EU countries in resource efficiency, i.e. Luxembourg (183) and Italy (180).
A detailed view of the five components of the Eco-innovation composite index for Slovenia in years 2011-2017 (see Figure 2.3) confirms that the Resource efficiency outcomes represents the weakest component of the Eco-innovation index for Slovenia. Furthermore, Resource efficiency outcomes component (mean index) has been stagnating in average. Even tough Slovenia managed to improve all four indicators in absolute terms, the pace of improving them was not sufficient compared to the EU average to improve the Resource efficiency outcomes component mean index. In recent years Slovenia on one hand managed to improve only material productivity index, that illustrates the GDP generated by material consumption of a country. On the other hand, the water productivity index, that illustrates the GDP generated by domestic water consumption, energy productivity index, that illustrates the GDP generated by domestic energy use, and GHG emissions intensity index, that illustrates the GDP generated by domestic energy use, worsened. Improving Resource efficiency outcomes component thus remains one of the main challenges for Slovenia in future (see Table 2.1.).
Table 2.1 Resource efficiency outcomes component for Slovenia in years 2010-2017

<table>
<thead>
<tr>
<th>4.1 Material productivity (GDP/Domestic Material Consumption, €/kg), 2015</th>
<th>4.2 Water productivity (GDP/total fresh water abstraction, €/m³), 2011</th>
<th>4.3 Energy productivity (GDP/gross inland energy consumption, €/toe), 2015</th>
<th>4.4 GHG emissions intensity (CO2e/GDP), 2015</th>
<th>4. Resource efficiency outcomes index (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>adjusted with thresholds Index</td>
<td>adjusted with thresholds Index</td>
<td>adjusted with thresholds Index</td>
<td>adjusted with thresholds Index</td>
<td>adjusted with thresholds Index</td>
</tr>
<tr>
<td>EU AVERAGE</td>
<td>2.25</td>
<td>0.43</td>
<td>78</td>
<td>0.17</td>
</tr>
<tr>
<td>Slovenia 2017</td>
<td>1.79</td>
<td>0.32</td>
<td>52</td>
<td>0.10</td>
</tr>
<tr>
<td>Slovenia 2016</td>
<td>1.74</td>
<td>0.44</td>
<td>47</td>
<td>0.18</td>
</tr>
<tr>
<td>Slovenia 2015</td>
<td>1.75</td>
<td>0.39</td>
<td>8</td>
<td>0.31</td>
</tr>
<tr>
<td>Slovenia 2014</td>
<td>1.72</td>
<td>0.39</td>
<td>8</td>
<td>0.31</td>
</tr>
<tr>
<td>Slovenia 2013</td>
<td>1.46</td>
<td>0.36</td>
<td>8</td>
<td>0.31</td>
</tr>
<tr>
<td>Slovenia 2012</td>
<td>1.20</td>
<td>0.26</td>
<td>8</td>
<td>0.31</td>
</tr>
<tr>
<td>Slovenia 2011</td>
<td>0.71</td>
<td>0.08</td>
<td>8</td>
<td>0.31</td>
</tr>
<tr>
<td>Slovenia 2010</td>
<td>0.71</td>
<td>0.08</td>
<td>8</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Source: EIO, 2017

Nevertheless, Slovenia improved its performance related to other components of the Eco-innovation index in recent years. The Eco-innovation inputs component reveals that Slovenia improved in government environmental and energy R&D appropriations and outlays (as a share of GDP) (see Table 2.2). Total R&D personnel and researchers (as a share of total employment) slightly decreased from 1.68% in 2014 to 1.59% in 2017 because higher employment rate than in previous years, however, it remains well above the EU average (1.32%). In 2017, similarly as in preceding years, the data on Total value of green early investments were not available. Overall, Slovenia performed quite well in Eco-innovation inputs component reaching 141% of the EU average and ranking 5th amongst 28 EU member states.

Table 2.2 Eco-innovation inputs component for Slovenia in years 2010-2017

<table>
<thead>
<tr>
<th>1.1 Governments environmental and energy R&amp;D appropriations and outlays (Share of GDP), 2016</th>
<th>1.2 Total R&amp;D personnel and researchers (Share of total employment), 2016</th>
<th>1.3 Total value of green early stage investments (USD/cap), 2014-2017</th>
<th>1.4 Resource efficiency outcomes index (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original data (in %)</td>
<td>Index</td>
<td>Original data (in %)</td>
<td>Index</td>
</tr>
<tr>
<td>EU AVERAGE</td>
<td>0.0374</td>
<td>0.57</td>
<td>1.32</td>
</tr>
<tr>
<td>Slovenia 2017</td>
<td>0.0421</td>
<td>0.66</td>
<td>1.59</td>
</tr>
<tr>
<td>Slovenia 2016</td>
<td>0.0290</td>
<td>0.45</td>
<td>1.58</td>
</tr>
<tr>
<td>Slovenia 2015</td>
<td>0.0346</td>
<td>0.36</td>
<td>1.62</td>
</tr>
<tr>
<td>Slovenia 2014</td>
<td>0.0293</td>
<td>0.30</td>
<td>1.68</td>
</tr>
<tr>
<td>Slovenia 2013</td>
<td>0.0312</td>
<td>0.38</td>
<td>1.66</td>
</tr>
<tr>
<td>Slovenia 2012</td>
<td>0.0300</td>
<td>0.27</td>
<td>1.64</td>
</tr>
<tr>
<td>Slovenia 2011</td>
<td>0.0300</td>
<td>0.32</td>
<td>1.56</td>
</tr>
<tr>
<td>Slovenia 2010</td>
<td>0.0300</td>
<td>0.32</td>
<td>1.38</td>
</tr>
</tbody>
</table>

Source: EIO, 2017

The Eco-innovation outputs component of the composite index reveals that the Eco-innovation related media coverage (per number of electronic media) index increased significantly in 2016 and 2017 compared to 2015 (from 0.21 in 2015 to 0.61 in 2017) thus surpassing the EU average (0.35 in 2017). Similarly, the Eco-innovation related publications (per mln pop) index increased from 0.63 in 2015 to 0.80 in 2017 (2016 data) thus surpassing the EU average of 0.32. However, the number of Eco-innovation related patents index remains low, i.e. 0.27 (per mln pop) in 2017 (2014 data) compared to 0.43 in 2016 and 0.26 in 2015 respectively, thus not reaching the EU average of 0.43 in 2017. Overall, Slovenia performed well in the Eco-innovation outputs component reaching 153% of the EU average in 2017 (only 92% in 2015) and ranking 5th in the EU.
has been decreasing since 2010 from registered organisations (per mln pop, 2016 data) the indicator reveals that the performance of Slovenia has been decreasing since 2010 from an index of 0.71 to 0.32 in 2017 respectively (the EU average was

**Table 2.3 Eco-innovation outputs component for Slovenia in years 2010-2017**

<table>
<thead>
<tr>
<th></th>
<th>3.1 Eco-innovation related patents (per mln pop)</th>
<th>3.2 Eco-innovation related publications (per mln pop)</th>
<th>3.3 Eco-innovation related media coverage (per number of electronic media)</th>
<th>3. EI output index (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of eco-patents per mln pop (original data)</td>
<td>No of publications per mln pop (original data)</td>
<td>Hits per electronic media (original data)</td>
<td>Index</td>
</tr>
<tr>
<td>EU AVERAGE</td>
<td>18.34</td>
<td>20.53</td>
<td>1.00</td>
<td>0.35</td>
</tr>
<tr>
<td>Slovenia</td>
<td>8.92</td>
<td>45.54</td>
<td>0.80</td>
<td>1.47</td>
</tr>
<tr>
<td>Slovenia 2010</td>
<td>17.89</td>
<td>25.21</td>
<td>0.45</td>
<td>1.24</td>
</tr>
<tr>
<td>Slovenia 2011</td>
<td>10.31</td>
<td>29.60</td>
<td>0.63</td>
<td>0.18</td>
</tr>
<tr>
<td>Slovenia 2012</td>
<td>10.00</td>
<td>18.94</td>
<td>0.38</td>
<td>0.10</td>
</tr>
<tr>
<td>Slovenia 2013</td>
<td>2.56</td>
<td>17.03</td>
<td>0.65</td>
<td>0.05</td>
</tr>
<tr>
<td>Slovenia 2014</td>
<td>1.99</td>
<td>11.22</td>
<td>0.48</td>
<td>0.04</td>
</tr>
<tr>
<td>Slovenia 2015</td>
<td>1.99</td>
<td>2.44</td>
<td>0.18</td>
<td>0.05</td>
</tr>
<tr>
<td>Slovenia 2016</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: EIO, 2017

The Socio-economic outcomes component shows quite enormous oscillations between 2011, 2013 and 2015. Therefore, one should note that different databases were used in 2013 and 2015 and caution must be used when comparing these indicators. Nevertheless, the database used for 2015 and 2017 has far better coverage of companies and the results show that with an index 0.57 Slovenia performed close to the EU average (0.60) in the Exports of products from eco-industries (% of total exports). The Employment in eco-industries index (% of total employment across all companies, 2016 data) decreased from 0.96 in 2015 to 0.52 in 2017, however, it remains above the EU average (0.37 in 2017). Similarly, the Turnover (income) in eco-industries index (% of total revenue across all companies, 2016 data) decreased from 0.79 in 2015 to 0.56 in 2017, however, it remains well above the EU average in 2017 (0.37). Overall, Slovenia reached 123% of the EU average and performed 4th in The Socio-economic outcomes component.

