

## ECO-INNOVATION AS A TOOL FOR SUSTAINABILITY IN EU

### EKOINOVÁCIE AKO NÁSTROJ UDRŽATEĽNOSTI V EÚ

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#### ABSTRACT

*Eco-innovation represents for many small and medium-sized enterprises the opportunity to increase their competitiveness and are important in implementation circular economy info life. This type of innovation is nowadays very popular and it is one of the important tools to achieve sustainability in this dynamic environment, to general. An importance of eco-innovation is presented also in main objective of “green economic” in Slovakia and in the European Union’s documents. The Paper is focused on the definition of eco-innovation from various views in the theoretic part and also focuses on three indicators monitored by European union.*

#### KEY WORDS

*eco-innovation, sustainability, indicators*

**JEL – CLASSIFICATION:** O31, O35, O35, J18

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## 1 Introduction

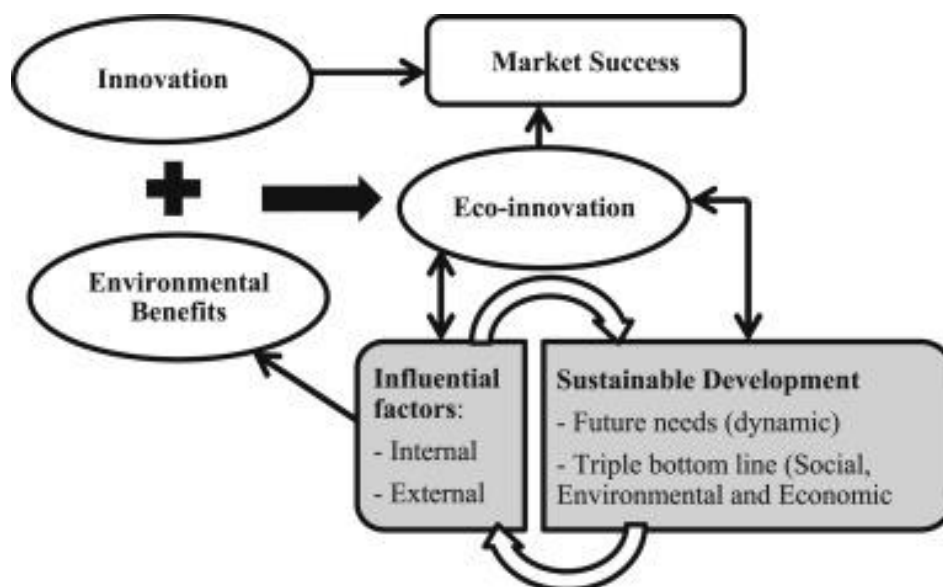
Eco-innovation is any form of innovation that aims and results to make significant and demonstrable progress towards the sustainable development goals set out in the 2030 Sustainable Development Agenda, by reducing environmental impact, strengthening environmental resilience to pressures or using natural resources more efficiently and responsibly. (SAŽP, 2021) Eco-innovation is a new concept. The European Commission define eco-innovation as the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use compared to relevant alternatives. (Arundel, Kemp, 2009)

## 2 Current state of the problem at home and abroad

The general definition of innovation is neutral concerning the content of change and open in all directions. In contrast, putting emphasis on innovation toward sustainable development is motivated by concern about direction and content of progress. (Rennings, 2000, p. 322) The term „*eco-innovation*“ can be used for all innovations that are less environmental harmful than relevant alternatives or it could be reserved strictly to those innovations whose purpose is to reduce environmental harm. (Kemp – Foxon, 2007) Eco-innovations are considered as an output, which could be achieved by companies demanded by society, as a way of contributing to sustainable development. Eco-innovations are also encouraged by the government. Figure 1 shows the dynamic of eco-innovation. Sustainable development has its focus in meeting the

needs of the present without compromising the needs of future generations. Innovation supports these needs, aiming at the development of new products and processes by a combination of factors, knowledge, skills and resources. Eco-innovation drives the scope towards a more sustainable development in a way that, its results should benefit the environment. The additional attribute of eco-innovation is to reduce the environmental impact and to contribute to specific problematic areas, e.g. greenhouse effect, toxic impact on eco-systems and humans, loss of biodiversity, land and resource use. (Bossle, Bonzanini et al., 2016)

**Figure 1**  
*Dynamic of eco-innovation*



*Source: Bossle, Bonzanini et al., 2016*

Treating the company as an eco-innovator means a radical redefinition of the roles different types of companies play for eco-innovation. There has been a tendency only to focus on the firms with a high environmental burden whereas other firms and whole industrial sectors with little direct environmental impact have been neglected.

