

Circular economy country profile 2024 – Portugal



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Introduction

The European Commission requested the EEA to produce EU country profiles that offer an updated view of the following elements:

- what circular economy policies are being implemented at a national level with a particular focus on elements that go beyond EU mandatory elements, and
- what are best practices with a focus on policy innovation.

With the EU Circular Economy Action Plan (CEAP 2020) "the Commission [...] encourages Member States to adopt or update their national circular economy strategies, plans and measures in the light of its ambition".

These country profiles originate in the work leading to the EEA More from less report (2016)¹, that presented an overview of approaches to material resource efficiency and to circular economy in thirty-two European countries. The More from Less report was followed by the 2019 EEA Report 'Resource efficiency and the circular economy in Europe 2019 – even more from less: An overview of the policies, approaches and targets of 32 European countries'².

It presented an updated and extended assessment of approaches and identified trends, similarities and new directions taken by countries in the connected policy areas of resource efficiency and the circular economy.

These reports, comprising a compilation of extensive survey responses from countries, were accompanied by 32 country profiles.

In the second quarter of 2022 a new survey with questions and guidelines was launched. Based on information reported by the Eionet network, in particular, the Eionet Group on Circular Economy and Resource Use, and after review and editing by the European Topic Centre on Circular economy and resource use (ETC CE), the 30 2022 CE country profiles³ were published alongside the EEA report 'Circular Economy policy innovation and good practice in Member States'⁴ (2022).

These 2024 CE country profiles are an update of the 2022 ones and based on the responses of 29 countries to the survey questions and guidelines that were launched in March 2024. The information in the countries' responses was again reviewed and edited by the European Topic Centre on Circular economy and resource use. A selection of Eurostat data was made to further complement these country profiles.

The main objectives of these assessments and its updates are to: • stimulate exchange of information and share good practice examples among country experts; • support policymakers in Eionet countries, the European institutions and international organisations by providing an updated catalogue of circular economy actions being undertaken in European countries.

This circular economy country profile is based on information reported by the Eionet network and, in particular, the Eionet Group members on Resource Efficiency and Circular Economy in the second quarter of 2024. Proposals for the further development or amendment of policies represent the view of the reporting country. For Portugal, all input was provided by the Portuguese Environment Agency. The information was reviewed and edited by the European Topic Centre on Circular economy and resource use. A selection of Eurostat data was made to further complement this country profile.

¹ [More from less – material resource efficiency in Europe – European Environment Agency \(europa.eu\)](https://europea.europa.eu/en/press-releases/2016/06/16-06-2016)



² [Resource efficiency and the circular economy in Europe 2019 – European Environment Agency \(europa.eu\)](https://europea.europa.eu/en/press-releases/2019/06/19-06-2019)

³ [Country profiles on Circular Economy in Europe – Eionet Portal \(europa.eu\)](https://europea.europa.eu/en/press-releases/2022/06/22-06-2022)

⁴ [draft-report-for-dg-env_final.pdf \(europa.eu\)](https://europea.europa.eu/en/press-releases/2022/06/22-06-2022)

The information is current as of September 2024, when members of Eionet verified the content of this profile.

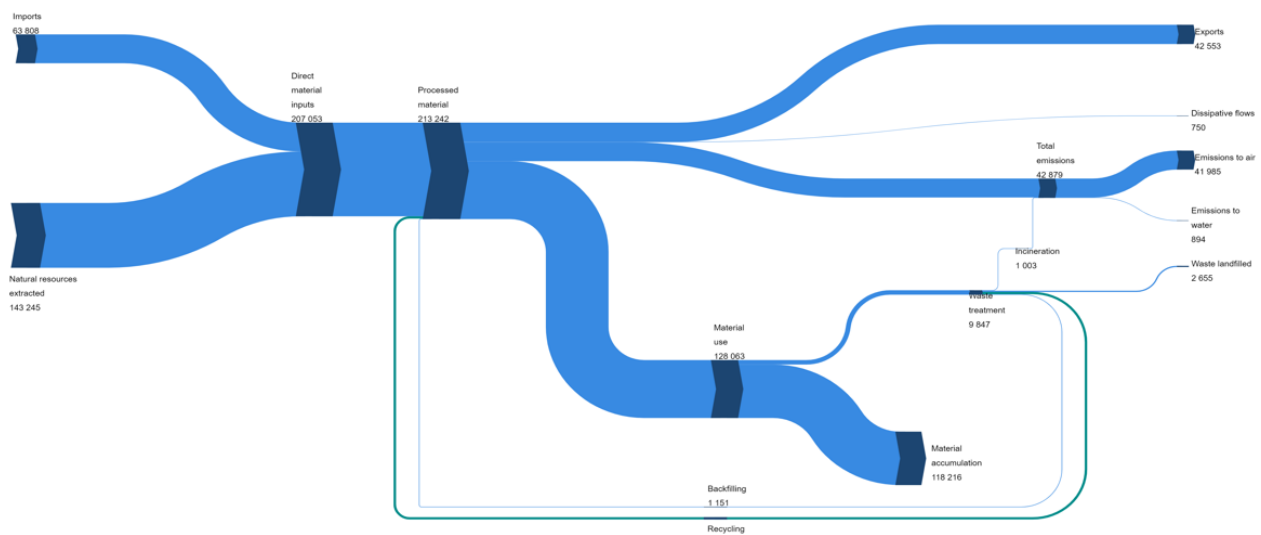
Portugal– facts and figures

 	GDP: EUR 265.5 billion (1.6 % of EU27 total in 2023)
	GDP per person: EUR 25,740 (purchasing power standard) (82.4 % of EU27 (from 2020) total per person)
	Use of materials (domestic material consumption (DMC)) 162.7 million tonnes DMC (2.6 % of EU27 total in 2022) 15.6 tonnes DMC/person (109.6 % of EU27 average per person in 2022)
	Structure of the economy (2023): Agriculture: 2.3 % Industry: 20.7 % Services: 77.0 %
	Employment in circular sectors: 87,525 people employed in CE sectors (2.0 % of EU total in 2021) People employed expressed as a percentage of total employment: 1.8 % (compared to 2.1 % for EU average in 2021)
Surface area: 92,226 square kilometres (2.2 % of EU27 total)	
Population: 10,516,621 (2.3 % of EU27 total in 2023)	

Note: all definitions and metadata used in this profile are taken, as shown, from Eurostat

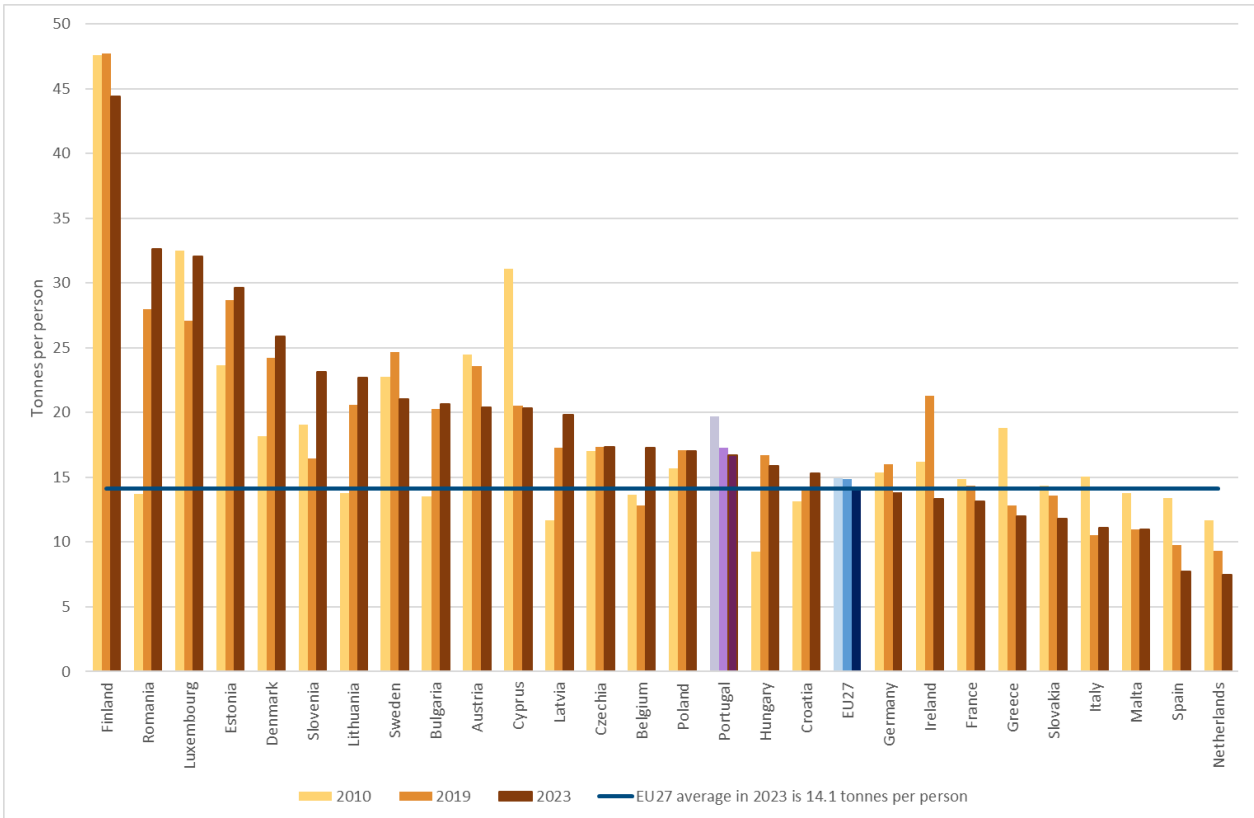
Source: Eurostat datasets, EU27 2021 EU27 2022 and EU27 2023 (accessed 21 August 2024)

Figure 1 Material flow diagram for Portugal in 2022, thousand tonnes



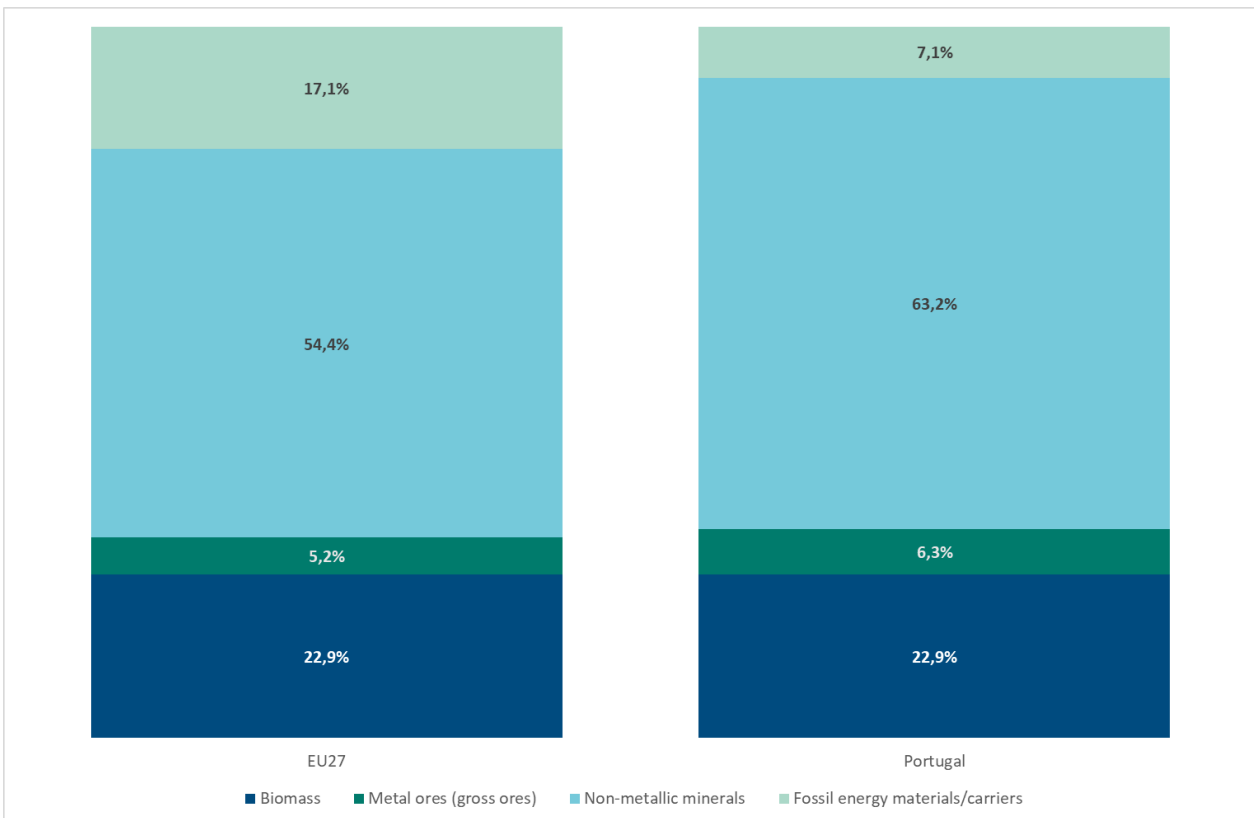
Source: Eurostat (2024) [env_ac_mfa], [en_ac_sd], [env_wassd] (accessed 21 August 2024)