**Table 2.4 Socio-economic outcomes component for Slovenia in years 2010-2017**

<table>
<thead>
<tr>
<th></th>
<th>5.1 Exports of products from eco-industries (% of total exports)</th>
<th>5.2 Employment in eco-industries (% of total employment across all companies)</th>
<th>5.3 Turnover (revenue) in eco-industries (% of total revenue across all companies)</th>
<th>5. SocEcon Outcome Index (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Share Eco-industry goods in total export (original data)</td>
<td>Eco-Industry employment in % of total employment</td>
<td>Eco-Industry revenue, in % of total revenue (original data)</td>
<td>Index</td>
</tr>
<tr>
<td>EU Average</td>
<td>0.73</td>
<td>1.85</td>
<td>2.30</td>
<td>100</td>
</tr>
<tr>
<td>Slovenia 2017</td>
<td>0.69</td>
<td>3.63</td>
<td>2.99</td>
<td>0.56</td>
</tr>
<tr>
<td>Slovenia 2016</td>
<td>0.57</td>
<td>3.61</td>
<td>3.05</td>
<td>0.50</td>
</tr>
<tr>
<td>Slovenia 2015</td>
<td>0.59</td>
<td>4.64</td>
<td>3.42</td>
<td>0.79</td>
</tr>
<tr>
<td>Slovenia 2014</td>
<td>0.68</td>
<td>5.22</td>
<td>3.85</td>
<td>1.00</td>
</tr>
<tr>
<td>Slovenia 2013</td>
<td>0.57</td>
<td>11.11</td>
<td>0.07</td>
<td>0.13</td>
</tr>
<tr>
<td>Slovenia 2012</td>
<td>1.37</td>
<td>3.48</td>
<td>9.75</td>
<td>1.00</td>
</tr>
<tr>
<td>Slovenia 2011</td>
<td>0.84</td>
<td>3.48</td>
<td>9.75</td>
<td>1.00</td>
</tr>
<tr>
<td>Slovenia 2010</td>
<td>0.56</td>
<td>3.48</td>
<td>1.96</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Source: EIO, 2017

The Eco-innovation activities component reveals that in 2017 Slovenia with an index 0.60 performed above the EU average (0.53) in relation to the Enterprises that introduced an innovation with environmental benefits obtained within the enterprise (2014 data). Slovenia (with an index of 0.75) also performed well above the EU average (0.50) in relation to the Enterprises that introduced an innovation with environmental benefits obtained by the end user (2014 data). As the data for previous years are not available, one cannot assess the development of these two indicators in time. Regarding the ISO 14001 registered organisations (per mln pop, 2016 data) the indicator reveals that the performance of Slovenia has been decreasing since 2010 from an index of 0.71 to 0.32 in 2017 respectively (the EU average was...
The number of ISO 14001 registered organisations in Slovenia varied from 218 in 2010, 173 in 2016, to 223 in 2017 respectively (EU average in 2017 was 218). Overall, Slovenia reached 124% of the EU average and performed 7th in The Eco-innovations activities component.

Table 2.5 Eco-innovation activities component for Slovenia in years 2010-2017

<table>
<thead>
<tr>
<th>Activity index</th>
<th>Original data</th>
<th>Index</th>
<th>Original data</th>
<th>Index</th>
<th>ISO 14001 registered organisations per mln population</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU AVERAGE</td>
<td>0.22 0.53</td>
<td>0.14 0.75</td>
<td>218 0.30</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2017</td>
<td>0.25 0.60</td>
<td>0.20 0.75</td>
<td>223 0.32</td>
<td>124</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2016</td>
<td>0.25 0.60</td>
<td>0.20 0.75</td>
<td>173 0.23</td>
<td>116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2015</td>
<td>n/a n/a</td>
<td>n/a n/a</td>
<td>206 0.32</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2014</td>
<td>n/a n/a</td>
<td>n/a n/a</td>
<td>226 0.42</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2013</td>
<td>n/a n/a</td>
<td>n/a n/a</td>
<td>204 0.43</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2012</td>
<td>n/a n/a</td>
<td>n/a n/a</td>
<td>195 0.40</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2011</td>
<td>n/a n/a</td>
<td>n/a n/a</td>
<td>192 0.48</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia 2010</td>
<td>n/a n/a</td>
<td>218 0.71</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: EIO, 2017

Finally, Slovenia significantly increased its performance in three components of the Eco-innovation composite index, i.e. from 78% of the EU average in 2015 to 141% in 2017 in the Eco-innovation inputs component, from 76% of the EU average in 2015 to 124% in 2017 in the Eco-innovation activities component, and from 92% of the EU average in 2015 to 153% in 2017 in the Eco-innovation outputs component. However, Slovenian performance slightly worsened in the Socio-economic outcomes component from 136% of the EU average in 2015 to 123% in 2017. Finally, the biggest challenge for Slovenia remains the Resource efficiency outcomes component (material productivity, water productivity, energy productivity and GHG emissions intensity), where the Slovenian index compared to the EU average has stagnated since 2010 between 60 and 70%.
2 | Selected circular economy and eco-innovation areas and new trends

Slovenia as a small, open and export-oriented economy with a well-educated population and preserved natural environment, has a relatively favourable starting point for a transition to a low-carbon society. A look back to the EIO Slovenia Country profiles reveals that already in 2015, the circular economy has been perceived as an important opportunity for Slovenia to boost economic development and employment and decrease its environmental impact. Since Slovenian companies in general are not highly competitive and do not have a very high value added per employee, or material and energy productivity, it should be crucial for them to join the transition towards the circular economy that has begun in the EU.

In 2014 the Ministry for Economic Development and Technology published results of a survey that focused primarily on small and medium-sized companies (SMEs) and their attitudes towards eco-innovations and eco-design (Glasenčnik et al., 2014). The results demonstrated that already more than half of participating companies systematically developed human resources in eco-innovations and more than three quarters of companies followed the principles of eco-design. However, where enterprises developed eco-innovations, they focused primarily on products and not services or business practices. Of the participating companies, micro- and small enterprises devoted the largest share of their revenues to the development of eco-innovations. In general, participating companies demonstrated that they were familiar with eco-design and develop eco-innovations. Furthermore, they were willing to invest in eco-design and eco-innovations in the future. Hojnik in 2018 reiterates that eco-innovations in Slovenia have been gradually penetrating all areas related to a more rational and efficient use of resources, and use of materials that are less harmful for the environment, more energy efficient, sustainable and easier to renew. Moreover, companies are increasingly using various IT tools to develop eco-innovations in the optimization of processes that reduce negative environmental impacts and place emphasis on eco-design that enables the transition to a circular economy (Hojnik, 2018).

In 2016 and 2017 the trends spotted in previous years intensified. Firstly, the business sector remains to be the key generator of R&D in Slovenia and certain Slovenian, mostly large, companies continue to pave the way for eco-innovation and circular economy. One of the leading areas for eco-innovation remain automotive companies and electric mobility, where e.g. Hidria, an industrial conglomerate which provides integral solutions, continues to be a European and global innovative leader (see Good Practice examples of Domel below, Hidria in 2015 report and Elaphe in 2010 report). These companies are primarily export-oriented and respond to new global green and electric mobility trends and/or even set them. A good example is the Automotive Cluster of Slovenia (ACS) that takes part in the Strategic Research Innovation Partnership ACS+ and its Edison project which aims to position Slovenia as a reference country for green mobility (SRIPACS+, 2017). In the field of sustainable mobility different modes of shared mobility have developed such as Bicikelj (bicycle sharing) and Avant2Go (car sharing) as well as innovative smart platforms such as prevoz.org and GoOpti (see the Good Practice example of GoOpti in 2013 report).

Important eco-innovation areas in Slovenia remain energy efficiency in buildings and sustainable construction, with several leading companies such as Trimo, Lumar, Knauf Insulation, Riko, M Sora and also other SMEs seeking a breakthrough by developing innovative energy efficient products and nearly zero-energy buildings (see Good Practices of M Sora in 2015 report and ATech Electronics in 2013). M Sora and Lumar IG also participate in a national pilot project of sustainable strategic transformation of...
companies’ business that aims to incorporate the sustainability in the companies’ development strategy and business models (SPIRIT, 2018).

Slovenian metallurgical and steel industry continues to strive for the sustainable development and growth. A good example represents the innovation of exploiting waste heat from industry for district heating in the commercial area and in the town of Ravne na Koroškem, developed jointly by the SIJ Group, or more exactly, by its company Metal Ravne and Petrol Energetika (see Good Practice example in report 2015).

Important eco-innovation areas remain efficient electric equipment, where e.g. Gorenje represents a leading Slovenian and European company with its focus on innovative user- and environment-friendly products (see Good Practice examples of Gorenje in 2017 and 2013 and Aurora 3M in 2013), and smart metering technologies (see Good Practice example of Iskraemeco below). Also, the area of pharmacy remains an important generator of eco-innovation in Slovenia with Krka and Lek (now a Sandoz company) as the leading Slovenian and global innovators developing new processes for manufacturing pharmaceuticals in a more efficient and ecologically acceptable manner (see Good Practice example of Krka below). Besides these areas, where the focus of companies primarily rests on energy efficiency, also some meaningful areas of circular economy need to be mentioned that e.g. focus on reuse and recycling. A good example of sustainable chemistry is the innovative ECONYL® Regeneration System, i.e. a process, that enables the transformation of the Nylon, contained in waste, such as carpets, clothing and fishing nets, back into raw material without any loss of quality (see Good Practice example of Econyl in 2015 report). Another good example is the Cel.Cycle programme that aims to exploit the potential of biomass for development of advanced materials and bio-based products, by creating new value chains for cascading utilisation of biomass (see Good Practice example of CEL.CYCLE below).

Secondly, there are important developments related with some areas that stand out in terms of circular economy and eco-innovation in Slovenia in recent years. One worthy area, that has been developing in recent years in Slovenia, is related with circular transition in the agricultural and food sector, especially in relation to reducing food waste, sustainable/organic farming and sustainable tourism. Numerous kindergartens, schools, hospitals and other public institutions aim to establish short food supply chains with local eco-suppliers and prevent food waste (Godina Košir, 2018). Sustainable/organic farming that ensures a local production of high quality organic food is increasing importance in this process, e.g. integrated production of indoor vegetables with the help of geothermal energy by Lušt association (Lušt, 2018), or eco-production of fresh salad, so called “live salad”, that is sold still growing in pots, by KMG PanOrganic (PanOrganic, 2018). Moreover, the number of organic farms or producers in Slovenia has been growing – from 2.5% (1.876 farms) in 2006 to 5.0% (3.518 farms) in 2016 respectively (Ministry of Agriculture, Forestry and Food, 2018). In parallel, the number of certificates grew from 1.393 in 2006 to 2.933 in 2016 respectively, as well as the extent of ecologically treated surfaces in Slovenia from 26.831 hectares (5.47%) in 2006 to 43.578 hectares (9.03%) in 2016 respectively (ibid.). An important trend is also digitalisation of agriculture, especially towards integrating a variety of systems and collecting data to manage decisions and achieve (more) sustainable farming. A good example of such a development is Pantheon Farming, an integral information business system for farm management of the Slovenian company Slovenski Datalab that also received the European Business Award 2016/2017 (Datalab, 2018).

