European Environment Agency

8th Environment Action Programme

Eco-innovation index

8TH EAP HEADLINE INDICATOR, 2025

European Environment Agency

Eco-innovation index in Europe

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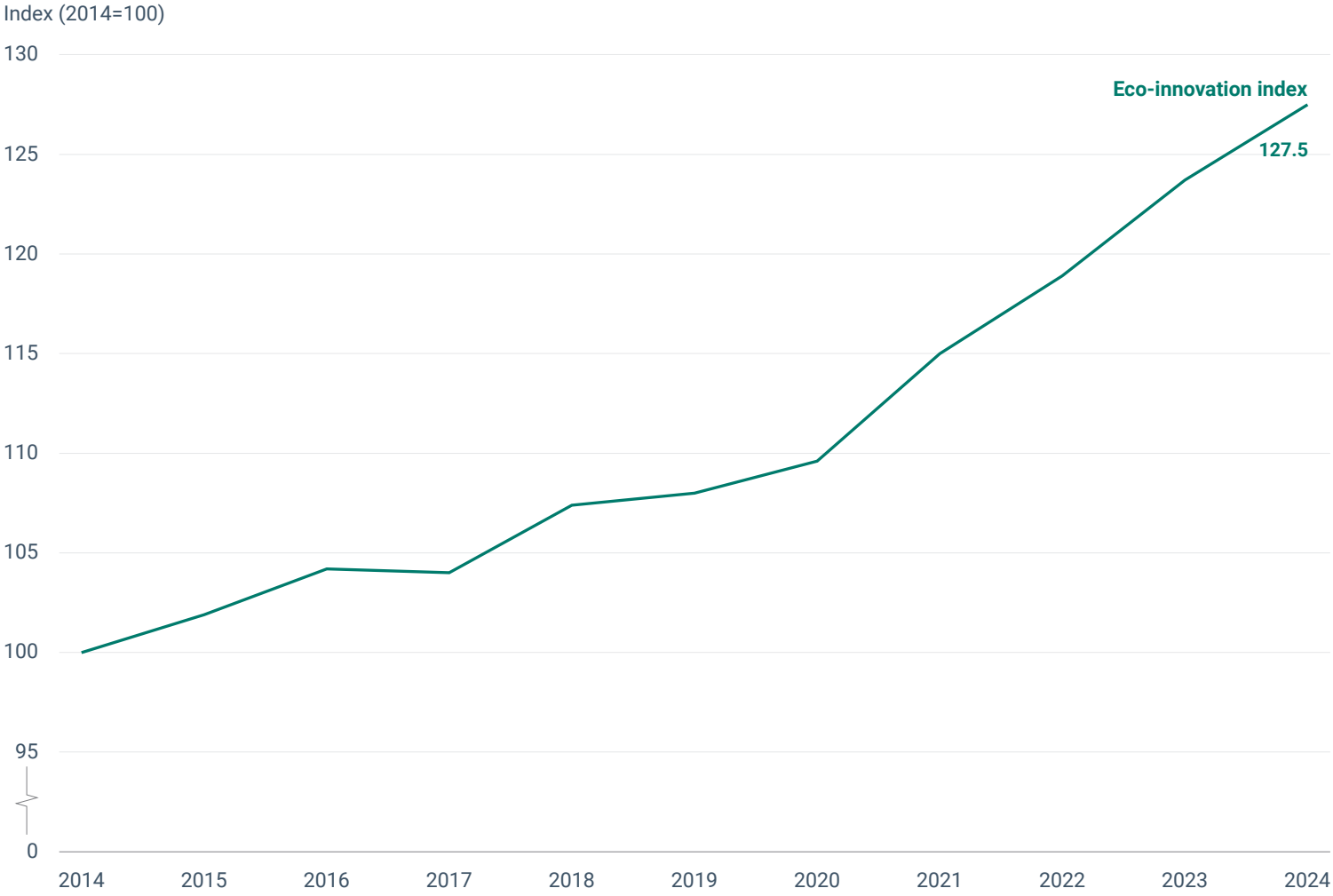
Eco-innovation, which is crucial for achieving the European Green Deal objective of transitioning to a carbon-neutral and sustainable economy, has increased in the European Union. The European Commission's eco-innovation index increased by 27.5% from 2014 to 2024, mainly driven by improvements in resource efficiency. This steady increase in recent years is expected to continue, as the European Green Deal has set ambitious environment- and climate-related objectives. Its associated initiatives are very likely to create favourable conditions for more eco-innovation.