Figure 2 Material footprint (raw material consumption), 2010,2019 and 2023, tonnes per person



Source: Eurostat (2024) [env_ac_rme] (accessed 21 August 2024)

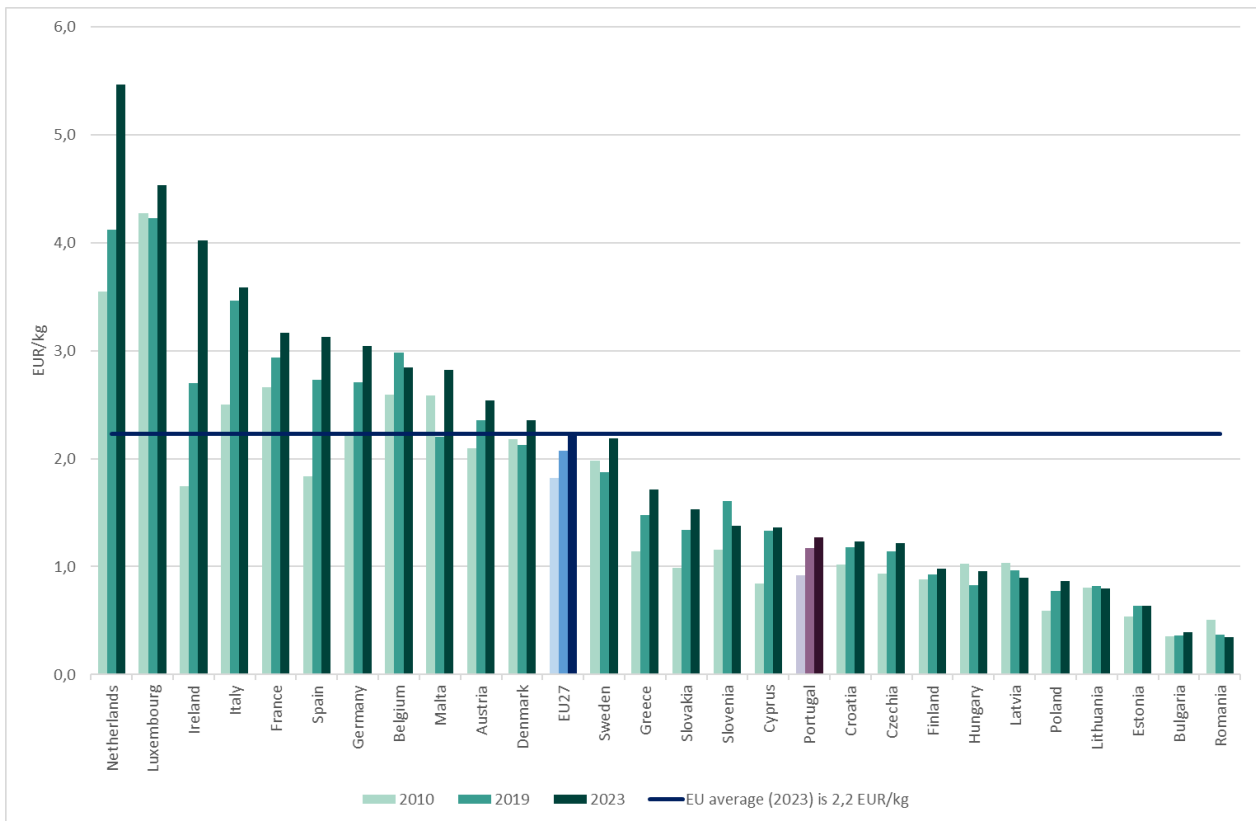
Figure 3 Domestic material consumption by selected material category, EU and Portugal, 2023, per cent



Note: totals may not sum to 100 % due to rounding

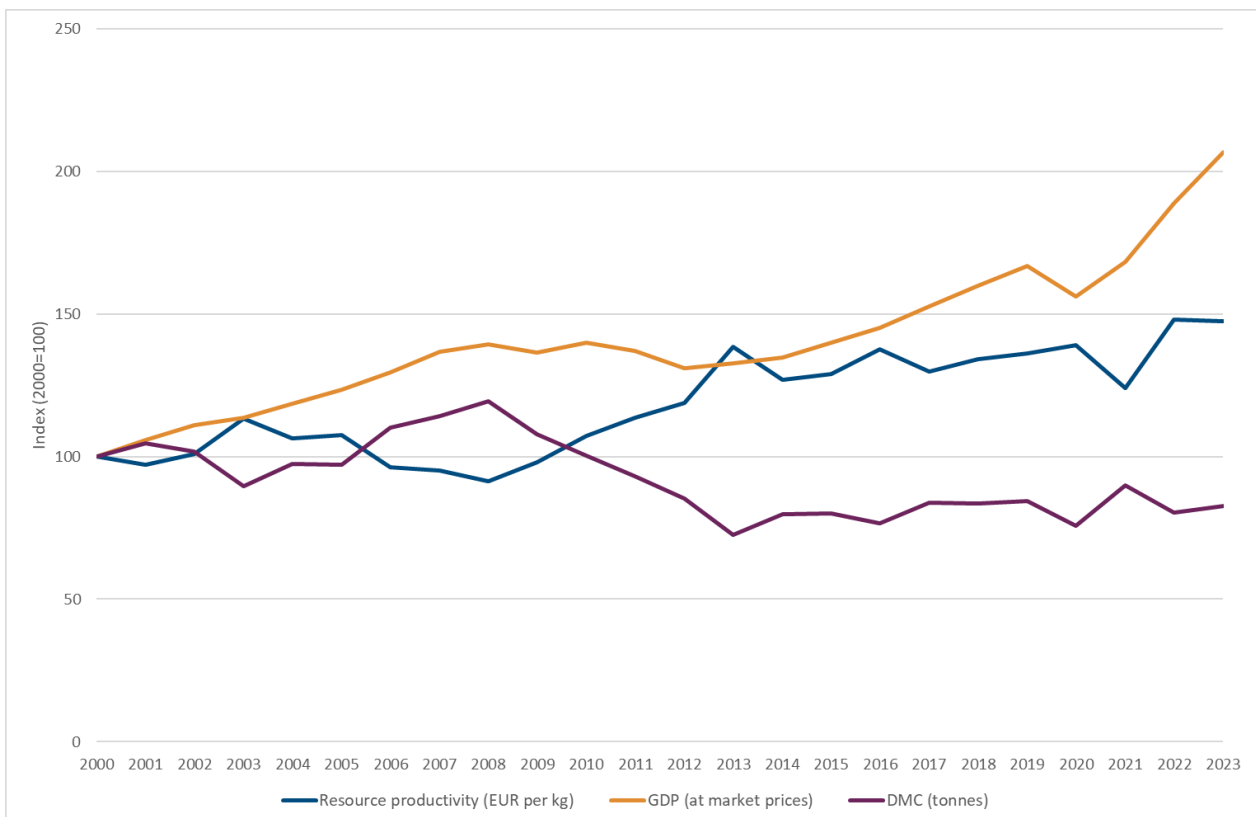
Source: Eurostat (2024) [env_ac_mfa] (accessed 21 August 2024)

Figure 4 Resource productivity (gross domestic product/domestic material consumption), EU27, 2010, 2019 and 2023, EUR per kilogramme



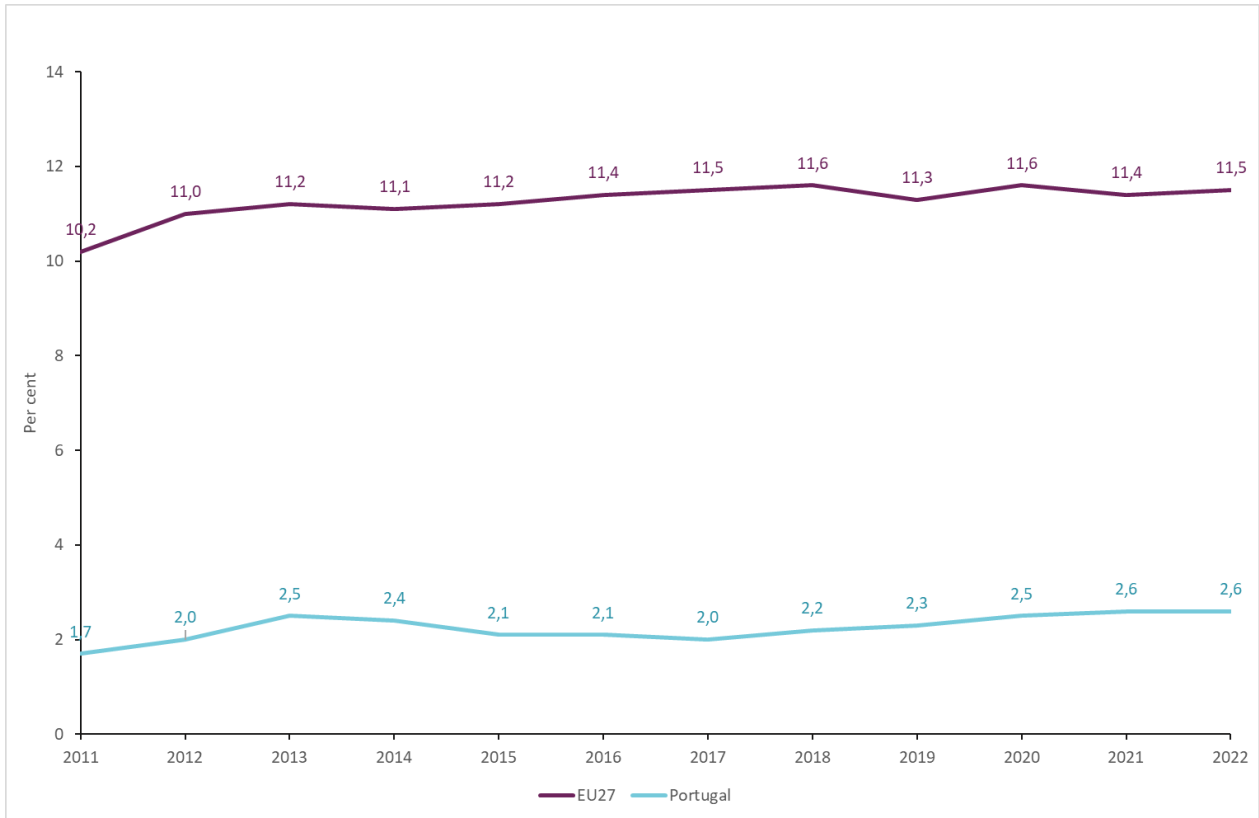
Source: Eurostat (2024) [env_ac_rp] (accessed 21 August 2024)

Figure 5 Gross domestic product, domestic material consumption and resource productivity trends, Portugal, 2000–2023, index (2000=100)



Source: Eurostat (2024) [env_ac_mfa], [env_ac_rp] & [nama_10_gdp] (accessed 21 August 2024)

Figure 6 Circular material use rate in Portugal, 2011–2022, per cent



Source: Eurostat (2024) [env_ac_cur] (accessed 21 August 2024)

Figure 7 Material import dependency in Portugal, 2011-2023, per cent



Source: Eurostat (2024) [cei_gsr030] (accessed 21 August 2024)

Existing policy framework

Dedicated national and/or regional strategy, roadmap or action plan for circular economy

The **Portuguese National Action Plan for the Circular Economy (PAEC)**⁽⁵⁾ was adopted by the Portuguese Government in December 2017 (Resolution of the Council of Ministers No. 190-A/2017, of 23 November⁽⁶⁾), later amended by Resolution of the Council of Ministers No. 108/2019, of 6 June⁽⁷⁾. The PAEC was approved for the period December 2017 - December 2020 and its structure, key objectives/initiatives have already been reported in the 2022 CE Country Profile⁽⁸⁾.