Green, sustainable and responsible development has also become the pillar of Slovenian tourism (see the Strategy of the Sustainable Growth of Slovenian Tourism for 2017-2021 adopted in October 2017 ( Ministry of Economic Development and Technology, 2018a)). Ministry of Economic Development and Technology also actively promotes the “Green Scheme of Slovenian Tourism”, a national programme and certification scheme setup in 2015, that encourages destinations and accommodation providers to acquire
the “Slovenia Green Accomodation” sign, which is based on the internationally adopted environmental signs (EU Eco Label, Emas, Ecocamping, etc.) (MGRT, 2018b).

Thirdly, municipal authorities are becoming an important and active stakeholder in the promotion of eco-innovation and circular change. An excellent good practice example represents the capital Ljubljana that has won the European Green Capital Award 2016 (see good practice example in 2015). The final month of Ljubljana’s stint as the European Green Capital was even dedicated to eco-innovation, green jobs and sustainable local management. Municipality officials stressed that eco-innovations coupled with a new mind-set can ease and speed up the transition to a sustainable society (The Slovenia Times, 2016). City of Maribor, the second largest city in Slovenia, is becoming another promising example. In 2016, after a successful presentation in Brussels, the City Municipality of Maribor initiated project Wcycle. Based on the model of the circular economy, it envisions a new developmental model for Maribor as an urban centre in the field of integrated management of all generated waste, surplus energy and wastewater (see Policy Good Practice example in chapter 4).

Fourthly, research organizations and groups from academia connect and cooperate with companies and industry, especially on priority areas promoted by Slovenia’s Smart Specialisation Strategy, which aims to overcome fragmentation, create new value chains and strengthen capabilities of Slovenian research and production sectors (see Good Practice example of Cel.Cycle below). An important role in this process is played by the state by promoting long-term collaboration in form of Research & Innovation Partnerships (SRIPs) of interested stakeholders in all relevant areas of Slovenia’s Smart Specialisation Strategy Strategic (SalecL and Medica, 2018). SRIPs already involve more than 400 companies and 100+ knowledge institutions and more are expected to join. Smart specialisation namely serves as a basis to draw EU funds in the 2014-2020 budget period and the state will, furthermore, provide them with financial and non-financial support (see more in the chapter 4 Policy Landscape in Slovenia).

Fifthly, within the Partnership for Slovenia’s Green Economy, created by the Government of RS to connect relevant stakeholders, a multitude of companies, municipal authorities, research organizations, NGOs, individuals, etc. is engaged through a Circular Change platform in a process of drafting a Roadmap for Slovenia's Transition to a Circular Economy. So far regional consultations in combination with referential international models highlighted four priority fields for the circular transformation in Slovenia: food systems, forest-based value chains, manufacturing industry and mobility (Starting Points of the Roadmap, 2017). The final draft Roadmap is supposed to disclosed in May 2018.

Finally, a more sustainable lifestyle and energy efficiency continues to be actively promoted by local authorities, non-governmental organisations, mass media and companies to raise public awareness on eco-food, waste management, traffic emissions and transition to circular economy.
Good practice: CEL.CYCLE Discarded potential of biomass

Description: Cel.Cycle programme is a cooperation platform for top research teams mastering materials, chemical engineering, manufacturing and process technologies, biotechnologies, nanotechnologies and engineering. They are joined with teams from the industry as key experiential partners and end-users, operating chemical, textile, paper, wood processing and automotive industry, construction, engineering and energy sector. The aim of this 4-year programme is bringing together 12 research organizations and 9 companies, to move beyond fragmentation and introverted individual activities, strengthen capabilities of Slovenian research and production sectors, to achieve excellency on international level and to join international value chains.

Strategic direction of the programme »Potential of biomass for development of advanced materials and bio-based products« is to exploit the potential of biomass for development of advanced materials and bio-based products, by creating new value chains for cascading utilisation of biomass. The programme is placed within priority area S4 (Slovenia’s Smart Specialisation Strategy) - The natural and traditional resources for the future, Networks for the transition to the circular economy, and is co-financed by EU Structural Funds in Slovenia. It comprises all of the identified focus areas and technologies: technologies for development of new bio-based materials, technologies for utilisation of secondary raw materials, and technologies for reuse of waste and production of energy from alternative sources.

Keywords: cooperation platform, biomass, new value chains, Cel.Cycle

Internet links:
- http://celkrog.si/?lang=en

Contacts:
Programme coordinator: Pulp and Paper Institute
Bogišičeva 8, SI-1000 Ljubljana
+386 (1) / 200 28 00
info@celkrog.si

Pictures:

(Source: http://celkrog.si/?lang=en)
Good practice: New Generation of Dishwashers SmartFlex

Description: The new generation of SmartFlex dishwashers excel in their extremely low energy consumption (10% below the A+++ grade energy efficiency threshold).

The SmartFlex DW30’s impressive stainless steel interior, one of the largest on the market, can accommodate 16 place settings at a time, and even 35 cm diameter plates. Equipped with a special water tank, that reduces water consumption to only 6.9 litres per cycle, the DW30 is also super silent, operating at a mere 41 dB.

Acclaimed in independent professional magazines and guaranteeing perfect washing results, the new SmartFlex range also excels in relation to the unique automatic door opening and optical signal display (both patent pending), low consumption water tank replete with special filter systems, and special effect exterior LED light.

With their new generation of Gorenje SmartFlex dishwashers Gorenje again won the gold national award of the Slovenian Chamber of Commerce and Industry for the most innovative enterprises and innovators.

Keywords: SmartFlex dishwasher, low energy consumption, Gorenje

Internet links:

Contacts for further information:
Gorenje d. d.
Partizanska 12
SI-3320 Velenje
E: info@gorenje.si
www.gorenje.com

Picture:

Good practice: Smart electricity meter platform

Description: Iskraemeco’s smart electricity meter platform enables simple integration of advanced smart functionalities into a smart grid concept and focuses on key challenges that utilities are facing when making a transition to a smart grid. It includes the basic functional requirements of smart metering such as: the availability of measuring data, remote reading, secure two-way communication, and easy and cost-effective adaptation to national markets.

The platform fully conforms to strict security and privacy requirements in the metering industry and enables utilities to minimise their maintenance and operation costs. The AM550 follows the sustainable Fair Meter approach that focuses on sustainable development in metering and aims to implement a completely transparent supply chain. The basic principles of the initiative are to ensure compliance with the existing labour standards and conformity and transparency of the used materials.

Iskraemeco’s smart electricity meter platform won the gold national award of the Slovenian Chamber of Commerce and Industry for the most innovative enterprises and innovators in 2017.

Keywords: smart electricity meter platform, smart grid, Iskraemeco

Internet links:
- https://daninovativnosti.gzs.si/Portals/210/katalog_2017_eng_v1_mali.pdf, pages 22-23

Contacts for further information:
Iskraemeco, d. d.
Savska loka 4
SI-4000 Kranj
E: info@iskraemeco.com
www.iskraemeco.com

Picture:

(Source: https://daninovativnosti.gzs.si/Portals/210/katalog_2017_eng_v1_mali.pdf, page 22)
Good practice: Process Optimisation of Active Pharmaceutical Ingredient Candesartan Cilexetil Production

Description: Krka has developed a new process for manufacturing the active ingredient Candesartan Cilexetil, which it has now introduced into industrial scale production.

The innovative procedure is accomplished using primary input ingredients, namely, substances which are cheaper and easier to obtain than those used in the erstwhile process. This new procedure is some 30 % more efficient, and Krka has replaced the ecologically problematic tributyltin compounds with ecologically more acceptable ones.

The introduction of regenerated solvents in this process also confirms that environmental protection remains an important factor in Krka’s business strategy.

Krka’s Process Optimisation of Active Pharmaceutical Ingredient Candesartan Cilexetil Production won the gold national award of the Slovenian Chamber of Commerce and Industry for the most innovative enterprises and innovators in 2017.

Keywords: Optimisation of Active Pharmaceutical Ingredient Production, energy efficiency, Krka

Internet links:
-  https://daninovativnosti.gzs.si/Portals/210/katalog_2017_eng_v1_mali.pdf, pages 24-25

Contacts for further information:
KRKA, d. d., Novo mesto
Šmarješka cesta 6
SI-8501 Novo mesto
E: info@krka.si
www.krka.si

Picture:

(Source: https://daninovativnosti.gzs.si/Portals/210/katalog_2017_eng_v1_mali.pdf, page 24)
Good practice: EC Motor with Integrated Electronics Option

Description: The new Domel universal EC motor (electronic commuting), which was developed in cooperation with the NELA Development Centre to achieve a low-weight design with a high degree of flexibility, comprises state-of-the-art design solutions, resulting from various competencies, particularly Domel’s long-term experience in over-moulding technology.

Compared to basic DC motors, in EC motors the mechanical commutation is replaced by electronic circuitry. Featuring a brushless design, the magnetic field is established by means of permanent magnets on the rotor. This enables the supply of precisely the right amount of current to the fixed armature in the right direction at the precise time for accurate motor control. Consequently, the motors achieve the same power with a 20-30% reduction in raw materials.

The new motors are efficient and exceed the IE4 requirements, the highest energy efficiency class according to EU regulations. Domel developed its new EC motors to be able to enter the washing machine market. But its new EC motors offer a competitive advantage with regard to a wide scope of applications, such as home appliances, ventilation devices, pumps, and other areas where continuous operation is required. With this product Domel is targeting several new market niches.

Domel’s EC Motor with Integrated Electronics Option received the Gold Award at the 2016 Slovenian Innovation Forum, the highest national award for innovation.

Keywords: EC Motor, energy efficiency, Domel

Internet links:

Contacts for further information:
Domel, d.o.o.
Otoki 21, SI-4228 Železniki, Slovenia
info@domel.com
www.domel.com

Nela razvojni center, d.o.o., Subsidiary OTOKI
Otoki 21, SI-4228 Železniki, Slovenia
info@nela.si
www.nela.si

Picture:

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

Slovenia is a small and open economy largely dependent on the international economic environment. The European common market represents an important opportunity for eco-innovations that otherwise would not be realised due to the small national market, which often lacks sufficient eco-related demand.