**Table 1**  
*Determinants of eco-innovations*

<b>Supply side factors</b>	<ul style="list-style-type: none"> <li>• Technological and management capabilities</li> <li>• Collaboration with research institutes, agencies and universities</li> <li>• Access to external information and knowledge</li> <li>• Size</li> <li>• Material and energy prices</li> </ul>
<b>Demand side factors</b>	<ul style="list-style-type: none"> <li>• Market share</li> <li>• Market demand for green products</li> </ul>
<b>Environmental policy influences</b>	<ul style="list-style-type: none"> <li>• Existing regulations</li> <li>• Expected future regulations</li> <li>• Access to existing subsidies and fiscal incentives</li> </ul>

*Source: Triguero, Moreno-Mondéjar & Davia, 2013*

These companies may though well 5 have important impacts on the eco-innovation processes, as is the case with the retail sector and within the knowledge service sector. (Andersen, 2008)

Table 1 represents the determinants of eco-innovation. These determinants could be considered as driving forces or impulses for the emergence of eco-innovation in the business environment.

### 3 Research design

This part of the paper focuses on setting a goal and identifying methods to achieve that goal. The aim of the presented paper is defined as the term “eco-innovation” in theoretical and finding out the state of implementation of eco-innovation. The main methods which were used in the paper are analysis, synthesis, deduction – as the main general research methods. In the practical part