The report **"Evaluation of PAEC's Activities and Results Achieved between 2018 and 2020"**⁽⁹⁾ assessed the implementation of the actions considered in the Plan. The main conclusions of this report were also included in the 2022 CE Country Profile.

Since then, a new National Action Plan for the Circular Economy 2024-2030 (PAEC 2030) was developed and submitted to public consultation between 9th October and 24th November 2023⁽¹⁰⁾. It is expected to be adopted in the second half of 2024.

The **vision of PAEC 2030** is to develop both an **economic and social development model** which is regenerative, efficient, productive and inclusive. **Regenerative**, by consuming less resources, preventing and, where that is not feasible, compensating the pollution, promoting carbon neutrality and eliminating wastage. **Efficient**, by producing more with less and extending the product's lifetime. **Productive**, by decoupling the economic growth from the use of resources and maximizing the economic value per amount of resources used. These three pillars for the sustainable growth of the economy not only will contribute respecting the limits of the planet, but will also promote social **inclusion**, guaranteeing that everyone is involved in the transition towards a more circular economy.

The main **objectives of the Plan** are:

- Avoid the over-exploitation of non-renewable resources, preserving the natural capital;
- Reduce waste generation;
- Prevent pollution and regenerate ecosystems;
- Create opportunities and socio-economic benefits; and
- Promote communication and raise awareness.

As in the previous Action Plan, PAEC 2030 assumes **three levels of action**:

- **Macro – Transversal to all sectors and regions**, divided into seven dimensions:
 - Policy Instruments for Circularity,
 - Funding for the Transition to a Circular Economy,
 - Education, Training and Awareness Raising for Circular Economy,
 - Technology, Research and Innovation on Circularity,
 - Circularity in Organizations,
 - Partnership for a Circular Economy, and
 - Life Cycle;
- **Meso – Targeted at priority sectors** (Agri-food, Construction, Distribution and Retail, Electric and Electronic, Plastics, Tourism, and Textile and Clothing); and
- **Micro – To stimulate strategies at regional / local level** in order to create circular, self-sufficient and sustainable territories, such as Circular Cities and Circular Business Zones.

The implementation of this Plan will involve several entities (public and private) from the academia, research centers, industrial and business associations, to funding and governmental institutions and

⁵ <https://eco.nomia.pt/contents/ficheiros/paec-en-version-4.pdf>

⁶ <https://files.dre.pt/1s/2017/12/23602/0005400073.pdf> (in Portuguese).

⁷ <https://files.dre.pt/1s/2019/07/12400/0331603317.pdf> (in Portuguese).

⁸ https://www.eionet.europa.eu/etcs/etc-ce/products/etc-ce-products/etc-ce-report-5-2022-country-profiles-on-circular-economy/portugal-ce-country-profile-2022_for-publication.pdf

⁹ https://apambiente.pt/sites/default/files/_SNIAMB_A_APA/Iniciativas_transectoriais/PAEC_RelatorioFinal.pdf (in Portuguese).

¹⁰ <https://participa.pt/pt/consulta/plano-de-acao-para-a-economia-circular-paec> (in Portuguese).

community, and will be monitored by a selected and appropriate set of indicators aligned with those foreseen in the EU's revised monitoring framework for the circular economy.

New initiatives, of national relevance, related to the implementation of the PAEC

- **The eMaPriCE Project** ⁽¹¹⁾ responded to the National Action Plan for the Circular Economy (PAEC) (Actions 5 and 7) and Directive EU 2018/851 of the European Parliament and the Council of 30th of May of 2018, according to which Member States should take measure to assure the best management of waste containing significative quantities of critical raw materials (CRMs). The project, financed by the Environmental Fund, was coordinated by the National Energy and Geology Laboratory (LNEG) with the collaboration of the Portuguese Environment Agency (APA).

It aimed to identify opportunities for Circular Economy strategies to be implemented in order to prevent that CRMs end up as waste, and options for their substitution by non-critical raw materials. The study addressed 31 CRMs (and one strategic material), designated as CRM+: 30 are the CRMs included in the EU CRM list ⁽¹²⁾, to which natural cork was added, due to its strategic relevance for Portugal, which is the world's largest producer.

Seven sectors were studied: textiles; ceramics; cork; electric and electronic equipment (EEE); renewable energy; automobile; fertilizer – phosphorous.

Several public policy suggestions were presented to increase circularity of CRM+ in Portugal, both at sectorial and global level. The project's final workshop took place in September 2022.

- In alignment with the objectives established in the PAEC, it was developed **the CIRCO Hub Portugal Project "Creating Business through Circular Design"** ⁽¹³⁾. The project, financed by the Environmental Fund, was coordinated by the National Energy and Geology Laboratory (LNEG) in partnership with the Agency for Competitiveness and Innovation (IAPMEI) and the Portuguese Environment Agency (APA). It was structured based on a training methodology developed in the Netherlands, which later gave rise to the CIRCO International Program ⁽¹⁴⁾.

Under the project, **95 companies** (from a wide range of sectors) **and approximately 50 designers were trained** and faced the challenge of developing products, services and business models aligned with circular design principles. The project highlighted the importance of design in transforming products and business models to a more circular and environmentally responsible format.

The project's final conference took place in September 2023.

A second phase of the CIRCO Hub Portugal project is planned as one of the macro-level actions to be carried out under the scope of PAEC 2030.

- **The Programme InC2 - National Circular Cities Initiative** implemented one of the key themes of the PAEC, the **development of circular cities** ⁽¹⁵⁾. It was a program of the Ministry of the Environment and Climate Action managed by the General Directorate of the Territory (DGT) and financed by the Environmental Fund. It aimed at supporting and empowering municipalities and their communities in the transition to the circular economy. In particular, it contributed to improving local participatory planning practices and network-based learning for the circular economy, by supporting national networks of circular cities.

Four Circular Cities Networks (RC2) were developed, each of which focusing on a specific priority theme (urban planning and construction, urban economy for circularity, urban-rural relations or urban

¹¹ Project website: <https://emaprice.lneg.pt/en/>; project report: https://emaprice.lneg.pt/en/wp-content/uploads/2022/11/eMaPriCe_RelatorioSetembro2022_FINAL.pdf (in Portuguese).

¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0474>

¹³ <https://circohubportugal.lneg.pt/> (in Portuguese).

¹⁴ The CIRCO methodology is based on an academic framework "Products that last" developed by C. Bakker & M. den Hollander. CIRCO makes this framework available for companies by adding design tools, inspiring cases and examples, trainer support and interaction, and an innovation drive. More information at: <https://www.circonl.nl/circo-international>

¹⁵ <https://cidadescirculares.dgterritorio.gov.pt/pages/iniciativa> (in Portuguese).

water cycle) and addressing one or more of the defined transversal themes (decarbonization, public procurement, digital transition and equity and social inclusion).

The four RC2, with 28 participating municipalities, supported by this program, are as follows:

- **Network for Circular and Sustainable Construction (R2CS)** ⁽¹⁶⁾, oriented towards urban planning/construction and, in addition, to the cross-cutting themes of decarbonization and public procurement (involved cities: Mangualde, Mértola, Oliveira de Frades, Ponta Delgada, Ponte de Sor, Ribeira Brava, Valongo and Vila Nova de Gaia -Gaiurb-);
- **CircularNet – Platform for circularity: Community, Companies and Natural Environment** ⁽¹⁷⁾, oriented towards the priority theme of urban economy for circularity and, in addition, to the cross-cutting themes of digital transition, decarbonization and public procurement (involved cities: Arcos de Valdevez, Famalicão, Figueira da Foz, Guarda, Monforte, Moura, Praia da Vitória and Tavira);
- **The Circular Links Network between Urban and Rural Areas (RURBAN Link)** ⁽¹⁸⁾, oriented towards the priority theme of urban-rural relations and, in addition, to the cross-cutting themes of digital transition and equity and social inclusion (involved cities: Bragança, Câmara de Lobos, Fundão, Guimarães, Lisboa -Lisboa E-Nova-, Penela, Reguengos de Monsaraz and Ribeira Grande); and
- **CApt2 (Water Circularity – by all and for all)** ⁽¹⁹⁾, oriented towards the priority theme of urban water cycle and, in addition, to the cross-cutting themes of decarbonization, digital transition and equity and social inclusion (involved cities: Águeda, Guimarães -Laboratório da Paisagem-, Lagoa, Loulé, Mértola, Oeiras, Oliveira de Frades and Ponte de Sor).

Each network was formed by eight municipalities, whose work ended at the end of June 2023 and resulted in the **production of 32 Local Integrated Action Plans (PLAI)** for promoting the transition to a circular economy. In total, 28 municipalities were involved, spread across all NUTS II, along with the autonomous regions of the Azores and Madeira.

The 32 PLAI included a total of 226 actions: 111 on circular economy projects and practices; 7 on the production of knowledge; 27 on the creation and/or review of regulations and incentives; and 81 on training, communication and awareness-raising actions.

The PLAI were the **result of collaborative processes developed in each municipality** with their communities, within the scope of the respective Local Planning and Action Groups (GPAL), which included the involvement and participation of representatives of relevant local actors, depending on the topics covered.

The outcomes of the programme were presented in October 2023.

- **The National Action Plan for Marine Litter 2024 – 2026 (PALM2026)** ⁽²⁰⁾, which is expected to be adopted soon, frames measures and actions for preventing and reducing the presence of waste in the marine environment, namely through the adoption of circular measures. This Plan is structured in **27 measures**, among which:
 - **Measures 12 and 13 – aimed at the prevention of loss of plastics into the sea from fishing activities and from aquaculture**, through the promotion of circular economy mechanisms for end-of-life fishing gears and accessory materials, the use of fishing equipment containing biodegradable materials with greater ecological neutrality, the end-of-life recycling and the reduction of the fishing equipment that is left behind in the aquatic environment after use.
 - **Measure 18 – aimed at the promotion of ecodesign** through: i) training actions within relevant industries focusing on the reduction in the use of plastic/fiber materials, the reuse of products that ensure an effective and efficient reprocessing of used plastics, the design and use of alternatives to traditional plastics, the use of biopolymers, and the design of mono-material products or products that use a reduced number of materials, which allows for greater recyclability; ii) the replacement of fossil raw materials by bio-based raw materials; iii) the

¹⁶ <https://cidadescirculares.dgterritorio.gov.pt/pages/b3cd503d84bb41779bcee39e2e20b21a> (in Portuguese).

¹⁷ <https://cidadescirculares.dgterritorio.gov.pt/pages/fd3524ed003e4f798346c82689e68fed> (in Portuguese).

¹⁸ <https://cidadescirculares.dgterritorio.gov.pt/pages/b0085f9e1b1c477bbec2ed5179ffeb6a> (in Portuguese).

¹⁹ <https://cidadescirculares.dgterritorio.gov.pt/pages/2201cdb94eba40d0ad69b66c435b6a43> (in Portuguese).