In the last two years the Slovenian GDP growth continued (3.1% in 2016 and 5.0% in 2017) and Slovenia’s trade in goods also continued to grow in 2017. Exports, that exceeded the pre-crisis level of 2008 already in 2011 and have been growing ever since, were 13.1% higher in 2017 than exports in 2016 (EUR 28.2 billion), while imports were 14.2% higher than in 2016 (EUR 27.5 billion). The external trade surplus has been recorded since 2014. The markets of the EU Member States remained the most important for Slovenia’s exports and imports in 2017, too: 76.7% of total exports of goods and 80.1% of total imports of goods were generated on the markets of EU Member States. Exports to those countries have been increasing since 2013 (SORS, 2018a).

In 2016 2.01% of GDP (i.e. EUR 812 million) was spent in Slovenia on R&D in all sectors. Gross domestic expenditure on R&D in Slovenia as a share of GDP continues to fall from 2013. Compared with the previous year (EUR 853.1 million), Gross domestic expenditure on R&D (GERD) was nominally lower by 4.8% (i.e. EUR 41.1 million), or if GERD is expressed as a share of GDP, the share is 0.19 of a percentage point lower. In absolute terms, most of the decrease was on account of the business enterprise sector, which spends most of the funds for R&D. Compared to the previous year, its funds for R&D decreased by 5.5% (i.e. EUR 35.9 million) (SORS, 2018b), however, as a share of GDP business enterprise funds remained at 69%. Business enterprise sector thus remains the main driver of eco-innovation in Slovenia as government budget appropriations on R&D continue to decrease from 0.68% of GDP in 2009 to 0.40% in 2016 (SORS, 2018c). An important source of funding for R&D, especially for SMEs that often find it difficult to access much needed funds for R&D in general, are funds from abroad (mainly the EU funding), that accounted for more than 10% of gross domestic expenditure on R&D in 2016 in Slovenia (See Table 3.1 and Image 3.1 below).

Table 3.1 and Image 3.1: Gross domestic expenditure on R&D, Slovenia, annually

| Source: prepared with data from SORS, 2018d |

In 2016 a study was undertaken indicating greatest influence of competitive pressure and customer demand on product eco-innovation and competitive pressure as the strongest driving force of process and organizational eco-innovation (in case of 223 Slovenian companies) (Hojnik, 2016, 294). Thus, the most important driver of implementation of (any) eco-innovation is not environmental policy instruments, but
“competitive pressure, which forces companies to become more environmentally friendly, be more eco-efficient in their use of resources (e.g. material, energy, water, etc.), and provide/offer to consumers more environmentally friendly solutions” (Hojnik, 2016, 295).

Nevertheless, the EIO report from 2016 revealed that some specific businesses, such as social green entrepreneurship, point out lack of financial incentives as the main barrier in the transition towards a circular economy. Despite its important social, environmental and financial impact such entrepreneurship, on account of its specificity, cannot create a stable business solely on the basis of market revenues. In addition, an important barrier for the development of circular and eco-innovative products and services in many cases still remains the “rule of the lowest price” in public procurement, which favours price over quality and in majority of cases rules out green and sustainable solutions since they cannot compete solely on the basis of price.

Similarly, the Chamber of Commerce and Industry of Slovenia highlights that some recycled materials hardly compete with primary resources, e.g. construction aggregates, solely on the basis of price. Besides, there is no (real) market for certain recycled materials, in particular for recycled plastics. Moreover, companies often emphasize the lack of appropriate quality standards for recycled plastics as an important barrier (Rataj and Božič Cerar, 2018). Companies have also pointed out some inconsistencies in legislation, even at the EU level, e.g. between legislation on waste, chemical legislation and technical and safety requirements for products related to consumer protection (ibid.). City of Ljubljana, however, notes the issue of too many laws related to waste, or respectively, the issue of too broad definition of waste in Slovenian legislation as a barrier to circular economy (Strojin Božič, 2018).

A valuable tool for the attainment of circular economy objectives should be the policy of green public procurement, in particular when it includes requirements that take into account the key concepts of circular economy. A decree on green public procurement was adopted already in 2011 and since then amended several times, however, it was never successfully implemented in practice. Already in 2012, the OECD (OECD, 2012) estimated that an obstacle to the more rapid adoption of green public procurement had been the lack of expertise and skills on the part of public procurements. In January 2018 a new decree on green public procurement came into force that currently sets which environmental aspects to take into account and which goals ought to be attained for 20 set items of public procurement (Official Gazette of RS, no. 51/17). It should represent a step in a right direction, however, its impact remains to be seen (Strojin Božič, 2018).

Another important barrier remains the lack of green budget reform. Plan B for Slovenia, a network of Slovenian environmental non-governmental organizations (NGOs) and experts, stresses that as long as primary raw materials are cheaper than secondary materials and the taxation in Slovenia focuses primarily on the labour, resource productivity will not be encouraged (Krajnc, 2018). Since the ways, how to increase resource productivity, had been proposed already in 2011, i.e. with The Roadmap to a Resource Efficient Europe (COM(2011) 571), it is obvious that there is a lack of decision-making competences in Slovenian ministries, primarily in the Ministry of Finance (ibid.). The Government of RS has pointed out green budget reform as one of the measures for the transition to the circular economy (which was proclaimed as a Slovenian strategic priority). So far, in March 2017 the Government managed (solely) to confirm the start of a green budget reform and the creation of a working group for a preparation of starting points for individual policies, instruments and green measures that will promote sustainable development and the transition to circular economy (Government of RS, 2017b). This has been so far the sixth attempt of a green budget reform in Slovenia, which represents a highly political issue, and taking into consideration that the Prime Minister resigned in March 2018, thus opening a way for preliminary elections (supposedly a couple
of weeks before the regular elections), it seems that the current attempt will not deliver any tangible results. Slovenia already has, however, a large share of green taxes, which flow directly into the state budget and only part of the financial flow is then allocated to green policies.

An important barrier to circular economy in Slovenia remains a multitude of adopted documents, specific area strategies and action plans, which prove to be sometimes incoherent or even partially inconsistent. Certain developments have been made with the adoption of the Slovenian Development Strategy 2030, nevertheless, a lot of room for enhanced inter-ministerial coordination and cooperation remains in the adoption and implementation of anticipated measures for the transition to circular economy. Besides this, Slovenia still lacks an integrated policy or framework focusing on eco-innovations. Another important barrier, pointed out by NGOs, certain eco-innovative companies and Circular Change platform, is the development that fails to take (fully) into account externalities, resulting in a situation, where eco-innovations (or circular economy approaches) fail to penetrate the market as their price for the final consumer proves to be higher than of similar, but environmentally less friendly products or technologies. Or if we put it differently, “the costs are being socialized, while the profits are privatized (Kos, 2018).

An important issue in the transition to circular economy remains access to sources of financing. Generally, we could speak of two groups of companies in Slovenia. The first one is represented by highly market competitive companies that only occasionally join the circular economy projects if these happen to fit them. The other group of companies more-less follows the market developments and sporadically succeeds to receive some funds promoting circular economy development. Long and often inefficient administrative procedures and sporadic financial incentives only partially encourage a systematic and comprehensive transition to the circular economy. Slovenia would thus benefit from a central system of financing incentives that would enable continuity in funding circular economy development in a simple, transparent and efficient manner (Godina Košir, 2018).

Another important barrier, already noted in the past, is inefficient transfer of knowledge from higher education to private sector. The former remains rigid when introducing eco-innovation and circular economy trends and developments in their curricula, especially in the higher education. Additionally, Slovenia has a higher share of R&D personnel and employment in total employment (1.59%) in relation to the EU average (1.32%), but it lags in eco-innovation related patents per mln population compared to the EU average, i.e. with approx. 9 patents in Slovenia and 18 patents in the EU average in 2017 respectively. Nevertheless, some progress has been made compared to 2015 – Slovenia maintained positive trends from 2013 in increasing eco-innovation related publications and eco-innovation related media coverage. The former quadrupled from 2012 (from 11 to 45 publications per mln in 2017, while the EU average was 20) and the latter tripled from 2015 reaching an index of 0.61 (eco-innovation related media coverage per number of electronic media), while the EU average was 0.35. Eco-innovation related content also seems gradually to penetrate in higher education curricula, e.g. “Master in Innovation and Entrepreneurship” programme at the University of Primorska (Finance.si, 2017).

The eco-innovation outputs in Slovenia indicate a positive trend related to the development of knowledge and its general dissemination. As already reported in the previous EIO Country Profiles, a baseline consensus on the green agenda in Slovenian society, and political and business communities continues to grow. An important role is played by non-governmental (environmental) organisations, regional and national chambers of commerce and industry (see good practice example), and local public authorities, which increasingly promote eco-innovation and a more sustainable lifestyle. Besides the capital of Ljubljana, the Green Capital of Europe 2016, which was presented as a good practice example in the previous country profile, also Maribor, the second largest city in Slovenia, has initiated a large project that
envisions a new developmental model for the city based on the transition to circular economy (see Good Practice example for more). Such examples indicate an important shift in the thinking, which the Slovenian society will need to reach on the widest possible level if the transition to circular economy is to become not only Government’s strategic priority but also a priority of the society and its every individual. “The transition to a circular economy is based on changes that need to be understood and accepted by a wider society” (Rataj and Božič Cerar, 2018; Kos, 2018).

Thus, some barriers to a shift towards a circular economy noted in the previous years appear to have started improving. The EIO review from 2016 pointed out certain lack of information, knowledge and targeted communication. In October 2015 the Partnership for Slovenia’s Green Economy was created that along the Strategic Research & Innovation Partnerships (SRIPs), setup within Smart Specialisation, attracted and connected a multitude of stakeholders in a so-called process of transition to circular economy. This process of networking and cooperation, especially in SRIPs (one of them directly setups “Networks for the transition into the circular economy” and the “Competence Centre Krog”) increasingly integrates business and education sectors with an aim to contribute to development of adequate human resources and competencies needed for the transition to circular economy (ŠGZ, 2018). Research organizations and companies are thus encouraged to cooperate with an aim to strengthen capabilities of Slovenian research and production sectors (see also e.g. Good Practice example of Cel.cycle). Certain companies and projects have thus become important role models that serve as inspiration and guidance to other companies and stakeholders in the transition to circular economy. Besides this, also funds from abroad, especially EU funds, proved to be an important driver to circular economy and eco-innovation development in Slovenia (Godina Košir, 2018).