Figure 1. Eco-innovation index, EU-27, 2014-2024 (EU-27=100 in 2014)



Eco-innovation refers to any innovation that **reduces impacts** on the environment, increases resilience to environmental pressures or uses natural resources more efficiently[1]. Eco-innovation is essential for achieving the objectives of the European Green Deal, such as the transition to a climate-neutral, circular economy.

The European Commission's eco-innovation index [2] is a composite indicator based on **five dimensions**:

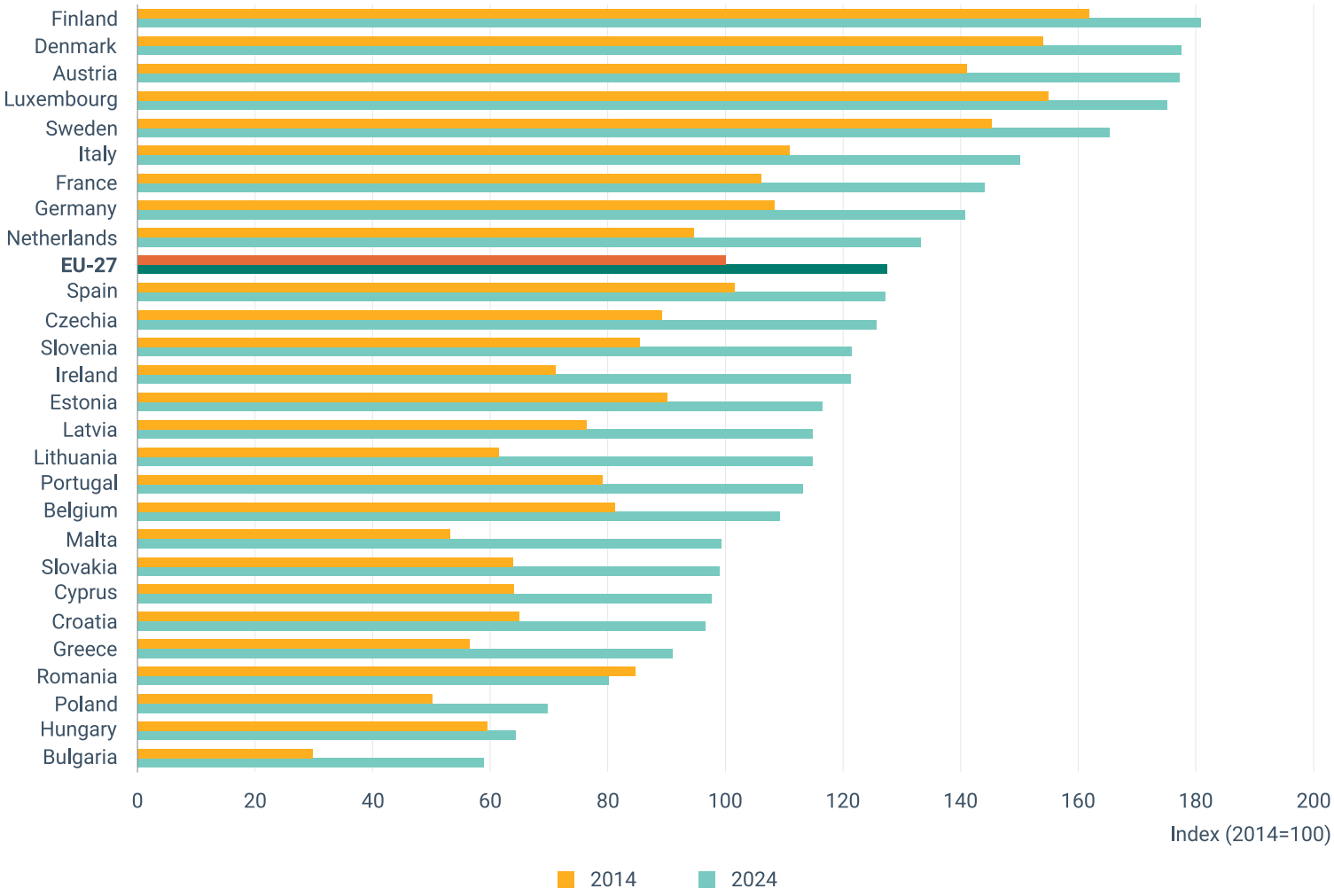
1. eco-innovation inputs;
2. eco-innovation activities;
3. eco-innovation outputs;
4. resource efficiency outcomes, and;
5. socio-economic outcomes.