²⁰ https://www.consultalex.gov.pt/ConsultaPublica_Detail.aspx?Consulta_Id=336 (in Portuguese).

exchange of knowledge and best practices, training and dialogue between various stakeholders on the use of renewable resources; iv) the establishment of partnerships for the use of by-products and materials; and v) the development of tools providing for digital product traceability.

With regard to the **institutional setting** promoting CE across the country, in Portugal, matters that fell under the scope of Circular Economy policies are coordinated by two governance areas, environment and economy, namely through the **Portuguese Environment Agency (APA)** and the **Directorate-General for Economic Activities (DGAE)**, respectively. These two institutions work together in order to ensure that circular economy guidelines are coherent and in line with the best European and international practices. The upcoming **PAEC 2030**, a core guidance document for the transition to a circular economy in Portugal, aiming at mainstreaming circular strategies amongst all economic sectors, but also amongst different governance areas, was **elaborated by these two institutions in close collaboration**. In order to ensure the **involvement of all sectors and actors**, the Plan was submitted to an open public consultation and it received dozens of contributions from several actors that were evaluated and, when appropriate, included in the Plan. In addition, several separate meetings were conducted with associations representing different sectors, in order to achieve the widest possible engagement, which would guarantee an effective involvement. In addition, **PAEC 2030 proposes a wide governance model, based on four fora (one strategic, two operational and one advisory), involving interested stakeholders**, which is meant to ensure not only the monitoring of the Plan, but also an inclusive management, allowing a smoother and effective transition towards a circular economy.

Another example of making circularity mainstream or becoming the norm across sectors and actors is the **follow-up and the monitoring of the Integrated Projects that are being implemented in the framework of the Recovery and Resilience Plan**, namely within Component 12 – Sustainable Bioeconomy, closely linked to circular economy (see the sections “Examples of private policy initiatives” and “Future plans”). APA is following up three Integrated Projects and monitoring their implementation, through the organization of regular meetings and technical visits. In this joint work, APA ensures that best circularity practices are present in these projects and provides the best support in order to accomplish them. Concluding, the strategic vision for the mainstream of circularity across sectors and actors in Portugal relies on a strong and coherent collaboration between APA and DGAE and a close joint work with all stakeholders.

Dedicated local strategy, roadmap or action plan for circular economy

Although there are other Portuguese cities developing local strategies to promote the circular economy, **28 municipalities participated, from 2019 to 2023, in the National Circular Cities Initiative (InC2)**, which are indeed circular cities with a link to both PAEC, as well as regional circular economy strategies. Please see above the InC2 – National Circular Cities Initiative description.

Cities participating in the Circular Cities and Regions Initiative (CCRI):

- **Comunidade Intermunicipal Viseu Dão Lafões:** the Matchmaking Circular Materials, Products and Waste (McM) project helps businesses across sectors to find high-value reuse options for materials and (waste) products, which is enabled by a cross-sector B2B platform and smart contracts. The matchmaking is supported by resources (materials, products, and waste) passports that provide information on the materials’ properties, such as composition, deconstruction, quality, and toxicity ⁽²¹⁾.
- **Matosinhos:** the main goal of Matosinhos’s circular economy strategy is to pursue public policy sustainability guidelines. The city has adopted the principles of circularity as a determining vector for a good quality of human life, with a balance of biodiversity and ecosystems ⁽²²⁾.

²¹ <https://circular-cities-and-regions.ec.europa.eu/fellows/comunidade-intermunicipal-viseu-dao-lafoes>

²² <https://circular-cities-and-regions.ec.europa.eu/fellows/matosinhos>

- **Guimarães:** under the framework of the Governance Ecosystem Guimarães 2030, which links the City Hall, academia, citizens and private sector, a task force was set up to integrate three domains: innovation; waste and resources; citizens' awareness and mobilisation ⁽²³⁾.
- **Almada:** the city of Almada developed a municipal strategy to promote and accelerate the transition to a circular economic model, focusing on the actions to be developed until 2030. This strategy is materialized in the document "Almada Circular – Action Roadmap for 2030" and is based on three key sectors: i) food system, ii) consumer goods and iii) built environment. The presentation of Almada's Circular Roadmap took place in August, 2024 ⁽²⁴⁾.

It is important to highlight that PAEC 2030 also has set local/regional actions regarding the development and strengthening of circular cities.

Circular economy policy elements included in other policies

Circular economy policy element	Included in policy
Climate and sustainability	
Sustainable cities Increase the efficiency of urban metabolism, assuming the priority of reducing and recovering waste as a resource, extending the framework of solutions for reuse, recycling and energy and organic recovery of waste and promoting the consumption of local products and preventing waste.	Strategy for Sustainable Cities 2020 (adopted in 2015) ⁽²⁵⁾ and Circular Cities National Initiative (InC2, in Portuguese; adopted in 2019)
Financial support for climate action and sustainability Promote communication, awareness raising and information campaigns, aiming at the transition to a circular economy.	Thematic Programme for Climate Action and Sustainability – Sustentável 2030 (in Portuguese; adopted in 2021)
Carbon neutrality Change the paradigm of resource use in production and consumption, moving away from the linear towards a circular and low carbon economic model.	Roadmap for Carbon Neutrality 2050 (RNC 2050; adopted in 2019)
Climate Promote the most efficient ways, in technical, climatic and economic terms, to take advantage of residues from the forestry sector, namely residual forest biomass.	Framework Law on the Climate (in Portuguese; adopted in 2022)
Biomethane Carry out selective collection of bio-waste and enable Urban Waste Management Systems to maximize organic recovery through anaerobic digestion.	Biomethane Action Plan 2024-2040 (in Portuguese; adopted in 2024)
Agriculture and Fishing	
Agriculture Promote the valorisation of by-products in a value cascade logic and according to an integrated approach of the production systems.	Innovation Agenda for Agriculture 2030 (in Portuguese; adopted in 2020) ⁽²⁶⁾

²³ <https://circular-cities-and-regions.ec.europa.eu/pilots/guimaraes>; <https://rrrciclo.pt> (in Portuguese).

²⁴ <https://www.cm-almada.pt/almada-circular> (in Portuguese).

²⁵ See also the Resolution of the Council of Ministers No. 61/2015, of 11 August <https://files.dre.pt/1s/2015/08/15500/0570405741.pdf> (in Portuguese).

²⁶ See also: <https://agricultura.gov.pt/pt/terra-futura> (in Portuguese).

Common Agricultural Policy - Measure C.3.1.1 - Bioeconomy productive investment – Modernization - Efficient resource management.	Strategic Plan for the Common Agricultural Policy (PEPAC; in Portuguese; adopted in 2023) ⁽²⁷⁾
Aquaculture Produce algae/microalgae and their compounds and derivatives, that can be used as agricultural supplements in the soil, replacing chemical fertilizers.	Strategic Plan for the Portuguese Aquaculture 2021-2030 (in Portuguese; adopted in 2021)
Water and Sea	
Ocean Strategy Valorise bioresources through biorefineries, seeking zero waste, generating multiple value chains for a single bioresource, and enabling more agile and diversified business models for the entities that install and operate biorefineries.	National Ocean Strategy 2021-2030 (ENM 2021–2030; in Portuguese; adopted in 2021) and ENM Action Plan (in Portuguese)
Water supply and wastewater and stormwater sanitation Prepare a technical guide on solutions associated with the circular economy in water services (e.g. reuse, sludge).	Strategic Plan for Water Supply and Wastewater and Stormwater Sanitation 2030 (PENSAARP 2030; in Portuguese; adopted in 2024)
River basin management Carry out awareness raising campaigns on the need of an efficient and sustainable use of water across the various sectors.	River Basin District Management Plan 3rd Cycle (in Portuguese; adopted in 2024)
Efficient use of water Reduce water consumption and wastewater generated through the adaptation of procedures, more efficient use of equipment and devices, and the adoption of water reuse/recirculation systems.	National Programme for the Efficient Use of Water (PNUEA; in Portuguese; adopted in 2005)
Water Definition of legal minimum levels of reuse in compatible uses of treated urban effluents.	National Water Plan (PNA; in Portuguese; adopted in 2016)
Agricultural and agroindustrial effluents Disseminate circular economy good practices, evaluating the possibility of creating quality label with national and international recognition.	National Strategy for Agricultural and Agroindustrial Effluents (ENEAPAI; in Portuguese; adopted in 2022)
Health and Nutrition	
Food waste Strengthen the cooperation between agents in the private and social sector, creating conditions that favour the meeting between the offer and the demand for food at risk of becoming waste.	National Strategy to Combat Food Waste (ENCDA; in Portuguese; adopted in 2018) ⁽²⁸⁾
Food and nutrition Promote local economies and small producers, stimulating economic circulation within the community and the supply of differentiated regional food products.	National Food and Nutrition Security Strategy (ENSANP; in Portuguese; adopted in 2021)
Healthy eating Encourage consumption and environmentally friendly local production methods.	National Programme for the Promotion of Healthy Eating (PNPAS; in Portuguese; adopted in 2012)

²⁷ See also: <https://www.gpp.pt/index.php/po-frutas-e-hortícolas/programas-operacionais-frutas-e-hortícolas-ao-abrigo-da-portaria-n-295-a-2018> (in Portuguese).

²⁸ See also: <https://www.cncda.gov.pt/index.php/> (in Portuguese) and https://www.cncda.gov.pt/images/Estrategia/Estrategia_EN.pdf .

Energy	
<p>Energy and climate</p> <p>Promote the material efficiency of products by improving the manufacturing process to generate less waste, reusing components in the production process, encouraging the design of products containing less material and more resistant/durable materials and incorporating natural or recovered materials.</p>	<p>National Energy and Climate Plan 2030 (adopted in 2020)</p>
Tourism	
<p>Tourism</p> <p>Promote projects that encourage energy efficiency in the tourism value chain and the integration of circular economy in its activity, namely the reduction, reuse, recovery and recycling of materials and energy.</p>	<p>Tourism Strategy 2027 (adopted in 2017)</p>
<p>Tourism</p> <p>Prepare and implement Regional Transition Agendas for the Circular Economy – integrate measures aimed at the tourism sector.</p>	<p>Tourism +Sustainable 20-23 Plan (in Portuguese; adopted in 2020)</p>
Education, research and innovation	
<p>Research and innovation in circular economy</p> <p>Create three strategic thematic pillars for R&D: industrial symbiosis, circular bioeconomy and circular territories.</p>	<p>Thematic Agenda for Research and Innovation in Circular Economy (in Portuguese, Executive summary in English; adopted in 2019)</p>
<p>Education</p> <p>Define “Make the economy circular” as one of the three pillars of the Strategy, pointing at the “Dematerialization, collaborative economy and sustainable consumption”, “Product ecodesign and efficient use of resources” and “Waste recovery”.</p>	<p>National Environmental Education Strategy (ENEA 2020; in Portuguese; adopted in 2017)</p>
Waste	
<p>Municipal waste</p> <p>Establish performance parameters for the development of product sustainability indices, such as circularity, reparability or recyclability indices.</p>	<p>The Strategic Plan for Municipal Waste 2030 (PERSU 2030; in Portuguese; adopted in 2023)</p>
<p>Waste management</p> <p>Evaluate the best management options for fractions with potential for recovery, including the energy recovery, and its contribution for the circular economy.</p>	<p>The National Waste Management Plan 2030 (PNGR 2030; in Portuguese; adopted in 2023)</p>
<p>Non-municipal waste</p> <p>Promote a centralized platform targeting waste, by-products and other secondary raw materials.</p>	<p>The Strategic Plan for Non-Municipal Waste 2030 (PERNU 2030; in Portuguese; adopted in 2023)</p>
<p>Waste management regimes</p> <p>Promote public awareness, aiming to implement sustainable and circular consumption habits.</p>	<p>Changes in Waste Management Regimes, with particular reference to extended producer responsibility (in Portuguese; adopted in 2024)</p>
Others	
<p>Public procurement</p> <p>Promote greater adoption in public procurement of circularity criteria and sustainable bioeconomy products.</p>	<p>National Strategy for Green Public Procurement 2030 – ECO360 (in Portuguese; adopted in 2023) and ecological criteria applicable to the conclusion of contracts by public administration entities (in Portuguese; adopted in 2023) ⁽²⁹⁾</p>

²⁹ See also: <https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/13-2023-207272801> (in Portuguese).