An enormous momentum for the transition to circular economy will provide the process of digitalisation of the life cycle of the product, including waste (Rataj and Božič Cerar, 2018). Furthermore, in Slovenia there are already manifold good practices in the field of circular economy, which should be adequately supported in the media and systematically regulated, which would improve access to investments. There are top experts and well-developed network of non-governmental and non-profit organisations, which should be more actively involved in this process of transition to a circular economy (Strojin Božič, 2018).

Last, but not least, an important barrier that had been noted in previous country briefs has been the lack of an integrated policy or framework focusing on eco-innovations in Slovenia. Hojnik (2016, 295) believes that “the economic incentive instrument in the Slovenian environment is not developed enough, and therefore should be more emphasized, especially for eco-innovations that deliver higher value or the environment and economy and are related to large investments, which require more time to pay off and consequently hamper company performance in the meantime” (ibid.). Even though Slovenia (still) has no specific policy focusing solely on eco-innovations, some positive regulatory and political developments took place in the last two years. A clear collective political action towards more green and circular economy policies has been initiated by the Slovenian government. Aside from Smart Specialisation Strategy, the Slovenian Development Strategy 2030 was adopted in 2017 and the transition to circular economy has been proclaimed for a strategic priority of Slovenia. The Roadmap for Slovenia’s Transition to a Circular Economy is being prepared within the Partnership for Slovenia’s Green Economy encompassing manifold and various stakeholders indispensable for its successful implementation and future paradigm shift in Slovenia’s economy, politics and society. Nevertheless, many challenges remain. One of the toughest, demonstrated also by the Resource efficiency outcomes component of the Eco-Innovation Index 2017, will be low material productivity (the ratio between GDP and use of resources) and high energy intensity of the economy (where (transit) road traffic also contributes considerably to the negative picture).
Policy landscape: towards circular economy in Slovenia

A look back to the EIO Slovenia Country Profile in 2013 reveals that Slovenia was significantly influenced by political changes, the challenges of consolidating public finances and the search for short-term solutions regarding the effects of the persisting financial and economic crisis (OECD, 2013), which was posing serious challenges to catching up with the rest of the EU. The adoption and implementation of key strategic and operational documents was lagging, Slovenia had not developed a specific policy on eco-innovation, neither dedicated any focus on it within the policies aiming at promoting R&D. However, positive developments have taken place since then. A new government was elected in autumn 2014, the Slovenian economy grew in 2014 (3.0%) and 2015 (2.3%) and Slovenia welcomed the EU’s Circular Economy Package and action programme, which should stimulate Europe’s transition towards circular economy.

In 2014 the Operational Programme for the Implementation of the EU Cohesion Policy in the period 2014 – 2020 was adopted, that inter alia aims to strengthen efforts particularly in the area of research and development, boost the innovation potentials of small and medium sized enterprises (SMEs), promote resource efficiency and reduce environmental pressures (Operativni program za izvajanje evropske kohezijske politike v obdobju 2014–2020, 2014). The Operational Programme was followed by the Slovenian Strategy for Smart Specialisation in September 2015 and Slovenia’s Development Strategy 2030 in December 2017, that set the transition to a low-carbon circular economy as one of 12 goals.

The Slovenian Smart Specialisation Strategy (S4) represents “a platform for concentrating development investment on areas where Slovenia has the critical mass of knowledge, capacities and competences, and where there is innovation potential for placing Slovenia within global markets and enhancing its recognisability” (Government Office for Development and European Cohesion Policy, 2018a). Slovenian approach to smart specialisation, that is a precondition for using EU structural funds in the field of research, development and innovation, has been recognised as a smart story by the European Commission and included in the Handbook as an example of good practice (European Commission, 2016).

S4 is an implementation document related to the already-adopted strategic documents and it addresses objectives under the (then) existing Slovenia’s Development Strategy (covering 2006-2013) for which Slovenia has already identified three key field-specific strategies; Research and Innovation Strategy of Slovenia 2011-2020, Slovenian Industry Policy (covering 2014-2020) and Digital Agenda.¹ Slovenian smart specialisation thus aims to i) strengthen the competitiveness of the economy by enhancing its innovation capacity, ii) diversify existing industries and service activities, and iii) boost growth of new and fast-growing industries and enterprises (S4, 2015, 5).

In the Slovenian Industry Policy (2013, 37) it was recognised that “even in some areas where Slovenian companies are only suppliers of raw materials or semi-finished products to foreign companies, measures can provide incentives for entrepreneurs to invest in eco-innovation and environmentally friendly end products, where added value is higher.” This is essential for Slovenia because it has a problem due to low

material and energy productivity (the ratio between GDP and use of resources) and the high energy intensity of the economy (road traffic also contributes considerably to the negative picture).

The strategic objective of the Slovenian smart specialisation is “sustainable technologies and service for a healthy life on the basis of which Slovenia will become a green, active, healthy and digital region with top-level conditions fostering creativity and innovation focused on the development of medium- and high-level technological solutions in niche areas”. Slovenia aims to no longer act as a follower in priority niche areas but as a “co-creator of global trends” (S4, 2015, 8). The key S4 target variable is “raising the value added per employee”. The overall S4 implementation performance by 2023 should result in i) increased share of high-tech intensive products in export, ii) increased share of export of knowledge-intensive services in total export, and iii) increased overall entrepreneurial activity (ibid.).

In identifying S4 priority areas of application great emphasis was given to strong empirical bases which resulted in 3 priority pillars and 9 areas of application, i.e.:

1) DIGITAL / Healthy working and living environment (areas of application: Smart cities and communities; Smart buildings and homes, including wood chain);
2) CIRCULAR / Natural and traditional resources for the future (areas of application: Networks for the transition to circular economy; Sustainable food production; Sustainable tourism);
3) “(S)INDUSTRY 4.0” (areas of application: Factories of the future; Health – medicine; Mobility; Development of materials as end products).

Image 4.1: 3 priority pillars on 9 areas of application of the Slovenian Smart Specialisation


The second abovementioned priority pillar of S4 (CIRCULAR) pertains to those areas of application which depend on the use of natural and traditional resources (e.g. cultural heritage, crafts, etc.) and which involve a number of stakeholders, usually without an obvious dominant actor. The first objective in this priority area is to connect stakeholders – business entities, educational and research system, non-
governmental organisations, the state and individuals – into value chains according to the principle “economy of closed material cycles” to develop new business models for the transition towards a circular economy (S4, 2015, 17).

Slovenia has namely relatively well-preserved natural resources, but better and more efficient preservation and management of natural resources is needed. “Consequently, economic systems of linear economies have to transform to circular ones by eliminating the concept of waste, and thus provide conditions for long circulation period of products in use, their cascading use and the provision of clean and unpolluted materials which can be reused. For establishing such a system innovation at the level of business models and the establishment of adequate systems of the so-called reverse logistics are essential” (S4, 2015, 18). The focus will be on technologies for sustainable biomass transformation and new bio-based materials; technologies for use of secondary and raw materials and reuse of waste; and production of energy based on alternative resources. In this regard the 2023 objectives are to (i) raise the material efficiency index (of 1.07 in 2011 to 1.50 in 2020) and to (ii) establish five new value chains with closed material cycles (S4, 2015, 17).

Slovenia will focus on those segments of the market where companies are already represented in global markets or have a real potential for a breakthrough into global markets. The field of sustainable energy production demonstrates an already-established cooperation between companies as well as research institutions, which will be further upgraded. During the entrepreneurial discovery process, 30 initiatives pertaining to the area of ‘Networks for the transition into circular economy’ were prepared, with an estimated investment value of over €950 million. In the field of ‘technologies for the use of secondary raw materials and reuse’, great potential is demonstrated in the building sector, paper industry, manufacture of rubber, agriculture, metallurgy and food industry. Using biomass does not only pertain to the production of energy; the initiatives build on the use of biomass for new biological materials and related products in papermaking and chemical industry”. (S4, 2015, 18)

Long-term collaboration in all relevant areas of S4 application has been promoted through Strategic Research & Innovation Partnerships (SRIPs) – each of the nine areas of application witnessed an establishment of one partnership by the end of 2016 following a spontaneous initiative recognising the need for cooperation and integration. The cooperation between stakeholders in SRIPs (currently of more than 400 companies and 100+ knowledge institutions and more are expected to join) is built on coordination of R&D activities, sharing of capacities, development of human resources, exchange of knowledge and experience, networking and collective representation of interest abroad. In the beginning of 2018 the SRIPs were in the phase of adopting their roadmaps or action plans (= business-development strategy) (Government Office for the Development and European Cohesion Policy, 2018c).2 The Action plan of the SRIP “Networks for the transition into the circular economy”, which is coordinated by the Chamber of Commerce and Industry Štajerska, was adopted in June 2017 (Action plan in Slovene, 2017; Action Plan summary in English, 2017).

Smart specialisation will serve as a basis to draw EU funds in the 2014-2020 budget period. The state will provide financial support to the identified priority areas as well as non-financial support providing services implemented in close cooperation with strategic partnerships (S4, 2015, 8). The document thus plans €656 million in development investments annually in the 2016-2018 period (S4, 2015, 42-43). In February 2016 a first tender implementing the S4 was launched with the aim to i) promote the implementation of

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2 In order to achieve their goals SRIPs have to determine, where Slovenia is heading and where it wants to get: concretisation of focus areas by attaching them goals (focus area development strategy). This stage will then be followed by identification of the activities needed to achieve the set goals, i.e.: Joint development activities roadmap, Internationalisation roadmap, Human resources development roadmap, Entrepreneurship and joint services promotion roadmap, and optimisation of the regulatory framework by the State (Government Office for the Development and European Cohesion Policy, 2018c).
research and development programs (€55 million in total) and ii) to give incentives to research and development projects (€12 million in total value) (Ministry of Education, Science and Sport, 2016). In June 2017 a second call was launched for proposals (“Incentives for R&D projects 2”) which provides EUR 74.2 million in funding and covers a multi-year period (Ministry of Economic Development and Technology, 2017). At the same time, these calls for proposals no longer relate only to the S4, but to the developed SRIP action plans ensuring a consistent, yet dynamic support to entities and encouraging them to interconnect, collaborate and to further concentrate their activity, which is necessary to achieve the critical mass both in human and financial terms (Government Office for the Development and European Cohesion Policy, 2018a).

Wostner thus argues that the major contribution of the Slovenian S4’s is not only the setting of national priorities as regards innovation but also the fundamental transformation of the way stakeholders on the ground interact with each other, i.e. creating value networks, and the way of policy-making within the government, i.e. shifting the perception of the government as a source of financing to a facilitator of change (Wostner, 2017).