of the paper are used the results of research, which were carried out by external institutions and which are publicly available. These results are processed through graphs and tables for a clearer display. Indicators which are monitored and used in the practical part of the paper are following:

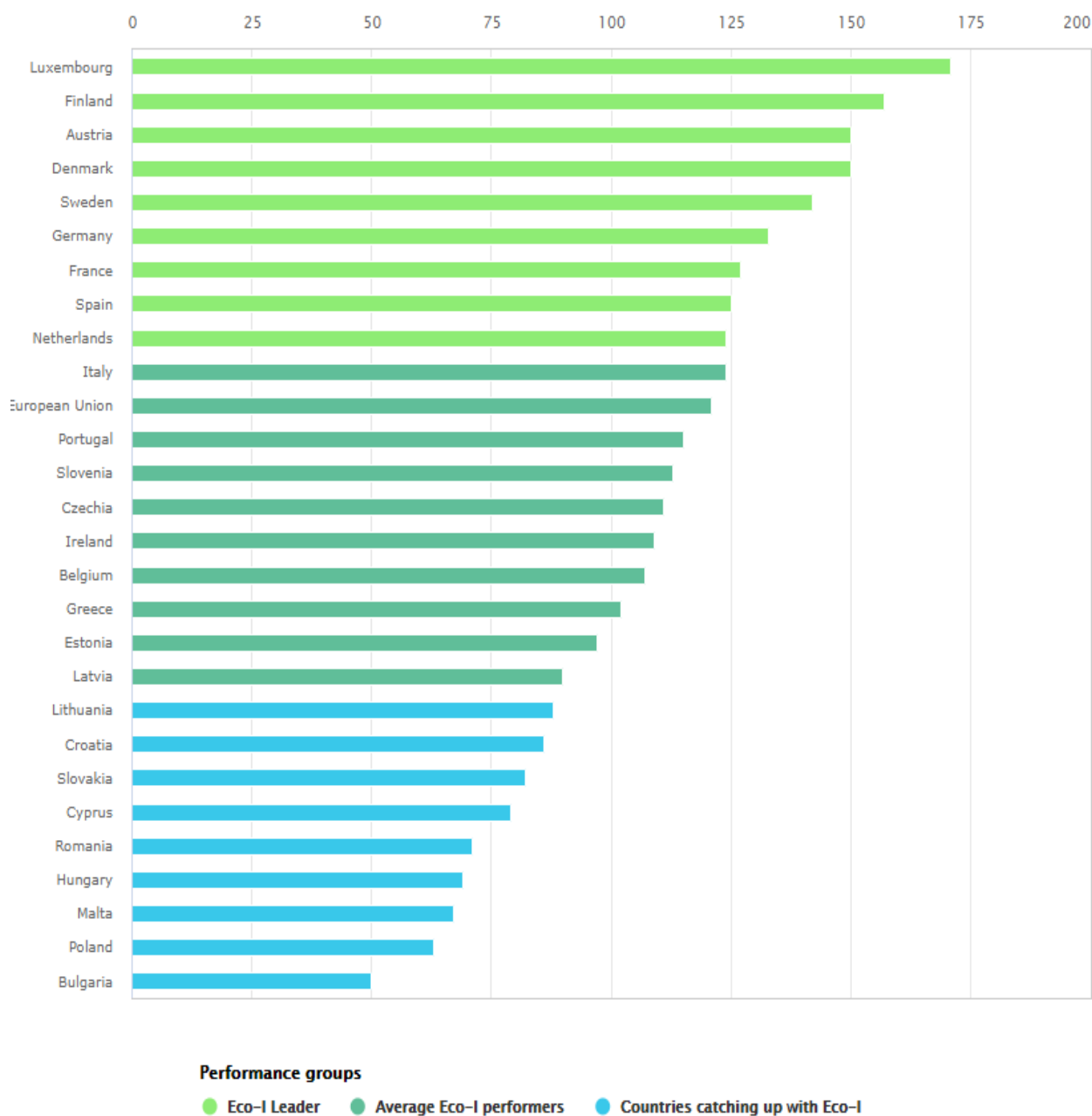
- **Eco-innovation index** – is a composite index that is based on 16 indicators which are aggregated into five components: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource efficiency outcomes and socio-economic outcomes. It divided countries into 3 groups as (Lesáková, Laco, 2020):
  - Eco-innovation leaders, with scores significantly higher than the EU average (a score of > 115);
  - Average eco-innovation performers with scores around the EU average (a score between 85 and 115);
  - EU countries with performance around 85 % or less compared to the EU average (with a score < 85).
- **Eco-innovation input index** – comprise investments (financial resources, human resources, technical resources) that provide an initiative for eco-innovation activities at companies, research organisations, and other institutions. Thus, eco-innovation investments are an important determinant of eco-innovation performance at the level of companies, sectors and countries. (European Commission, 2021)
- **Eco-innovation output index** – is an index that is used to monitor the extent to which knowledge outputs generated by businesses and researchers relate to eco-innovation. (European Commission, 2021)