Bioeconomy Promote the use of bio-based secondary raw materials through the dynamization of markets of materials and improved management.	Action plan for a sustainable bioeconomy – Horizon 2025 (PABS; in Portuguese; adopted in 2021)
Spatial planning Promote the transition to a circular economy, with a special attention to the Circular Economy Regional Agendas and Urban Agendas.	National Spatial Planning Policy Programme (PNPOT; in Portuguese; adopted in 2019)
Resource efficiency Calls on the institutions to reduce 20 % on their material consumption.	Resource Efficiency Programme in Public Administration (ECO.AP 2030; adopted in 2020) ⁽³⁰⁾

In the following, further details are provided on the policies presented in the Table above. Hyperlinks to the policy documents are reported in the Table.

Climate and Sustainability

- **Strategy for Sustainable Cities 2020 and Circular Cities National Initiative (InC2)**

The Strategy for Sustainable Cities (ECS) 2020 is a territorial development policy that seeks to affirm and respond to the urban structural needs of the country and acts to strengthen and consolidate the prospects and vision of territorial development shared among the relevant stakeholders, contributing to the promotion of the necessary conditions for competitiveness, sustainability and national cohesion. The Circular Cities National Initiative (InC2) is an instrument for the implementation of the ECS 2020, contributing to Axes: 2 – Sustainability and Efficiency and 4 – Territorialisation and Governance, and also of the PAEC and the National Spatial Planning Policy Programme (PNPOT). It aims to support and empower municipalities and their communities in the transition to a circular economy, by promoting sustainable urban development and the achievement of specific public policy objectives.

- **Thematic Programme for Climate Action and Sustainability – Sustentável 2030**

It is a financial instrument to face the challenges of the energy and climate transition and achieve carbon neutrality in 2050. Under the strategic objective 2.6 - Promote the transition to a circular and resource-efficient economy, the Plan defines a set of measures such as the promotion of communication, awareness raising and information campaigns and initiatives, studies and monitoring mechanisms at national and supra-regional levels, which will be complementary to the actions for the prevention, reuse, recycling and recovery of industrial and domestic wastes.

- **Roadmap for Carbon Neutrality 2050 (RNC 2050)**

The Roadmap for Carbon Neutrality (RNC) 2050 identifies the main drivers of decarbonisation in all the sectors of the economy, together with the policy options, measures and the emission reduction trajectory required to achieve climate neutrality in different socio-economic development scenarios. CE was considered an integral part of the narrative of the socio-economic scenarios and was translated into the sectoral assumptions that support the modelling of greenhouse gas (GHG) emissions.

- **Framework Law on the Climate**

It defines the basis of climate policy, which includes as one of its objectives, the promotion of the circular economy, improving energy and resource efficiency and establishing a set of guidelines for the State, Autonomous Regions, local authorities and, specifically, for the ecodesign of products, packaging, infrastructures and buildings.

- **Biomethane Action Plan 2024-2040**

The Biomethane Action Plan 2024-2040 establishes an integrated and sustainable strategy for the development of the biomethane market in Portugal, promoting it as a sustainable way to reduce GHG emissions, decarbonize the national economy, reduce imports of natural gas in the industrial and domestic sectors, including its use in mobility, taking full advantage of endogenous resources existing in various sectors. It aims at achieving circularity objectives, with measures supporting the

³⁰ See also the Resolution of the Council of Ministers No. 104/2020, of November 24, <https://files.dre.pt/1s/2020/11/22900/0000500014.pdf> (in Portuguese).

development of biomethane communities to promote local/regional circularity and enhance the use of digestate nutrients and biogenic CO₂ available after biogas upgrading, in synergy with other industrial sectors.

Agriculture and Fishing

- **Innovation Agenda for Agriculture 2030**

It aims to guide the strategy and policies of the Portuguese agricultural sector in line with European and international priorities. “Circular Agriculture” is included among the 15 initiatives defined in the agenda, along with its five lines of action: organic fertilizers, animal production, biogas, biorefineries and small biomass and by-product plants.

- **Strategic Plan for the Common Agricultural Policy (PEPAC) 2023-2027**

It provides the support instruments of the Common Agricultural Policy financed by the European Union through the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD).

- **Strategic Plan for the Portuguese Aquaculture 2021-2030**

It defines the strategy for the Portuguese aquaculture sector. The Plan is organized in ten strategic objectives, including combating Climate Change and Pollution and Restoring Ecosystems, promoting Employment and the Circular and Sustainable Blue Economy.

Water and Sea

- **National Ocean Strategy 2021-2030 (ENM 2021–2030)**

The National Ocean Strategy (ENM) 2021–2030 is the instrument that defines the public ocean policy for the next decade. The Strategy is organised around ten major strategic objectives, one of which is fostering jobs and the circular and sustainable blue economy. The Action Plan of the ENM 2021-2030 contains a set of measures associated with each strategic objective, including: a focus on the development of sustainable and circular aquaculture; promoting circular business models, developing product lifecycle studies (from the extraction of the raw material from the sea through its transformation, the reduction of consumption and the reuse and recycling of the final product); promoting the financing of entrepreneurship and innovation projects in the blue economy that support decarbonisation, sustainability, circularity, efficiency and have a positive impact on biodiversity; investing in the enhancement of products and by-products resulting from fishing and aquaculture, by promoting their circularity, efficiency and valorisation, as well as the certification of their sustainability.

- **Strategic Plan for Water Supply and Wastewater and Stormwater Sanitation 2030**

The Strategic Plan for Water Supply and Wastewater and Stormwater Sanitation 2030 aims to ensure the long-term sustainability of the sector. It is the guiding instrument for policies, addressing the urban water cycle and the challenges arising from climate change. Several measures of this Strategic Plan aim for greater circularity, such as those promoting the use of alternative water sources, the management and valorisation of urban sludge and products resulting from treatment, the promotion of circularity and best environmental performance of infrastructures, and in associated services.

- **River Basin District Management Plans**

It aims at the management, protection and environmental, social and economic valorisation of water at the level of the river basic district, making uses compatible with water availability. These plans establish measures with a view to achieving the objectives set out in the Water Law, including promoting sustainable use of water.

- **National Programme for the Efficient Use of Water (PNUEA)**

The National Programme for the Efficient Use of Water (PNUEA) is a national environmental policy instrument, the main objective of which is the promotion of the efficient use of water in Portugal. Its strategic objectives are to reduce losses in water supply systems in urban areas and agricultural irrigation systems, as well as to optimise water use in the industrial sector and limit environmental impacts associated with the discharge of industrial wastewater. An Implementation and Monitoring Commission was set up to ensure active, motivated and transparent governance that promotes the participation of the main actors in this process.

- **National Water Plan**

The National Water Plan (PNA) is a framework plan for national water resources management policies, endowed with a strategic vision of water resources management and based on a logic of resource protection and sustainability of national socio-economic development. It covers two planning cycles, 2016–2021 and 2022–2027 and pursues three fundamental objectives, including the protection and rehabilitation of aquatic and terrestrial ecosystems, the promotion of sustainable, balanced and equitable use of good quality water, and increasing the resilience to the effects of floods, droughts and other extreme weather events resulting from climate change. The PNA includes measures aimed at the efficient use of resources such as: the imposition of adequate labelling of water-using devices; and the legal imposition of minimum levels of reuse in compatible uses of treated urban effluents.

- **National Strategy for Agricultural and Agroindustrial Effluents (ENEAPAI)**

This Strategy aims at finding solutions that allow to solve the environmental problems associated with the incorrect management of agricultural and agroindustrial effluents that affect the quality of water bodies. The Strategy prioritises the recovery of agricultural and agro-industrial effluents, which, must be carried out in a sustainable way and avoiding changing the state of surface and underground water bodies.

Health and Nutrition

- **National Strategy to Combat Food Waste**

The National Strategy to Combat Food Waste 2018-2023 (ENCDA) was developed by the National Commission to Combat Food Waste (CNCDA) to promote the reduction of food waste through an integrated and multidisciplinary approach.

With the mission of "combating food waste, a shared responsibility, from the producer to the consumer", the ENCDA created the necessary working basis to involve all agri-food chain operators, including redistributors, in achieving three strategic objectives: preventing, reducing, and monitoring food waste. To achieve these goals, an Action Plan was drawn up, establishing 14 measures, including publicising good practices (guidelines and success stories); promoting awareness-raising actions; dissemination of innovative processes that prevent and reduce food waste; facilitating and encouraging the donation of food at risk of being wasted; implementing a collaboration platform that facilitates the donation of surplus food and promoting specific places in supermarkets to sale products close to their expiry date. The Strategy and Action Plan have been linked to other initiatives at national level, including the PAEC, whose objectives are complementary.

Following the evaluation of the implementation of the ENCDA, consultation and discussion are currently underway, in order to design the future national strategy for the period 2024-2030.

- **National Food and Nutrition Security Strategy**

The National Food and Nutrition Security Strategy (ENSANP) represents a point of reference for integrated action towards a sustainable and healthy food system. ENSANP integrates a diagnosis of food and nutritional security in Portugal and an analysis of the evolution of production/consumption trends with a survey of the various initiatives and strategies that intersect with its objectives. It identifies four strategic pillars and seven measures necessary for its implementation in the coming years. Pillar 3 aims to improve the functioning of the food chain, including by assessing the production and consumption patterns.

- **National Programme for the Promotion of Healthy Eating**

The National Programme for the Promotion of Healthy Eating (PNPAS) was launched in Portugal in 2012, with the mission to "improve the nutritional status of the population, stimulating the physical and economic availability of healthy food and creating conditions so that the population can value, appreciate and integrate healthy food behaviour into their daily routines". It was approved by the Portuguese Directorate-General of Health (DGS) in 2012, as one of eight priority health programmes, using multisectoral collaboration and represents the first comprehensive national strategy in the field of food and nutrition in Portugal after the first programmes launched in 2005 and 2007 by the Ministry of Health to fight obesity at national level.

PNPAS aims to: (i) raise the awareness of citizens so that they can make educated decisions about nutritious foods and cooking techniques; (ii) promote the production of nutritious food, while enhancing local economies, jobs, and balanced land use; (iii) encourage consumption and

environmentally friendly local production methods; (iv) reduce disparities in the availability of and demand for nutrient-dense food; and (v) raise the standards of professionals who can affect public food consumption.

The new strategic guidelines of the PNPAS were published in 2022 and they are being developed in the context of the National Health Plan 2030 and fall within one of the goals of the Recovery and Resilience Plan.

Energy

- **National Energy and Climate Plan 2030**

It represents the main energy and climate policy instrument for the 2021-2030 decade. The 58 lines of action defined in this Plan, for the decarbonization of society and the energy transition, include “Promoting the transition to a circular economy” for which three measures are defined, namely: (i) Promoting the recirculation of materials, (ii) Promoting the material efficiency of products, and (iii) Boosting circular business models.

Tourism

- **Tourism Strategy 2027**

The National Tourism Strategy for 2027 (ET2027), adopted in 2017, aims at establishing tourism as a hub for economic, social and environmental development throughout the country, positioning Portugal as one of the most competitive and sustainable tourism destinations in the world. One of the five strategic pillars of the Strategy is to boost the economy, and one line of action of this pillar consists of stimulating the circular economy in tourism. The priorities included in this line of action are:

- Creating standards for sustainable tourism in Portugal with regard to economic, environmental and social aspects, as well as governance, allowing for circular flows of reuse, restoration and renovation, in an integrated manner;
- Initiatives for promoting the sustainability of destinations, along with communications and the inclusion of non-financial variables (environmental, social and governance) in tourism investment projects;
- Projects that stimulate energy efficiency in the tourism value chain and the integration of the circular economy in the value chain, namely in terms of reducing, reusing, restoring and recycling materials and energy;
- Inclusion of a sustainability dimension as an element in the classification system for tourism establishments.