Slovenia, which supported the integrated approach from the Commission to “close the loop” of product lifecycles and stimulate the transition towards a circular economy, namely adopted a similar approach in October 2015 by establishing the so called “Partnership for Slovenia’s Green Economy” and setting the green economy as Slovenia’s strategic guideline (Government of RS, 2015). The adopted Framework Programme for the Transition to a Green Economy with the Action plan for 2015-2016 aimed to design and implement measures set in the Framework programme to create conditions for a more green and sustainable growth and development and to steer the process of transition towards a green economy. The proposed measures cover the nine following areas: Sustainable management of resources, Greening of the economy, New green jobs, Green products and services, Green budget reform, Sustainable urban development, Green public procurement, Training and education for a green economy, Green farming practices (Slovene; English summary). With this document the Government, however, primarily started to connect knowledge and reach the consensus on the vision that green economy represents Slovenia’s strategic guideline (Government of RS, 2018, 21a).

In 2015 a working group, led by the Ministry of Environment and Spatial Planning, was created, that invited all interested stakeholders (local communities, public sector, NGOs and universities) to join in monitoring and facilitating the implementation of the Framework programme (MOP, 2015). During 2016 various events and workshops were organised for different stakeholders to present the opportunities of the circular economy and stimulate the transition to it and in December Slovenia joined the Ellen MacArthur CE 100 programme. Under the patronage of the Slovenian Prime Minister more than 2000 stakeholders connected within the Partnership for Slovenia’s Green Economy, which should also draft a Roadmap for Slovenia’s Transition to a Circular Economy.

In February 2017 the “A Vision for Slovenia in 2050” was adopted (Government of RS, 2017a), that stresses “learning for and through life”, “innovative society”, “trust”, “quality of life” (mentioning circular economy) and “identity” (Vision of Slovenia, 2017). The Government, which took note of the Vision 2050, then focused on a new long-term development strategy for Slovenia up to 2030. Its drafting began during the summer of 2016 and after a lengthy process of topical debates, expert workshop, conference and professional harmonisation, discussions, several rounds of interdepartmental coordination on strategy drafts, public consultation, parallel discussions with interested stakeholders and final round of interdepartmental coordination the final draft strategy was discussed and adopted by the Slovenian Government in December 2017 (Government of RS, 2018b).
Slovenian Development Strategy 2030 includes the UN 2030 Agenda for Sustainable Development and thus presents a new long-term Slovenian development framework. Its primary objective is a “high quality of life for all”. It has five strategic orientations (1. inclusive, healthy, safe and responsible society; 2. learning for and through life; 3. highly productive economy that generates value added for all; 4. well-preserved natural environment; 5. high level of cooperation, competence and governance efficiency) and twelve interconnected development goals. Each goal contains rationale of the goal’s relevance, key guidelines that require further activities, two to three core outcome indicators, that represent desired outcomes, and a link to the Sustainable Development Goals (Slovenian Development Strategy 2030 Overview, 2017, 2) (See Image 4.2).

Within the 8th goal “Low-carbon circular economy” the strategy defines the transition to a low-carbon circular economy as “a priority development orientation for the entire economy” (Slovenian Development Strategy 2030, 2017, 38). This goal should be achieved by a) breaking the link between economic growth and growth in consumption of resources and GHG emissions; b) promoting innovation; c) replacing fossil fuels through the promotion of energy efficiency and the use of renewables in all areas of energy use; d) ensuring that infrastructure and energy use in transport support the transition to a low-carbon circular economy and allow sustainable mobility, and e) using spatial planning to design nodes for the low-carbon circular economy and development solutions at the regional and local levels (Slovenian Development Strategy 2030, 2017, 39). The achievement of this goal will be monitored with the help of three performance indicators: material productivity, share of renewable energy in gross final energy consumption, and GDP per total greenhouse gas emissions (ibid.).

In order to implement Slovenia’s development goals, incl. The goal of “Low-carbon circular economy”, a four-year national development policy programme (NDPP) and a medium-term fiscal strategy should be drawn up, and extended annually. Later, using the OECD’s framework for assessing the impacts of the individual scenarios or agreed measures, also the achieving of the Strategy’s goals and the orientations of development policy up to 2030 or 2050 will be monitored (Slovenian Development Strategy 2030, 2017, 39). The Institute of Macroeconomic Analysis and Development should, however, keep monitoring the progress towards the strategy’s objectives in its annual development reports and a special advisory body – Government Council for Development - should be set up to oversee the delivery and potential revision of the strategy (Government of RS, 2018b).

The process of drafting a Roadmap for Slovenia’s Transition to a Circular Economy was initiated in September 2017 with an aim to join countries such as the Netherlands, Finland and Denmark that stress a transition to a circular economy as a strategic priority and had already prepared their national roadmaps. The project, that incorporates numerous regional consultations and several conferences, is led by the Partnership for a Green Economy in cooperation with Circular Change platform and a consortium of partners (see Good Practice example). The Roadmap, that will build upon the propositions made in strategic documents Vision of Slovenia 2050, Development Strategy 2030 and other sectoral strategic documents, should identify the regional and local opportunities of the circular economy sector in Slovenia and pave the way towards transitioning to a circular economy. The project is aimed to end in May 2018 when the final document will be unveiled (Government of RS, 2018c; Circular Change, 2018a; Starting Points of the Roadmap, 2017). In January 2018, the Slovenian Prime minister ambitiously announced at the World Economic Forum that Slovenia will set up a “Circular Hub” within the global platform of the World Economic Forum PACE (Platform form Accelerating the Circular Economy) (Energetika.net, 2018).
Image 4.2: Slovenian Development Strategy 2030: primary objective, strategic orientations, goals, performance indicators and link to UN Sustainable Development Goals.

Source: Slovenian Development Strategy 2030 Overview, 2017, 2
Besides the above presented policy developments related to circular economy, also some other issues need to be pointed out. In June 2016 after two earlier warnings from the Commission Slovenia (finally) adopted its national waste management plan and waste prevention programme, in line with the objectives of EU Waste Framework Directive (Directive 2008/98/EC) and the circular economy (Program ravnanja z odpadki in Program preprečevanja odpadkov Republike Slovenije, 2016).

A valuable tool for the attainment of circular economy objectives should also be the policy of green public procurement. A Decree on Green Public Procurement was adopted already in 2011 and since then amended several times. Since it failed to deliver the anticipated results, a new Decree on Green Public Procurement was adopted in September 2017 and came into force in January 2018 (Official Gazette of RS, no. 51/17). The new decree still provides a list of public procurement projects which fall under obligation to comply with environmental criteria. However, the decree no longer provides a list of mandatory environmental requirements which need to be set by the contracting authority in the call for competition. Instead the decree provides a non-exhaustive list of guidelines which need to be considered by the contracting authority when awarding the contract and provides a lists of goals which need to be satisfied with the award of the contract, depending on the object of the public procurement (ibid.).

Slovenia has also been active in the field of sustainable design by participating in the Project Retrace (A Systemic Approach for Regions Transitioning towards a Circular Economy), which is implemented under the Interreg Europe Programme and promotes the use of systemic design as a method facilitating the shift to a circular economy. In March 2018 the Action Plan on the Use of Systemic Design for Transition to a Circular Economy, which had been developed under the project, was presented. The Action Plan aims to support the first concrete steps towards making sustainable design part of a systemic approach to design of policies, financial instruments and other support mechanisms (Government Office for Development and European Cohesion Policy, 2018d).

EU Eco-Management and Audit Scheme (EMAS) as a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance does not seem to be particularly attractive for businesses in Slovenia (Očko, 2018). In November 2017 there was namely only 11 organizations involved in EMAS in Slovenia (ARSO, 2018). The Regulation (EC) No 1221/2009 foresees that EMAS registration should be beneficial for organizations in form of reliefs when implementing environmental legislation. The forms of reliefs are, however, left for EU member states to decide upon. It seems that taking into consideration the additional administrative costs for EMAS registration, Slovenian companies do not find it attractive in practice. In Slovenia companies rather prefer to obtain a certificate of compliance with the requirements of SIST EN ISO 14001:2005 (GZS, 2018).

There is also more interest in obtaining an EU Ecolabel flower, a voluntary environmental performance certificate that is awarded to products and services. A good practice example is an already mentioned incentive to promote the Ecolabel for touristic locations in Slovenia that account for more than half of (20) acquired Ecolabels in Slovenia (Rataj and Božič Cerar, 2018). Besides EU Ecolabel flower, that is being used in Slovenia for a variety of products, agricultural products or goods sold in Slovenia must be labelled with a single label “ecological” if the product or good has been produced or processed in line with the Rules on organic production and processing of agricultural products and foodstuffs (Official Gazette of RS, no. 8/14), EU Regulation
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834/2007/ES and EU Regulation 889/2008/ES. Besides the label “ecological” also abbreviations such as “bio” and “eco” can be used (Ministry of Agriculture, Forestry and Food, 2018b).

In relation to environmental technology verification (ETV), however, no developments have been reached in Slovenia. Nevertheless, one has to mention a pilot project called Sustainable transformation of companies that took place in Slovenia. The outcomes were presented in March 2018 and 60 Slovenian companies are expected to receive EU funding that will support their transition to more environmentally friendly ways of doing business (SVRK, 2018).

An important policy development has been achieved on the municipal level. Ljubljana has already in 2007 adopted a Vision 2025 with a commitment to a sustainable development. Since then it successfully concluded more than 1900 projects (Strojin Božič, 2018). Numerous other Slovenian municipalities similarly started to develop their own models of a transition towards circular economy. While Ljubljana and in recent years also Maribor (see Good Practice of Wcycle) develop comprehensive business models, other regions focus on certain areas of circular economy and sustainable development, such as food production, energy, mobility, wood chains etc. (Kos, 2018).