Performance in each of these dimensions is measured using relevant indicators, which are published by, for instance, Eurostat, the European Environment Agency and the Organisation for Economic Co-operation and Development (OECD).

The EU's performance between 2014 and 2024 **improved** markedly, as shown by the by steady 27.5% increase in the eco-innovation index score. Increases were seen in all of the five themes, however the increasing eco-innovation index score can mostly be attributed to improvements in resource efficiency outcomes. This theme increased by 62% during the period, particularly in greenhouse gas (GHG) emission productivity (i.e. decreases in GHG emissions generated per unit of gross domestic product (GDP)). At the indicator level, the greatest improvement was seen in the number of eco-innovation publications, while the worst performance was in eco-innovation related patents.

The steady increase in the eco-innovation index score between 2014 and 2024 is expected to continue in the future. This is because the improvements in resource efficiency and other contributing indicators are likely to continue due to the highly ambitious environment- and climate-related objectives of the European Green Deal and its associated initiatives[3].

Figure 2. Eco-innovation index by EU Member State, 2014-2024 (relative to EU-27=100 in 2014)



The Nordic countries, Luxembourg and Austria were the **best performers** of eco-innovation from all individual EU Member States in 2014 and 2024[4]. Apart from Finland, all of these countries performed well in resource efficiency outcomes. Finland and Austria scored particularly highly on socio-economic outcomes.

Index scores improved between 2014 and 2024 for all Member States except Romania. Eighteen Member States achieved increases of above the EU-27 average. Lithuania achieved the **largest growth**, followed by Ireland and Malta. Lithuania's improvement is largely driven by strong growth in eco-innovation related academic publications, water productivity (GDP/total freshwater abstraction), the number of ISO 14001 certificates, and indicators included in socio-economic outcomes.

Some countries showed substantial progress over the period, reflecting concerted efforts to foster eco-innovation activities. For example, Greece experienced a steady improvement in its eco-innovation, increasing from 56 in 2014 to 91 in 2024. However, there remains a gap between the top performers and those still in need of further progress. The top-performing member state, Finland, scored three times higher than the lowest-performing member state, Bulgaria.

Supporting information

Definition

‘Eco-innovation is any innovation that make progress towards a more green and sustainable economy by reducing environmental pressures, increasing resilience or using natural resources more efficiently’ [5].

The eco-innovation index is based on the eco-innovation scoreboard, which has 12 indicators in five thematic areas[3]:

1. 'Eco-innovation inputs, which includes financial and human capital investment in eco-innovative activities;
2. Eco-innovation activities, which defines the extent to which companies in a given country are active in eco-innovation;
3. Eco-innovation outputs, which measures the output of eco-innovation activities concerning the number of patents and academic literature;
4. Resource efficiency outcomes, which pinpoint a country’s efficiency of resources and GHG emission intensity;
5. Socio-economic outcomes, which aims to measure the positive societal as well as economic outcomes of eco-innovation’.