- **Tourism +Sustainable 20-23 Plan**

It aims to stimulate the circular economy in tourism, promoting the transition to an economic model based on the prevention, reduction, reuse, recovery and recycling of materials, water and energy, thus reinforcing the Agenda for the Circular Economy in the Tourism Sector. The various areas of activity presented in this Plan include the “Circular Economy”, for which 11 actions are defined.

Education, research and innovation

- **Thematic Agenda for Research and Innovation in Circular Economy**

The Thematic Agenda for Research and Innovation in Circular Economy is another strategy for a transition to the circular economy. It is a multidimensional guide for medium- and long-term (2030) research and innovation covering: i) the design and development of new products, processes and services; ii) the sustainable resource management cycles; iii) governance and territory; iv) new business models, behaviour and consumption.

- **National Environmental Education Strategy**

The National Environmental Education Strategy (ENEA) 2020 aims to establish a collaborative, strategic and cohesive commitment to environmental literacy in Portugal.

This strategy is being implemented through 16 measures framed by three strategic objectives: more cross-cutting, open, and participatory environmental education. The actions envisaged are based on the following pillars: i) decarbonise society; ii) make the economy circular; and iii) valuing the country. The second pillar, making the economy circular, covers three areas: dematerialisation, a collaborative

economy and sustainable consumption; product design and the efficient use of resources; and waste recovery.

Waste

- **The Strategic Plan for Municipal Waste 2030 (PERSU 2030)**

The Strategic Plan for Municipal Waste 2030 (PERSU 2030) focuses on the prevention of waste production and on the separate collection, paying particular attention to new fractions: textile waste, hazardous waste and bio-waste. It also promotes the use of materials resulting from waste treatment. It includes several important actions for the circular economy, in terms of waste prevention and management, such as, among others: the establishment of performance parameters aiming to develop product sustainability indices, such as circularity, reparability or recyclability indices, in line with requirements of European Union legislation; the promotion of reuse; the provision of incentives to reintroduce the recyclables fractions recovered from municipal waste (plastic, paper...) in the production cycle; and the application of the polluter pays principle and the waste hierarchy, through the differentiation of tariff systems (fixed/variable) depending on production and destinations (e.g. through support for systems Pay-As-You-Throw -PAYT-, Save-As-You-Throw -SAYT- or Receive-As-You-Throw -RAYT-).

- **The National Waste Management Plan 2030 (PNGR 2030)**

The National Waste Management Plan 2030 (PNGR 2030) is a planning instrument for waste policy, at macro-level, that focuses on changing the current paradigm in terms of waste. It aims at advocating waste prevention in order to protect, preserve and improve the quality of the environment and protect human health and ensuring that the management of waste that cannot be prevented is carried out through sustainable material management, ensuring the efficient use of natural resources, promoting the principles of circular economy, reinforcing the use of renewable energy and increasing energy efficiency. Regarding “Objective 2 - Promote efficiency and sufficiency in the use of resources, contributing to a circular economy”, the Plan sets three targets for 2030 (see the section “Circular economy targets”).

- **The Strategic Plan for Non-Municipal Waste 2030 (PERNU 2030)**

The Strategic Plan for Non-Municipal Waste 2030 (PERNU 2030) is the new reference instrument for non-municipal waste policy in Portugal, replacing the specific sectoral plans (i.e. Strategic Plan for Industrial Waste or Strategic Plan for Hospital Waste) and addressing both the remaining uncovered sectors and the specific flows that may be associated with them. It includes important actions for the circular economy, such as, the promotion of a centralized platform for waste, by-products and other secondary raw materials, contributing to administrative, legislative and regulatory simplification, in order to facilitate circular processes.

- **Changes in Waste Management Regimes**

The changes in Waste Management Regimes include, among other measures, the indexation of waste tariffs applied to the actual production of waste, in order to hold producers responsible for waste management and the creation of two new extended producer responsibility regimes (to be operational by December 31, 2025), for furniture placed on the market, mattresses and their waste; and waste from health self-care.

Others

- **National Strategy for Green Public Procurement 2030 — ECO360**

The National Strategy for Green Public Procurement 2030 — ECO360, approved by the Resolution of the Council of Ministers No. 13/2023, defines the vision, objectives, and main vectors of action for green public procurement in Portugal. This instrument plays a strategic role in the pursuit of the sustainable development of the Portuguese economy. One of the strategic objectives of this Strategy is to promote resource efficiency, sustainable bioeconomy and the transition to the circular economy through: i) the adoption of circularity criteria and products from the sustainable bioeconomy in public procurement, ii) the stimulation of the development of new circular products, services, and business models, and iii) the promotion of efficiency in the use of resources and retention of the value of materials. For each strategic objective, goals and indicators are defined, which will be detailed in the Action Plan, which is expected to be adopted in 2024.

The Resolution of the Council of Ministers No. 132/2023 defined the green criteria applicable to the conclusion of contracts by entities in the direct and indirect public administration, for 16 product groups, such as paper products; furniture; textiles; catering services; copying and printing services and equipment; acquisition or rental of computer equipment; or public works contracts, among others. For each product group, mandatory, voluntary and recommended criteria were established.

- **Action plan for a sustainable bioeconomy – Horizon 2025**

The Action Plan for a Sustainable Bioeconomy – Horizon 2025 (PABS) is a strategic document that frames the main measures to accelerate the transition of the Portuguese bioeconomy to a sustainable and circular model. The implementation of PABS has six guiding principles ⁽³¹⁾ and five axes: Axis 1: Encouraging sustainable production and intelligent use of regionally-based biological resources; Axis 2: Promoting Research, Development and Innovation - valuing the national scientific and technological capacity of excellence; Axis 3: Developing a circular and sustainable bio-industry - Innovation in the value chain and processes; Axis 4: Society: promoting knowledge and the development of skills through education and training; and Axis 5: Bioeconomy monitoring: assessing the evolution, understanding ecosystems boundaries and promoting certification. The PABS also includes specific action and financing, foreseen under the Recovery and Resilience Plan, for three sectors that in Portugal have great potential for the bioeconomy: textiles and clothing; shoes; and natural resin. Future high potential sectors will also be identified.

- **National Spatial Planning Policy Programme**

The Action Plan of the National Spatial Planning Policy Programme (PNPOT) 2030 makes 10 commitments for the country, three of which address aspects related to promoting the transition to a CE and the development of circular economy models. The 10 commitments are operationalised within the framework of five intervention domains, one of which is the economic domain that contributes to increasing the circularity of the economy. This domain includes a specific measure, organizing the territory for the circular economy, which is supported by a set of operational objectives and monitoring indicators. The operational objectives are: developing knowledge about the nature, quantity and location of by-products capable of integrating circular economy processes; creating new jobs associated with ecodesign, servitisation, repair, reuse, remanufacturing and reconditioning; promoting the creation of a network of circular cities; fostering the adoption of circular economy principles in land management tools and developing R&D projects that promote circular economy. Some monitoring indicators are provided: the number of circular economy awareness-raising activities by municipalities; the number of thematic intermunicipal plans on the circular economy; the number of Responsible Business Hubs and of the companies involved; the number of established industrial symbioses; the number of projects by municipalities financed under Portugal 2020, LIFE, Horizon 2020, etc. addressing the circular, green and/or blue economies, and sustainable consumption and production; the number of municipal master plans that include the concept of the circular economy.

- **Resource Efficiency Programme in Public Administration (ECO.AP 2030)**

The Resource Efficiency Programme in Public Administration (ECO.AP) 2030 aims to promote the decarbonisation and energy transition of activities developed by the State; contribute to the GHG emission reduction targets established, at a national level, for 2030; the reduction of energy, water and material consumption; the incorporation of renewables into the gross final energy consumption; and to promote the efficient management of these resources by the public administration. ECO.AP 2030, which replaced the previous Energy Efficiency Programme in Public Administration, is more ambitious in presenting measures to reduce the consumption of energy, water and materials, and the respective GHG emissions. These measures will be applied to buildings; facilities; vehicle fleets and infrastructure, including mobility infrastructure; electricity, energy production capacity and energy storage solutions, managed or used, directly and indirectly, by Public Administration entities, including

³¹ Promote bio-based economy with lower carbon intensity, ensure food and nutritional security, manage renewable natural resources in a sustainable and ensure biodiversity, strengthen competitiveness and create employment at local and regional levels, promote a bio-based industry innovative with intelligent processes, and promote awareness and engagement of consumer and market.

central and peripheral bodies. By 2030, and taking 2019 as a reference year, the State has to fulfil a set of goals:

- reduce primary energy consumption by 40 %;
- contribute so that 10 % of energy consumption is ensured by self-generating solutions originating from renewable energy sources;
- reduce water consumption by 20 %;
- reduce the consumption of materials by 20 %;
- yearly renovate 5 % of the buildings covered by ECO.AP 2030 ⁽³²⁾, by improving their energy and water-related performance.

The ECO.AP Barometer is an IT tool that aims to characterize, compare and publicize the performance of resources use by Public Administration entities, and support the monitoring of the ECO.AP Program. Additionally, the Barometer discloses some examples of good energy efficiency practices implemented by public entities, or similar ones, with a view to catalysing their replication in other services and bodies, and serving as a mechanism to induce energy efficient practices and behaviours.

Monitoring and targets

Assessment of circular economy performance

The European Commission has set up a [monitoring framework](#) to keep track of progress towards a circular economy. This framework provides a holistic view as it:

- measures direct and indirect benefits of 'becoming circular' and
- values the contribution of a circular economy in living well within the limits of the planet
- addresses energy and material supply risks.

It consists of **5 thematic sections** with a total of **11 statistical indicators**, some of which have additional sub-indicators. In some cases policy targets exist which should be achieved in the future, and the indicators monitor progress towards these targets. The current monitoring framework is a revision of the original framework which was set up in 2018.

This section elaborates on the assessment of Portugal, its progress in terms of observed trends over the last 5 years and what country characteristics or policy actions may explain differences between the country its performance and the average EU performance.

Below a comparison is provided between Portugal's and the EU 27 CE performance over the last years, based on the EU monitoring framework ⁽³³⁾.

Production and consumption

- **Material consumption**
 - **Material footprint** – Portugal's trend is in line with the EU 27, presenting a **decrease in the period from 2008 to 2013, and then showing a stabilization with a slight positive slope until 2023**. This shows that there is a modest increase in the total amount of raw materials extracted to meet the Portuguese final consumption demand, meaning that Portugal needs complementary actions in order to invert this trend. From 2008, Portugal decreased the material consumption by 33.5% while the EU 27 diminished it by 24.8%.
 - **Resource productivity** – Portugal's trend is **in line with EU 27, presenting a slight positive slope**, which indicates that Portugal is moving towards decoupling economic growth from resource use at a rate similar to the one observed in the EU 27.

³² Buildings owned by Public Administration entities, direct and indirect, including central and peripheral services.

³³ <https://ec.europa.eu/eurostat/web/circular-economy/monitoring-framework>

Regarding the **absolute values of resource productivity**, the differences observed between Portugal and the EU 27 could be explained by the **low levels of circularity** in Portugal.