Finally, a look back to the EIO Slovenia Country Profile in 2013 reveals that Slovenia has managed to consolidate public finances, overcome the persisting financial and economic crisis and achieve positive developments in the legislation developments. The Slovenian economy continued to grow in 2016 (3.1%) and 2017 (5.0%) (SURS 2018) and the country started catching up with the rest of the EU. On one hand Slovenia has not managed to develop a specific eco-innovation policy, but on the other hand Slovenia welcomed the EU’s Circular Economy Package and action programme, adopted key strategic development documents (first and foremost Slovenian Development Strategy 2030) and set up the green economy as Slovenia’s strategic guideline. In the last two years Slovenia succeeded to rally nation-wide support of manifold and various stakeholders within the Partnership for Slovenia’s Green Economy to elaborate and adopt a Roadmap for Slovenia’s Transition to a Circular Economy. Thus, Slovenia will join those EU member states that lead the in the transition towards a circular economy. In the recent four years and especially in the last two years Slovenia managed to achieve some important positive developments in (circular economy) policy formation and decision-making. However, after the early elections in May/June 2018 the new government will need to continue the efforts that have been done in the policy formation and implement these policies in order to fully realise the potential that Slovenia undoubtedly has in the transition to circular economy.

The Institute of Macroeconomic Analysis and Development of the Republic of Slovenia similarly concluded in its latest Development Report from 2017 that a faster transition towards a green economy will be ensured by moving towards more sustainable production and consumption patterns in Slovenia. In that manner it will be essential for Slovenia to “promote sustainable and efficient exploitation of natural resources, to accelerate research and innovations that also benefit the environment, to improve sustainable mobility and increase the competitiveness of rail transport, and to improve the cooperation between sectoral policy areas to align their measures« (IMAD, 2017, 12).
Policy good practice: Wcycle Maribor

**Description:** Maribor is the second largest city in Slovenia with about 120,000 inhabitants and it has a long history of ups and downs, of changes and crises. In the recent years it had to deal with persistent unemployment, lack of investments and decreased fiscal capabilities, while Maribor’s waste management system needed an upgrade to handle the ever-increasing amount of waste and meet the demands of new national and EU legislation on waste handling. The municipal authorities thus decided to integrate material waste management processes with the city’s energy and water supply systems. By aiming to be both innovative and sustainable, Maribor introduced its own municipal Waste management strategy (2015) ([in Slovene](http://wcycle.maribor.si/)), which already included circular economy as a key ingredient, and the Sustainable Urban Strategy of the Municipality of Maribor (2016), where the yet-unnamed circular economy project was outlined.

In 2016, after a successful presentation in Brussels, the Municipality of Maribor unveiled project Wcycle. Based on the model of the circular economy, it envisions a new developmental model for Maribor as an urban centre in the field of integrated management of all generated waste, surplus energy and wastewater. It combines an integrated material, energy and water strategy for using processed waste, energy and treated water as resources for secondary activities, such as construction and heating. Furthermore, it requires collaboration between public utilities on mutual projects with the goal of recycling and recovering as many materials, water and energy as possible.

**Keywords:** new developmental model, circular economy, integrated waste management, Maribor

**Internet links:**
- [http://wcycle.maribor.si/](http://wcycle.maribor.si/)

**Contacts:**

Inštitut Wcycle Maribor – Inštitut za krožno gospodarstvo
Address: Jadranska cesta 25, 2000 maribor, Slovenia
Email: info@wcycle.com

** Pictures:**

Source: [http://www.circularchange.com/wp-content/uploads/2017/12/2a2c08_5bc650148ef040829a65ddcc9cfac1ab_mv2.png](http://www.circularchange.com/wp-content/uploads/2017/12/2a2c08_5bc650148ef040829a65ddcc9cfac1ab_mv2.png)
Policy good practice: Innovative Slovenia (Chamber of Commerce and Industry of Slovenia Innovation Awards)

Description: The Chamber of Commerce and Industry of Slovenia (CCIS) Innovation Awards have a long tradition. New innovative and improved products and production technologies have been awarded for already 22 years, as are innovations pertaining to organisation, service provision and marketing. An important criterion in the award process represents also the impact of the innovation on the environment.

Selection of the CCIS Innovation Award winners is a two-step process. Firstly, the regional chambers invite entries from local innovators, and their projects and innovations are assessed according to a set of criteria which are applied both regionally and thence nationally. The best within the individual competitions receive gold, silver and bronze awards. The outstanding innovations from Slovenia’s thirteen regions are then considered and judged in the context of a national competition for the country’s best innovation. All entries must meet three main criteria pertaining to originality, viability and contribution to the clean environment.

In 2018 an innovation challenge has been announced: Circular Economy Innovation.

Keywords: innovation awards, chamber of commerce and industry

Internet links:
- https://eng.gzs.si/vsebina/Supporting-innovation/Awarding-innovativity
- https://www.gzs.si/skupne_naloge/inovativna_slovenija/Novice/ArticleId/63453/razpis-za-inovacije-2018

Contacts:
Simona Rataj, MSc
Head of Technology Development and Innovation
E-mail: simona.rataj@gzs.si

Pictures:

Source: https://eng.gzs.si/Portals/English/Vsebine/novice-slicice/inovative_slovenia.jpg
Policy good practice: Partnership for Slovenia’s Green Economy and Circular Change platform

Description: In October 2015 a Governmental Intersectoral Working Group for Circular Economy was established and in October 2016 the Partnership for Slovenia’s Green Economy was created to connect relevant stakeholders (industry, regions and local communities, experts, academia, investors, NGOs, etc.) and exchange experience and knowledge, design policies and enable vertical and horizontal cooperation. In parallel a stakeholder engagement platform “Circular Change” focusing on the Circular Economy was setup to inform, educate, recognize leaders, interpret best practice and co-create pioneering case studies in the transition from linear to circular business models. It is a private non-profit organization, collaborating with a network of international partners.

Circular Change and a consortium of partners is currently working to bring forth the first Slovenian Circular Economy Roadmap through an inclusive multi-stakeholder process of 12 regional consultations and 3 international Circular Change conferences. The Roadmap focuses on four priority areas: food systems, forest-based loops, the manufacturing industry and the wholesome concept of mobility. The draft framework, called the Starting Points for the Roadmap was published in November 2017 while the final document will be presented to the public at the 3rd International Circular Change Conference in the beginning of May 2018.

The project team of experts from various backgrounds is being led by the former European Commissioner for the Environment and current co-chair of the UN International Resource Panel dr. Janez Potočnik and includes the Jožef Stefan Institute, Wcycle Institute, and others. Circular Change serves as the connecting hub and main communication platform. Ladeja Godina Košir, Founder and Executive Director of Circular Change, has been also recognised as one of six finalists of the Circulars 2018 at the World Economic Forum in Davos 2018.

Pictures:

Source: https://pbs.twimg.com/media/C9UB4T2UwAAxK49.jpg

Keywords: partnership, stakeholder engagement platform, circular economy

Internet links:
- http://www.vlada.si/teme_in_projekti/prehod_v_zeleno_gospodarstvo/
- http://www.circularchange.com/
- [http://www.circularchange.com/events/kazipot/](http://www.circularchange.com/events/kazipot/)

**Contacts:**

Circular Change  
Address: Gestrinova 1, 1000 Ljubljana, Slovenia  
Phone number: +386 (0)40 666 678  
Email: [join@circularchange.com](mailto:join@circularchange.com)  
Executive Director: mag. Ladeja Godina Košir
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### ANNEX: Policy measures addressing circular economy and eco-innovations in Slovenia

<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>
</table>
|                          | Publicly co-funded venture capita funds | **Slovene Enterprise Fund (SEF)** is the Public Fund of Republic of Slovenia for Entrepreneurship established with the purpose of improving the access to financial resources for micro, small and medium-sized enterprises (SMEs) including with financial resources for SMEs start-up and micro financing in Slovenia. Every year the Fund offers proper financial solutions for development – business projects in Slovenian entrepreneurial sector via financial engineering, which is majorly based on financial instruments with refundable means (loans, guarantees for loans, subsidised interest rates, venture capital) which allows combining of financial resources of different financial institutions (financial lever). SEF offers financial products in the form of:  
  i. **START UP INCENTIVES** (grants) for establishing an enterprise  
  ii. **SEED CAPITAL** (convertible loans and capital investments) for the entry and expansion on the market  
  iii. **VENTURE CAPITAL** (mezzanine capital) for rapid global growth  
  iv. **MICROCREDITS** (direct SEFs credits) for specific target groups for current operation  
  v. **GUARANTEES** for bank loans with interest rate subsidy for current operation and further growth | Circular economy | **x** |  |  |
|                          |                        | **Slovene Enterprise Fund (SEF)** Incentives for start-up enterprises in the field of wood utilization are designed for new enterprises in the field of wood utilization. The goal is the introduction of products and services with a higher value added in the field of wood utilization and the integration and exchange of knowledge in the forest-wood chain. | Generic focus on eco-innovation |  | **x** | **x** |
|                          |                        | **Slovene Regional Development fund** acts as one of the key institutions of regional development policy. It operates as a public financial fund, which is designed for a more sustainable achievement of public goals in regional development and rural development. The Fund carries out its mission | Resource efficiency improvement |  |  |  |  |
|                          |                        |                  | Energy efficiency improvement |  |  |  |  |
|                          |                        |                  | Reduction of emissions incl. CO2 |  |  |  |  |
|                          |                        |                  | Other relevant areas (e.g. renewable energy, etc) |  |  |  |  |
through incentives that are intended for entrepreneurs and companies, agricultural holdings, co-operatives and the food processing industry, projects in the areas of the autochthonous national communities, municipalities. All funds are awarded through public invitations to tender. As a primary form of incentive, the Fund grants loans with a favourable interest rate and a long maturity.

| Public guarantee funds | Slovene Enterprise Fund (SEF) offers guarantees for bank loans with interest rate subsidy with an aim to enable SMEs a faster, easier, but mainly cheaper obtaining of bank loans for the implementation of projects that provide a competitive market penetration and an improved market position. SEF offers (in general):
- Guarantees for YOUNG enterprises
- Guarantees for SMEs 5+ |

| Support for R&D in public sector and industry | The Slovenian Research Agency (SRA) as an independent public funding organisation performs tasks relating to the National Research and Development Programme and creation of European Research Area. The Agency aims to provide the scientific community with instruments enabling stable funding of scientific excellence. It, inter alia, selects and finances research and infrastructure programmes that provide a public service in the research field.

**EUREKA** public grants (last call in June 2017) aim to encourage Slovenian companies to fully participate in international EUREKA programmes and technological areas of EUREKA programme.