### 4 Results and discussion

The chapter „*Results and discussion*“ is focused on the measure of multitude of eco-innovation and other indicators related to eco-innovations.

The first indicator **Eco-innovation index is a composite indicator** obtained by taking an unweighted average of the 16 indicators included in the measurement framework. Results of the indicator are represented by 9 countries as eco-leaders in 2021. So, this means, that their scores were higher than 115. The biggest eco-leader is Luxembourg, the second one is Finland and third is Austria. Average eco-innovators are 10 countries, so it means, that their scores are between 85 and 115. From the V4 group, the Czech Republic is part of average eco-innovators as only one. Other countries from the V4 group include Slovakia are part of the third group of eco-innovators – as the lowest eco-innovators with scores lower than 85 % of the EU average. In this group, there are 9 countries from the EU at all. Bulgaria is the lowest eco-innovator from all countries in the EU with a very poor score just 50. The difference between the highest and lowest eco-innovator is 121 points. All results are represented in figure 2.

**Figure 2**  
*Eco-innovation scoreboard for EU countries in 2021*

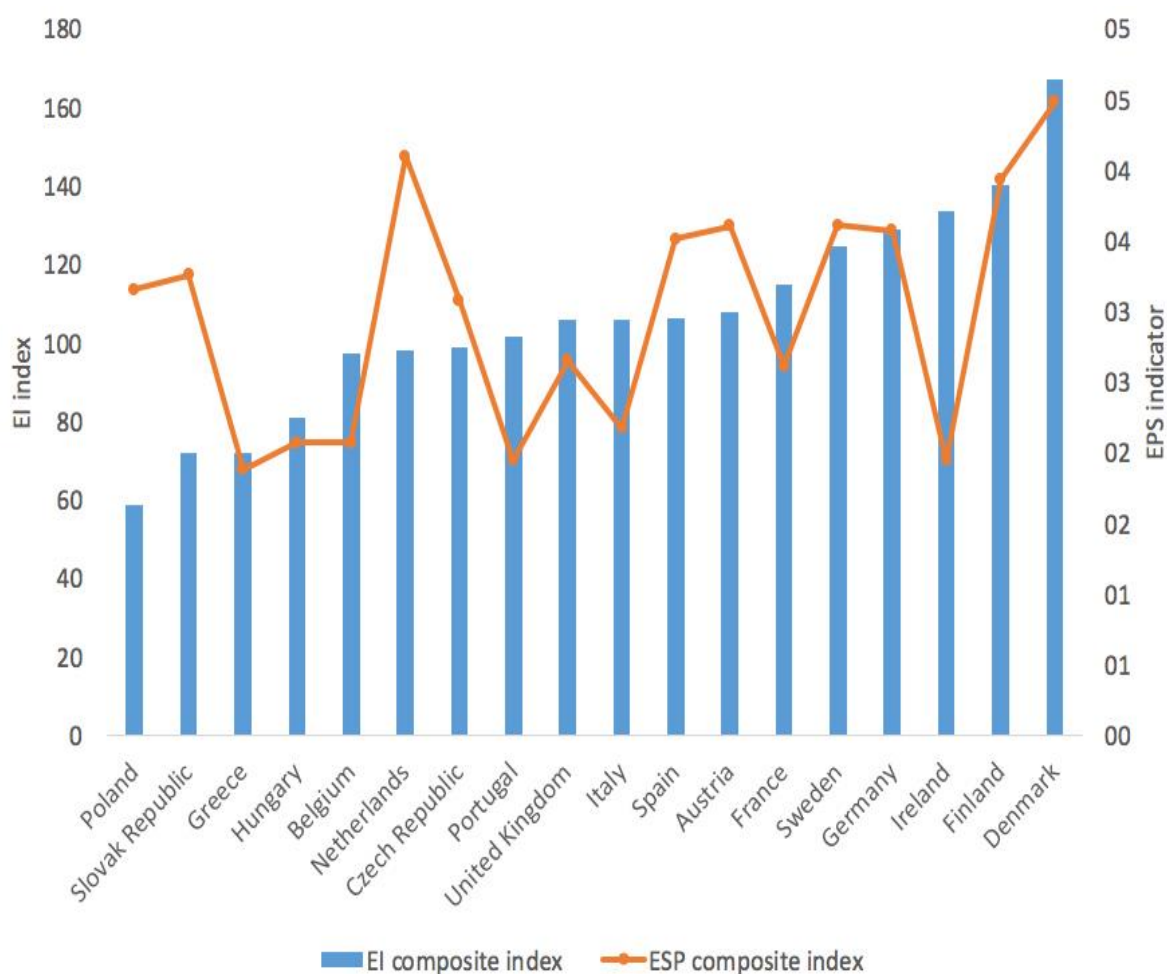


**Source:** European Commission. (2021). [https://ec.europa.eu/environment/ecoap/indicators/index\\_en](https://ec.europa.eu/environment/ecoap/indicators/index_en). [accessed 29.09.2021]

In figure 3, there is eco-innovation index comparing with environmental policy stringency index in selected EU countries. In countries like Denmark, Finland, Germany and Sweden stricter environmental policies correlate with better eco-innovation performance. However, in the Netherlands where EPS index is very high, the eco-innovation performance is less impressive. In other countries, environmental regulations have not yet translated in better eco-innovation performance.

**Figure 3**

*Eco-innovation index vs environmental policy stringency index in selected EU countries*