- **Waste generation**

- **Waste generation per capita** – Portugal presents **similar values for waste generation per capita in 2008** (1,599 kg per capita) **and 2020** (1,612 kg per capita), showing that in those 12 years there was no significant change and meaning that complementary and more effective efforts should be made in order to achieve the targets. EU 27 shows a similar trend. It should be noted an increase in the waste generation since 2012. Since 2004, Portugal generated 42% less waste per capita, while the EU 27 reduced waste per capita by 7.2%.
- **Generation of waste excluding major mineral waste per GDP unit** – After an increase observed from 2004 to 2006, Portugal **decreased substantially the waste generation until 2010**. From 2010 to 2016 Portugal and the EU 27 generated nearly 70 kg of waste per thousand of Euros. After 2016, this indicator in Portugal increased reaching **79 kg of waste per thousand of Euros in 2020**. By contrast, in the EU 27 it decreased to 65 kg waste per thousand of Euros. Compared to the values registered in 2004, until 2020 Portugal diminished the generation of waste by 29.7% while in the EU 27, the reduction was 14.5%.
- **Generation of municipal waste per capita** – From 2000 to 2022, Portugal showed **different trends**. Until 2005 the generation of municipal waste was stable with values around 450 kg per capita. In the period from 2005 to 2009 an increase was observed, reaching 520 kg per capita in 2009, followed by a decrease until 2013 (440 kg per capita). Afterwards another increase was registered, reaching 513 kg per capita in 2019, a value that remained constant in 2020 and 2021. When compared to the EU 27, Portugal has, in most years, lower values, except in 2009-2010 and 2018-2019. However, the generation of municipal waste per capita in Portugal is now closer to the EU 27 than it was in 2000.
- **Food waste** – Considering the available data (for 2020 and 2021), Portugal's trend is **in line with the EU 27**, presenting in both cases a slight increase (2.8% in Portugal and 0.8% in the EU 27).
- **Generation of packaging waste per capita** – Portugal's trend is also **in line with the EU 27**, presenting an increase in the generation of packaging waste. However, the last four years monitored (2018-2021) show a deacceleration. Compared to the amount of packaging waste per capita registered in 2005, Portugal and the EU 27, in 2021, increased packaging waste generation per capita by 23.8% and 19.8%, respectively.
- **Generation of plastic packaging waste per capita** – Since 2005, the **trends for Portugal and the EU 27 are very similar**. Portugal and the EU 27 present a continuous increase in the generation of this waste stream (near + 0.8 kg per capita/year in both cases), reaching, respectively 41.32 and 36.11 kg per capita in 2021.

Waste Management

- **Overall recycling rates**

- **Recycling rate of municipal waste** – The recycling rate of municipal waste in Portugal follows, from **2000 to 2016, the same trend of the EU 27**, which corresponds to a continuous growth. In Portugal, it increased from 10.5% in 2000 to 30.9% in 2016, while in the EU 27 it grew from 27.3% in 2000 to 45.9% in 2016, meaning that Portugal, in those years, converged towards the EU 27 average. However, **in the subsequent years (2017-2021), Portugal diverged from the EU 27**, due to the stabilization of this indicator (30.4% in 2021). It is important to mention that in 2023 the Strategic Plan for Municipal Waste (PERSU 2030) was approved, which will contribute to the improvement of the recycling of this waste.
- **Recycling rate of all waste excluding major mineral waste** – While the EU 27 shows a consistent growth of this indicator from 2010 to 2020, Portugal presents two distinct stages: a first one, from **2010 to 2014, of convergence towards the EU 27**, with an increase of the recycling rate (47% in 2010 and 54% in 2014, the latter being the same value of the EU 27), and a second one **from 2014 to 2020**, with a decrease to 39%, **diverging from the EU 27**.

- **Recycling rates for specific waste streams**

- **Recycling rate of overall packaging – Portugal showed a strong growth** of the recycling rate of overall packaging **from 2000 (30.8%) to 2008 (61.0%)**. This value, achieved in 2008, was higher than the one registered in the EU 27 (59.9%). The **subsequent years until 2021, were characterized by an irregular trend**, with increases and decreases, reaching a recycling rate of 63.1% in 2021, close to the EU 27 (64%).
- **Recycling rate of WEEE separately collected – The recycling rate of WEEE separately collected in Portugal has been diminishing**, more steeply since 2019 (it was 51.7% in 2021), while in the EU 27 the recycling rate ranged from 80.8% (2015) to 84.2% (2016).

Secondary raw materials

• Contribution of recycled materials to raw materials demand

- **Circular material use rate – Portugal presented in 2010 a circular material use rate of 1.8%. From 2012 to 2014 a sharp increase (2.5% in 2013)** was registered, mostly due to the reduction of the domestic material consumption. In the **subsequent years, until 2017** (the year in which the first Portuguese Circular Economy Action Plan was approved), **a stagnation was observed**. From then to 2022, even with the COVID-19 pandemic and the war in Ukraine, Portugal managed to register a smooth increase of nearly 0.1% per year, reaching **the value of 2.6% in 2022**. This trend, with lower values, is similar to the one observed for the EU 27, where the circular material use rate ranged from 10.2% (2011) to 11.6% (2018).

• Trade in recyclable raw materials

- **Imports from non-EU countries – In Portugal, the imported recyclable raw materials from non-EU countries increased from 0.6 Mt (in 2010) to 1.1 Mt (in 2017)**. The value of these imports registered in 2023 (0.85Mt) is similar to the one registered in 2004 (0.87 Mt), showing that, in Portugal, **no significant change has occurred in the last twenty years** (overall the imported recyclable raw materials decreased by 2%, while in the EU 27 the decrease was 9%).
- **Exports to non-EU countries – Since 2014, Portugal and the EU 27 have been exporting more recyclable raw materials to non-EU countries**. Portugal, in 2004, exported 34,366 tonnes and in 2023 the exported amount reached 356,368 tonnes, which is 10 times more than in 2004 (in the EU 27 the increase was of 74%). It should also be highlighted that the exported recyclable materials in 2016 (482,138 tonnes) represent the highest value registered so far.
- **Intra EU trade – From 2004 to 2011, Portugal increased sixfold the import of recyclable raw materials from EU countries**. Afterwards, three periods of reduction and growth have occurred: 2011-2014, 2014-2018 and 2018-2023, reaching, in 2023, the value of 2017, which is similar to that of 2011. This indicates that **Portugal was, in 2022, importing six times more recyclable raw materials from the EU countries than in 2004**, while the EU 27 registered an increase of 26%. Confronting this information with that of the Portuguese imports from non-EU countries, it seems that the growing amount of recyclable raw materials imported from EU countries did not substitute the ones imported from non-EU countries.

Competitiveness and innovation

• Private investment, jobs and gross value added related to circular economy sectors

- **Private Investments – During the period from 2012 to 2021, Portugal increased the private investment** in circular economy sectors by about 20 M€, representing, in 2021, the 0.8% of GDP, i.e. the same value of the EU 27.
- **Persons employed – Portugal presents a stable percentage of persons employed** in circular economy sectors (around 1.8% for the time period monitored), while the EU 27 shows, for the period 2009-2021, a slight increase (from 1.8%, in 2009, to 2.1%, in 2021).
- **Gross value added – As observed for the persons employed in circular economy sectors, Portugal presents also a stable percentage of gross value added** related to circular economy sectors, ranging from 1.4% (2013 and 2014) to 1.6% (2009 and 2018). The EU 27 registered an increase on this indicator from 1.6%, in 2008 to 2.1%, in 2021.

• Innovation

Patents related to waste management and recycling – Portugal presents an **irregular trend** regarding the number of patents registered, related to waste management and recycling, which can be explained by the reduced number of patents registered and the time between the application and the granting of the patent.

Global sustainability and resilience

- **Global sustainability from circular economy**

- **Consumption footprint** – During the period 2010-2022, Portugal's consumption footprint showed an overall trend that can be described as follows: i) a decrease between 2010 and 2013 (6%), ii) a subsequent increase until 2019 (21%), iii) a sharp decrease in 2020 (7%), and finally, iv) an increase that reached the highest value registered so far (**118 in 2022**). This indicates that the value of Portugal in 2022 is substantially higher than the one observed in 2010 (+18%). The EU 27 showed a similar trend, but to a lower extent, registering in 2022 a value of 110.
- **GHG emissions from production activities** – Portugal and the EU 27 show similar trends, with a **decrease of the emissions of GHG** from production activities at similar rates (24,8% and 24.9%, respectively) in the period 2006-2022.

- **Resilience from circular economy**

- **Material import dependency** – The dependency of Portugal on material import presents distinct patterns throughout the years. **From 2008 to 2016**, the ratio of imports over direct material inputs **increased**, reaching, in 2016, the highest value registered so far (31.2%). **The trend in the subsequent years until 2023 was inverted** and a smooth decrease was observed (dropping to 29.6% in 2023). The values of 2021 and 2022 seem to be clearly influenced by the COVID-19 pandemic.
Compared to 2008, Portugal was, in 2023, more dependent on material import, while in the EU 27 there were no significant changes, since it has a similar ratio of imports over direct material inputs.

Circular economy monitoring frameworks and their indicators beyond the ones from Eurostat

The **proposal for the new PAEC 2030 includes a set of indicators** that aim to monitor and assess the transition to a circular economy. This set of indicators considers **four areas of impact** (resources, environment, economy, and society) and **five related general objectives**.

Regarding the **resources**, the set of indicators has the objective to avoid the over-exploitation of non-renewable resources, preserving natural capital, thus showing a globally positive trend with an increasing resource productivity and circular material use rate.

Concerning the **environment**, and the objective to reduce waste generation, the set of indicators show that, despite a slight increase in the total waste generation, a decrease is registered for municipal waste generation and a stabilization for packaging waste generation. The recycling rate for all waste, excluding mineral waste, has been decreasing; however, more attention should be paid to some waste flows such as the electrical and electronic equipment and the construction and demolition waste. Other indicators that aim at preventing pollution emissions and regenerating ecosystems indicate that these (CO₂ and other GHG) emissions are decreasing.

Finally, with regard to the **economy and society**, which share the same objective (creation of opportunities and socio-economic benefits), the indicators show a stabilization of the gross value added, private investment and employment in circular economy.

The indicators under the Circular Economy monitoring framework included in the proposal for the new National Action Plan for the Circular Economy (PAEC 2030) are aligned with those included in the EU's revised monitoring framework for the circular economy (Eurostat), complemented by other indicators available at the National Statistics Office (INE).

Below, the **list of the indicators included in the PAEC 2030** is provided.

Resources

- [Resource productivity](#) (million €/t) – cei_pc030
- [Domestic Material Consumption](#) (in Portuguese) (t) – National Statistics Office (INE)
- [Direct Material Input](#) (DMI) (in Portuguese) (t) – National Statistics Office (INE)
- [Material footprint](#) (in Portuguese) (t per capita) – National Statistics Office (INE)
- [Circular material use rate](#) (in Portuguese) (%)– cei_srm030

Environment

- [Waste generation per capita](#) (kg per capita) – cei_pc034
- [Generation of municipal waste per capita](#) (in Portuguese) (kg/inhab.) – National Statistics Office (INE)
-Disaggregated by municipality
- [Food waste](#) (in Portuguese) (kg/inhab.) – National Statistics Office (INE)
- [Generation of packaging waste per capita](#) (kg per capita) – cei_pc040
- [Generation of plastic packaging waste per capita](#) (kg per capita) – cei_pc050
- [Generation of waste excluding major mineral waste per GDP unit](#) (kg per thousand Euro)– cei_pc032
- [Recycling rate of all waste excluding major mineral waste](#) (%) – cei_wm010
- [Recycling rate of municipal waste](#) (%) – cei_wm011
- [Recycling rate of packaging waste](#) (%) – cei_wm020
- [Recycling rate of plastic packaging waste](#) (%) – cei_wm020
- [Recycling rate of waste of electrical and electronic equipment \(WEEE\) separately collected](#) (%) – cei_wm060
- [Consumption footprint](#) (2010 = 100) – cei_gsr010
- [Greenhouse gases emissions from production activities](#) (kg per capita) – cei_gsr011
- [CO₂ emission per unit of Added Value](#) (in Portuguese) (kg CO₂/€) – National Statistics Office (INE)

Economy

- [Gross fixed capital formation](#) (investments) (% of GDP) – tec00011
- [Private investment and gross added value related to circular economy sectors](#) (% GDP) – cei_cie012
- [Gross Value Added](#) (% GDP) – cei_cie012
- [Patents related to environment](#) ("green patents") (total number/million inhabitant) (in Portuguese)– National Agency for Industrial Property (INPI) and European Patent Office (EPO)
- [Patents related to waste management and recycling](#) (number) – cei_cie020

Society

[Persons employed in circular economy sectors](#) (% of total employment) – cei_cie011

With regard to indicators addressing social aspects, the current set of indicators only include the percentage of persons employed in circular economy sectors; however it should be noted that the final version of the **set of indicators to be considered within PAEC 2030 is still being consolidated**.