Public tenders for “**Incentives for Research Development Projects**” (First public tender in 2016 (Section I – MGRT tender and Section II – MIZS tender); Second public tender in 2017) promote research and development activities in companies or consortia of companies within innovative research development projects for the development of new or improved products, processes or services in the priority areas of the Slovenian Smart Specialisation Strategy. |

| Collaborative grants | Slovenia takes part in **Eurostars**, i.e. the European funding and support programme that specifically supports the niche market of research-performing SMEs in their innovative R&D projects. It stimulates international collaborative research and innovation projects and it is co-funded from the Slovenian budget and by the European Union through Horizon 2020. |
### R&D Infrastructure

**Research Infrastructures Roadmap 2011-2020** sets up and presents Slovenian priorities in the area of research infrastructure. It complements the Research and Innovation Strategy of Slovenia 2011-2020. **Slovenian Research Agency (SRA)** through year-long contracts co-finances the operation, management and maintenance of research organisations’ infrastructure as support to the research activity. The SRA finances infrastructure programmes and program groups. SRA also occasionally issues public tenders for subsidising equipment purchase. After 2009 there was one tender in 2015 and one in January 2018.

### Fiscal Measures

**Tax incentives for R&D and start-ups**

Companies enjoy tax relief for their investments for R&D and the [Law on Corporate Income Tax](https://example.com) determines tax relief for investments in research and development (Article 55):

> "The person may claim the tax relief in the amount of 100% of the amount which represents the investment in research and development during this period, but not exceeding the amount of the tax base", i.e. investing in "the internal R & D activities", and "the purchase of R & D services".

### Education, training and mobility

**Tailored training courses for companies, entrepreneurs**

The Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia as the central national management institution for scholarships and development of human resources has supported (in March 2017) 11 competence centres for human resource development for 2017 and 2018. Competence centres, that connect 240 companies, aim to enable the implementation of trainings amongst involved companies to improve their competences, productivity, creativity and innovation capability of employees, and to strengthen the competitiveness of the Slovenian economy in accordance with the Smart Specialisation Strategy. Amongst 11 competence centres also a Competence centre for the development of personnel in Circular Economy was setup (Competence Centre KROG).

**E!nnoVest** programme has been created by the international EUREKA network and has three main objectives: to educate SMEs how to improve their level of investment preparedness; to encourage the integration of investment-ready SMEs and internationally active investors; to increase private investment in EUREKA SMEs.
<table>
<thead>
<tr>
<th><strong>Podjetniški portal</strong> (the Entrepreneur's Page) run by SPIRIT (Public Agency for Entrepreneurship, Internationalisation, Foreign Investments and Technology) offers information and advice, how to start and develop a company, market products and services. It also promotes, <em>inter alia</em>, creativity, innovation, sustainability in entrepreneurship amongst the young generation (see page <a href="#">Mladi</a>).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advise/consulting for start-ups, companies, entrepreneurs</strong></td>
</tr>
<tr>
<td>Podjetniški portal (the Entrepreneur's Page) run by SPIRIT (Public Agency for Entrepreneurship, Internationalisation, Foreign Investments and Technology) offers information and advice, how to start and develop a company and market products and services, <em>inter alia</em>:</td>
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<tr>
<td>- <a href="#">Mladi</a>: advice and workshops for young people and entrepreneurs;</td>
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<tr>
<td>- <a href="#">Zagon</a> (Start-up): free information on how to start a company;</td>
</tr>
<tr>
<td>- National innovation system: free support activities to encourage and facilitate innovations, market entrance and the protection of property and intellectual rights.</td>
</tr>
<tr>
<td><strong>Process improvements tender 2017-2018</strong>: Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology supports the competitiveness of companies through improvements of business processes in companies and the transition to (S)Industry 4.0 in line with the Smart Specialisation Strategy.</td>
</tr>
<tr>
<td>- Slovene Business Point (<a href="#">Slovenska poslovna točka – SPOT</a>) is a new national system incorporating former One Stop Business Points (<a href="#">VEM</a> and <a href="#">e-VEM</a>). It represents a comprehensive system of free support services for businesses under a single brand. The SPOT will offer information, e-services, entrepreneurial consulting and training to all existing and new businesses. It will also cover the issues of internationalisation and foreign investments.</td>
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<tr>
<td><strong>Placement schemes for students</strong></td>
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<tr>
<td>Slovene Human Resources Development and Scholarship Fund as the central national management institution for scholarships and development of human resources, offers scholarships for study and research, increases international mobility of students and researchers, provides financial incentives to employers for development of human resources, awards excellence, provides up-to-date information and helps build a network for minimising obstacles to mobility of students, researchers and employees. However, no special focus is given to circular economy and/or eco-innovations.</td>
</tr>
<tr>
<td><strong>Support for R&amp;D workers recruitments</strong></td>
</tr>
<tr>
<td>The Slovenian Research Agency finances postgraduate study and research training for <em>young researchers</em>. The programme runs with great success</td>
</tr>
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</table>
since 1985. To date more than 5,000 young researchers have successfully completed the programme.

<table>
<thead>
<tr>
<th>Networks and partnerships</th>
<th>Competence centres, clusters, science-technology parks</th>
<th>Technology platforms and innovation networks</th>
<th>Foresight and common vision building</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Research and Innovation Partnerships (SRIPs)</strong> were established by the end of 2016 following a spontaneous, not policy-driven bottom-up initiative recognising the need for cooperation and integration on each of the nine areas of application of the <a href="https://example.com">Slovenian Smart Specialisation Strategy (S4)</a>, adopted in September 2015. The initiative also included an agreement on coordinators of SRIPs (=clusters). More than 400 companies and 100+ knowledge institutions already joined the initiative, including the majority of centres of excellence, competence centres and clusters already created in the past, forming nine following SRIPs:</td>
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<td>- Smart cities and communities</td>
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<td>- Smart buildings and homes, including wood chain</td>
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<tr>
<td>- Networks for the transition into circular economy</td>
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<tr>
<td>- Sustainable food production</td>
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<td>- Sustainable tourism</td>
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<td>- Factories of the Future</td>
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<td>- Health – medicine</td>
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<td>- Mobility</td>
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<tr>
<td>- Development of materials as products</td>
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<tr>
<td>Podjetniški portal (the Entrepreneur’s Page) run by SPIRIT supports Technology parks and incubators (university incubators, entrepreneurial incubators) to encourage the development of start-ups and their competitiveness and value added in general. However, no special focus is given to circular economy and/or eco-innovations.</td>
<td></td>
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<tr>
<td>Podjetniški portal (the Entrepreneur’s Page) run by SPIRIT supports technology transfer and innovation of public research organisations to enable transfer of knowledge and technologies to private sector. So-called Technology transfer offices represent Universities in Ljubljana, Maribor and Primorska, and National Institute of Chemistry, Institut “Jožef Stefan” and National Institute of Biology. However, no special focus is given to circular economy and/or eco-innovations.</td>
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</table>
Market intelligence and other forms of information sharing

**Strategic Research and innovation Partnerships (SRIPs)**, especially the SRIP Networks for the Transition into Circular Economy

Slovenia joined the Ellen MacArthur Foundation in October 2016. Association of Municipalities and Towns of Slovenia, Chamber of Commerce and Industry of Slovenia, and Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology are responsible for the process of dissemination of knowledge on the transition to Circular Economy. In this process also the Circular Change platform takes part.

**Circular Change** is a stakeholder engagement platform focusing on the best practices of pioneers transitioning to circular business models.

**Chamber of Commerce and Industry of Slovenia** in general provides market intelligence to companies and organises manifold seminars, workshops and conferences.

**Slovenian Entrepreneurship Observatory**, that was established in 1998, prepares comparative analyses and reports for economic policy-makers and actors promoting entrepreneurship in Slovenia, see e.g. “Slovene Companies and Circular Economy” published in February 2018.

### DEMAND SIDE FOCUS

<table>
<thead>
<tr>
<th>Regulations and standards</th>
<th>Regulations, targets, cap &amp; trade schemes</th>
<th>Ecolabel flower is being used in Slovenia for a variety of products. Agricultural products or goods sold in Slovenia must be labelled with a single label “ecological” if the product or good has been produced or processed in line with the Rules on organic production and processing of agricultural products and foodstuffs (<a href="https://www.goris.rs">Official Gazette of RS, št. 8/14</a>), EU Regulation 834/2007/ES and EU Regulation 889/2008/ES. Besides the label “ecological” also abbreviations such as “bio” and “eco” can be used.</th>
<th>x</th>
<th>x</th>
<th>x</th>
<th>x</th>
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</table>
| Performance standards, labelling, certification | **“Green” public procurement of goods and services**

Environmental and sustainability requirements are obligatory for certain products in public procurement procedures ([Green public procurement of goods and services](https://ec.europa.eu/info/business-economy-euro/tenders-and-contracts/green-procurement_en)). |

R&D procurement

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<table>
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<tr>
<th><strong>Support of private demand</strong></th>
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<tbody>
<tr>
<td><strong>Demand subsidies (e.g. eco-vouchers, consumer subsidies)</strong></td>
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</tbody>
</table>
| **Slovenian Environmental Public Fund (Eco Fund)** manages the assets, earmarked by the Republic of Slovenia, for the preservation of public interest in the field of environmental protection. Eco Fund's main purpose is to promote development in the field of environmental protection. It provides financial supports for environmental projects. The financial assistance is offered mainly through soft loans from revolving funds and since the year 2008 through grants. The financial resources for Eco Fund's grants are gathered under the Regulation on energy savings ensured to final customers. To fulfill its mission Eco Fund makes use of the following loan programmes:  
**Loans to legal entities** (municipalities and/or providers of public utility services, enterprises and other legal entities) and sole traders for investments in environmental infrastructure, environmentally sound technologies and products, energy efficiency, energy saving investments, and use of renewable energy sources  
**Loans to individuals** (households) for conversion from fossil fuels to renewable energy sources, energy saving investments, investments in water consumption reduction, connections to sewage system, small waste water treatment plants, replacement of asbestos roofs | x |

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<tr>
<th><strong>Tax reductions for products and services (e.g. VAT reductions)</strong></th>
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<tbody>
<tr>
<td>Motor vehicles, which are equipped with only an electric drive motor, are exempted from the payment of the annual duty for the use of the vehicle, registered in Slovenia, in road transport (Law on motor vehicles duties, Art. 8; Official Gazette of RS, no. 54/17)</td>
<td>x</td>
</tr>
<tr>
<td>Awareness raising and information provision</td>
<td>Grants to individuals (households) for investments in electric cars and for investments in residential buildings (energy efficiency and use of renewable energy sources)</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 EcoAP website and register to get access to more information and to access all EIO resources.

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