Methodology

Eco-innovation index scores are currently calculated on the basis of 12 indicators belonging to the following five thematic areas:

1. Eco-innovation inputs: governments’ environmental and energy R&D appropriations and outlays (governments’ environmental and energy R&D appropriations and outlays as a proportion of GDP); total R&D personnel and researchers (total R&D personnel and researchers as a proportion of total employment).
2. Eco-innovation activities: number of ISO 14001 certificates (number of ISO 14001 certificates/population in millions).
3. Eco-innovation outputs: eco-innovation-related patents (number of patent applications filed under the Patent Cooperation Treaty (PCT) in the fields of environment-related technologies, climate change adaptation technologies and sustainable ocean economy inventions/population in millions); eco-innovation-related academic publications (number of publications with any the following list of English keywords in the title and/or abstract: eco-innovation, energy efficient/efficiency, material efficient/efficiency, resource efficient/efficiency, energy productivity, material productivity, resource productivity)population in millions;

4 Resource efficiency outcomes: material productivity (GDP/domestic material consumption (DMC)); water productivity (GDP/total fresh water abstraction); energy productivity (GDP/gross available energy for a given year); GHG emission productivity (GDP/GHGs (CO_2, N_2O in CO_2 equivalent, CH_4 in CO_2 equivalent, hydrofluorocarbons (HFCs) in CO_2 equivalent, perfluorocarbons (PFCs) in CO_2 equivalent, SF_6 in CO_2 equivalent, NF_3 in CO_2 equivalent)).

5 Socio-economic outcomes: exports of environmental goods and service sector (export of goods and services in the field of environmental protection and resource management activities/total exports); employment in environmental protection and resource management activities (employment in environmental protection and resource management activities/total employment); value added in environmental protection and resource management activities (value added in the environmental goods and service sector/GDP).

Policy/environmental relevance

The Eighth Environment Action Programme (8th EAP) should, among other things, accelerate the transition to a green economy in the context of a well-being economy through, inter alia, 'continuous… innovation' (EU, 2022). This indicator is a headline indicator for monitoring progress towards meeting one of the 8th EAP and contributes mainly to monitoring progress in relation to aspects of Article 3(w), which requires 'strengthening the environmental knowledge base… and its uptake…, including through… innovation' (EU, 2022). The European Commission communication on the 8th EAP monitoring framework specifies that this indicator should be used to monitor the increase in 'eco-innovation as a driver for the green transition' [6].

Data sources and providers

- Eco-innovation index, Research and Innovation (DG)

Metadata

DPSIR

Response

Topics

Sustainability solutions

Tags

impacts # 8th EAP # Transition # Eco-innovation # environment # resource efficiency # SUSO001 # environmental pressures

Temporal coverage

2014-2024

Geographic coverage

Austria
Belgium
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden

Typology

Descriptive indicator (Type A - What is happening to the environment and to humans?)

UN SDGs

SDG11: Sustainable cities and communities

Unit of measure

This is a composite indicator and therefore no units are used.

Frequency of dissemination

Once a year

References and footnotes

1. EC, 2011, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Innovation for a sustainable future — the eco-innovation action plan (Eco-AP)', COM(2011) 899 final of 15 December 2011.

2. Al-Ajlani, H., Cvijanović, V., Es-Sadki, N. and Müller, N., 2022, *EU eco-innovation index 2022 — policy brief*, European Commission.
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3. Mohamedaly, Al-Ajlani, H., Kuuliala, V., McKinnon, D. and Johansen, M., 2022, *Eco-innovation for circular industrial transformation — a report on the best practices, drivers, and challenges in key sectors*, European Commission.
a b

4. The progress made by EU Member States over time is presented relative to an eco-innovation score for the EU-27 in 2014 of 100.
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5. EC, 2022, *Eco-index 2022 — indicators and methodology*, European Commission.
↲

6. EC, 2022, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the monitoring framework for the 8th Environment Action Programme: measuring progress towards the attainment of the programme's 2030 and 2050 priority objectives, COM (2022) 357 final of 26 July 2022.
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