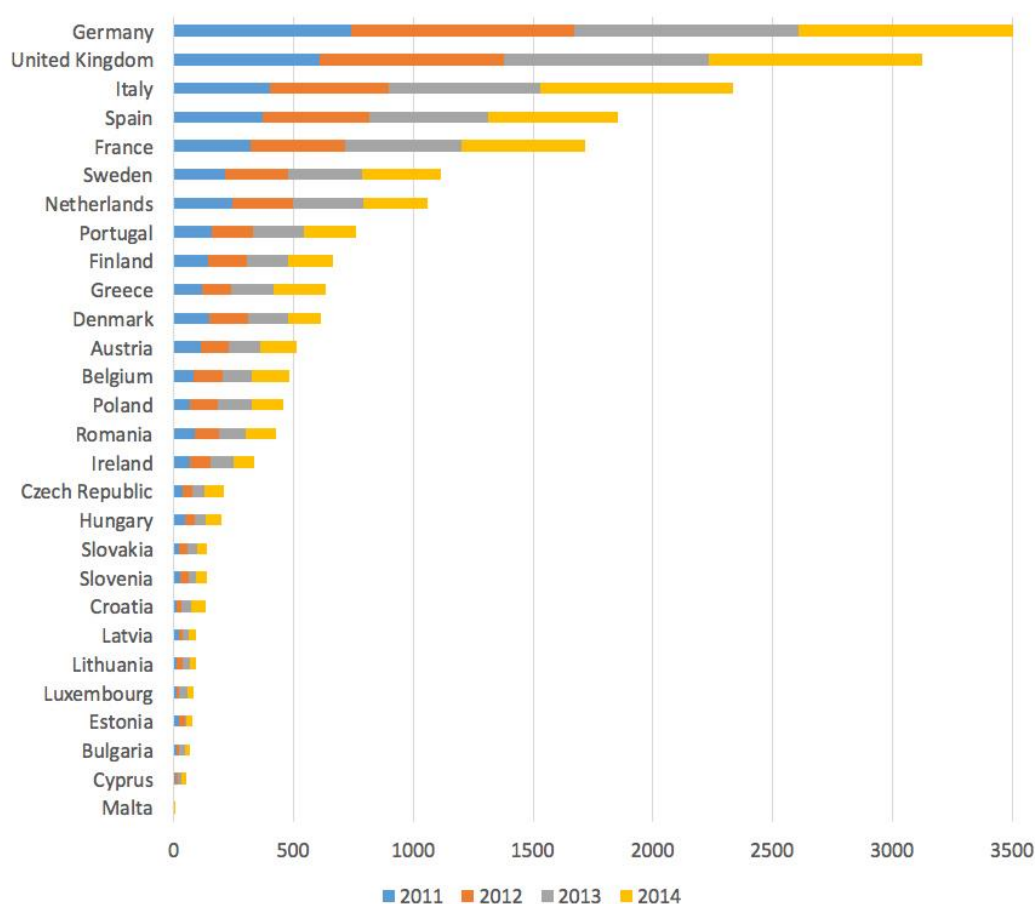


**Source:** European Commission. (2021). [https://ec.europa.eu/environment/ecoap/indicators/inputs\\_en](https://ec.europa.eu/environment/ecoap/indicators/inputs_en). [accessed 29.09.2021]

The last indicator which is interpreted in this paper is from a group of eco innovation output indexes. Results of this presented indicator base on the quantity of total number of scientific publications which are focused on eco-innovation topic. Results are represented in figure 4, where we monitored the number of scientific publications in 2011 to 2014. Unfortunately, we do not have actual data. The largest contributors of academic literature in eco-innovation related topic are German, British and Italian scientists. From countries in V4 group, Slovakia has the lowest number of scientific publications. On the other side, the most total number of scientific publications focused on eco-innovation topic from V4 group, has Poland.

This is very interesting, because in eco-innovation scoreboard, Poland has score just 63, which means that was the second lowest eco-innovator from other EU countries. However, it is very complicated to compare these two indicators, in spite of fact, we do not know number of publications in Poland in 2021.

**Figure 4**  
**Total number of scientific publications addressing eco-innovation topic in EU in 2011–2014**



**Source:** European Commission. (2021). [https://ec.europa.eu/environment/ecoap/indicators/outputs\\_en](https://ec.europa.eu/environment/ecoap/indicators/outputs_en). [accessed 29.09.2021]

While the contribution is still limited, in the new EU Member States the scientific publishing activities are on the rise.

## 5 Conclusion

In presented paper we focused on eco-innovation, which are consider for one of tool to sustainability in modern globalize business environment. In first part of paper, theoretical background, there is defined the term „eco-innovations“, as well as dynamic of eco-innovation and determinants. On the other side, in practical part of paper, there are monitored three indicators of eco-innovations. The positions of Slovakia in these results are not very positive. In eco-innovation scoreboard, Slovakia is in group of countries which catching up with eco-index lower than 85 point compare to EU average in 2021. The second indicator, which represented correlations between eco-innovations index and environmental policy stringency index. Slovakia achieved the result which means that environmental regulations have not yet translated in better eco-innovation performance. The last one, monitored the total number of scientific publications which are focused on eco-innovation related topic. Slovakia is from V4 countries, country with lowest number of publications. However, this result is from years 2011–2014. Actual data are not available. In spite of this fact, we consider focus on eco-innovation in

Slovakia for very interesting and important because of very fast changes of climates, dynamic of business environment and changes of consumer's preferences.

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