PAEC 2030 provides for the creation of an **online dashboard** that will make information about the Plan monitoring (i.e. the general indicators reported above and the specific indicators defined for each action of the Plan) available to the public.

Circular economy targets

Circular Economy related targets are included within Waste Management regulations and Waste Planning instruments, and the Strategic Plan for Water Supply and Wastewater and Stormwater Management.

Since 2022, **circular economy related goals** and targets were **established in the National Waste Management Plan 2030** (PNGR 2030), approved in March 2023, and in the **Strategic Plan for Water Supply and Wastewater and Stormwater Management 2030**, approved in February 2024 (PENSAARP 2030). They are reported in the Table below.

Target	Indicator	Reference value	Target 2030
Reduce waste production (PNGR 2030)	Waste production (2018 value = index 100)	100	85.6
Reduce the production of hazardous waste compared to the total waste produced (PNGR 2030)	Production of hazardous waste/Production of waste, 2018 (%)	7.0	4.4
Decoupling economic growth from material consumption (PNGR 2030)	GDP at constant prices, 2016/DMC (k€/t)	1.18	1.68
Decoupling economic growth from waste production (PNGR 2030)	Waste production/GDP at constant prices, 2016 (t/k€)	0.080	0.059
Increase the availability of waste for the economy (PNGR 2030)	Recovery except energy recovery/Waste production (%)	65.0	80.5
Reduce waste disposal (PNGR 2030)	Waste disposal (2018 value = index 100)	100	41.5
Reduce GHG emissions from the waste sector (including wastewater) (PNGR 2030)	Mt CO ₂ eq. emitted into the atmosphere by the waste management sector	6.50	4.55
Production of water for reuse (PENSAARP 2030)	% of total wastewater treated in wastewater treatment plants	1.3	20
Proper disposal of sludge from water treatment plants for low supply system ⁽³⁴⁾ (PENSAARP 2030)	%	93	99-100
Proper disposal of sludge from wastewater treatment plants for high supply system ⁽²⁹⁾ (PENSAARP 2030)	%	100	99-100
Proper disposal of sludge from wastewater treatment plants for low supply system ⁽²⁹⁾ (PENSAARP 2030)	%	100	99-100
Proper disposal of sludge from wastewater treatment plants for high supply system ⁽²⁹⁾ (PENSAARP 2030)	%	100	99-100

³⁴ High supply systems are those that include the components located upstream of the distribution network, connecting the water sources to low supply systems, which provide water supply services to consumers.

The following Table, instead, provides information on **the status of CE targets mentioned in the 2022 CE Country Profile** ⁽³⁵⁾.

Goals	Indicator	Reference value	Target 2020	Target 2030	Current value
Increasing productivity of materials (GGC)	EUR GDP/kg materials consumed (€/kg)	1.14 (2013)	1.17	1.72	1.30 (2022)
Increasing the incorporation of waste in the economy (GGC)	The quotient of the total waste subject to recovery (except energy recovery) and the total waste produced (%)	56 (2012)	68	80.5	72 (2022)
Decoupling economic growth from waste production (PNGR)	Tonnes of produced waste/ 1,000 EUR GDP (t/k€)	0.08 (2018)		0.059	0.096 (2022)
Reducing waste production: -15% compared to 2012 (PNGR)	Waste production/waste production in 2012 (%)	100 (2012)		85.6	126.9 (2022)
Progressive elimination of waste disposal in landfill, eradicating landfilling by 2030 (PERSU)	Waste landfilled/ Waste generated/produced (%)				55 (2022)
Recycling of packaging waste (PERSU)	Weight of recycled packaging waste/Weight of packaging waste collected (%)	n.a	70	n.a	63 (2021)

Note: GGC: Green Growth Commitment ⁽³⁶⁾; PNGR: National Waste Management Plan; PERSU: Strategic Plan for municipal waste.

According to Eurostat, in 2022, the circular material use rate for Portugal was 2.6. **Although PAEC II includes actions aiming to increase the circularity rate**, namely by promoting more efficient production processes capable of generating minimal waste and preventing adverse impacts on the environment or communities, **it does not set a specific target to be attained**. The most recent values for indicators were included in PAEC, in order to establish a reference value to assess future progress.

Actions and implementing measures undertaken to achieve CE targets

By the end of 2020, the new EU waste strategical framework, including the Waste Framework Directive, the Landfill Directive and several Directives addressing specific waste flows, were transposed into national law by the Decree-Law 102-D/2020, of 10th December ⁽³⁷⁾, which includes the Waste Management Regime (RGGR) ⁽³⁸⁾, the Waste Landfilling Regime and modifies the Regime for Management of Specific Waste Flows (UNILEX) ⁽³⁹⁾, establishing a legal framework that sets new and updated legally binding targets:

- The new **RGGR establishes new obligations, which support the transition to the circular economy** with a focus on preventing and promoting the waste hierarchy, encouraging separate collection and focusing on simpler and more agile waste declassification procedures. For example, when contracting construction and maintenance works for infrastructure under the Public Contracts Code, it is mandatory to use at least 10% of recycled materials or products that incorporate recycled materials in relation to the total amount of raw materials used in work (no. 5 of article 28 of the RGGR). Decree-Law no. 24/2024, of March 26 included in RGGR the provision of considering the accountability of the

³⁵ https://www.eionet.europa.eu/etcs/etc-ce/products/etc-ce-products/etc-ce-report-5-2022-country-profiles-on-circular-economy/portugal-ce-country-profile-2022_for-publication.pdf

³⁶ <https://files.dre.pt/1s/2015/04/08400/0218902191.pdf> (in Portuguese).

³⁷ <https://diariodarepublica.pt/dr/legislacao-consolidada/decreto-lei/2020-150908020> (in Portuguese).

³⁸ <https://files.diariodarepublica.pt/1s/2020/12/23901/0000200269.pdf> (in Portuguese).

³⁹ <https://diariodarepublica.pt/dr/legislacao-consolidada/decreto-lei/2017-114350681> (in Portuguese).

Construction and Demolition Waste for the calculation of the quantities of recycled materials incorporated on site and the need of pre-demolition audits in demolition and renovation works of buildings or public works infrastructures, in order to promote the reuse of products, and the recovery of a maximum quantity of construction elements or materials.

- The **Legal Regime for Specific Waste Flows (UNILEX)** promotes the application of extended producer responsibility with a focus on the waste hierarchy, determining a set of new specific waste flows and corresponding targets for selective collection and recycling, and objectives related to the reuse, repair and remanufacturing of products (Decree Law n.102-D/2020, December 10).
- The current version of **Decree-Law no. 78/2021**, 24 September (Decree-Law no. 83/2022, of 9 December) **transposes**, at the national level, the **Single-Use-Plastics Directive** aiming to reduce the impact of certain plastic products on the environment, establishes Extended Product Responsibility (EPR) regimes for certain single use plastic products, sets targets to incorporate recycled plastic into beverage bottles and national targets for the selective collection of bottles and for the collection and recycling of single use plastic cups and fishing gear containing plastic ⁽⁴⁰⁾.

At the national level, the **interim evaluation of PERSU 2020** ⁽⁴¹⁾ pointed out to the need for (re)alignment with the expected challenges. Briefly, the assessment stressed the need to:

- Increase the amount of waste separately collected;
- Optimize new investments, at the regional level, taking into account existing infrastructures and installed capacities at the national level, to recover residual fractions (e.g. preparation of refuse-derived fuel – RDF);
- Increase the quantity and quality of waste resulting from treatment (e.g. introducing changes and updating collection systems, RDF and fertilizing materials);
- Ensure approaches, at the municipal level, to comply with the separate collection of bio-waste and to attain the technical and economic-financial sustainability of all the 23 municipal wastes management systems.

During **2023**, the **National Waste Management Plan, the Municipal Waste Strategic Plan and the Non-Municipal Waste Strategic Plan** were approved.

In March **2024**, **Decree-Law n. 24/2024** introduced amendments related to waste management, landfill and specific waste streams (UNILEX) subject to the principle of extended product responsibility. These amendments include objectives for reducing waste generation and a longer period of time suitable to attain a change in behaviour required to ensure an effective prevention; the indexation of waste tariffs applied to the actual waste generation in order to hold producers responsible; and the creation of two new extended producer responsibility regimes (RAP; to be operational by December 31, 2025), for furniture placed on the market (including mattresses and their waste) and domestic health-care waste (needles, syringes, home dialysis waste, etc.).

Innovative approaches and good practices

Examples of public policy initiatives (national, regional or local)

➔ *Good practice examples: sharing information about the circular economy and networking*

- **State of the Environment Portal** ⁽⁴²⁾

The State of the Environment Portal was launched in December 2016 to support the understanding and dissemination of data from the State of the Environment Report, a national reference document. The portal, that is updated on an yearly basis, houses a wide variety of **indicators on the state of the environment, presented in more than 50 thematic pages**,

⁴⁰

https://apambiente.pt/sites/default/files/Residuos/FluxosEspecificosResiduos/ERE/PI%C3%A1sticos%20utiliza%C3%A7%C3%A3o%20%C3%BAnica/CT_novos_fluxos_SUP.pdf (in Portuguese).

⁴¹ <https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/30-2023-210923318> (in Portuguese).

⁴² <https://rea.apambiente.pt/> (in Portuguese).

distributed across eight environmental domains: "environment and economy", "energy and climate", "transport", "air", "water", "soil and biodiversity", "waste" and "environmental risks". This digital and interactive platform, aimed at decision makers, organisations and citizens, provides easy, fast and more transparent access to the latest data and environmental trends, helping to improve the understanding of the complexity of crosscutting environmental challenges and supporting the design of the responses.

- **ECO.NOMIA Portal** ⁽⁴³⁾

The Portal ECO.NOMIA, dedicated to the circular economy, is an initiative of the Ministry of the Environment, which was launched in 2016. It aims to **inform consumers and public and private institutions about projects, business models, funding opportunities, good practices, events, products and services** focussed on the implementation of the principles of the circular economy. It also supports and promotes initiatives that, directly or indirectly, contribute to promoting the transition to a circular economy. The portal aims to be a knowledge aggregator, to inform and assist consumers and companies in the interpretation of the circular economy concept and associated benefits; disseminate policies and cases; contribute to the dissemination of existing funding opportunities and, in a reserved access space, promote interaction between agents that can leverage ideas, projects and business models. According to PAEC 2030, this Portal is foreseen to be updated.

- **FECA – Alentejo’s Circular Economy Forum** ⁽⁴⁴⁾

Alentejo’s Circular Economy Forum (FECA) is a space where Regional Coordination and Development Commission Alentejo (CCDR-Alentejo) aims to foster the **collaboration between companies, organizations and institutions**, promote the sharing of knowledge and good practices, and contribute to the identification of business and innovation opportunities, encouraging more efficient use of natural resources, the promotion of more resilient and adaptable systems and the development of sustainable solutions that benefit the local economy. Several partners participate in the Forum, including companies, universities, associations and local authorities. The Forum promotes events, debates, workshops, projects and other initiatives to discuss and disseminate the principles and practices of the circular economy. It was created as a part of the Smart Circular Procurement – CircPro project ⁽⁴⁵⁾, which is supported by the INTERREG Europe programme, aiming to promote a transition to the circular economy, at national and regional level, through its implementation in processes and procedures. The first FECA took place in 2017 and it is still being held annually, in conjunction with other initiatives, such as free training workshops on circular public procurement.

→ *Good practice example: product-related policies*

See **CIRCO Hub Portugal Project "Creating Business through Circular Design"** ⁽⁴⁶⁾ reported in the section on "Existing policy framework".

→ *Good practice example: green public procurement*

- **"Green Public Procurement Awards - ECO 360" (Portuguese Environmental Fund)** ⁽⁴⁷⁾

Based on the five action axis of the National Strategy for Green Public Procurement – ECO360 ⁽⁴⁸⁾, in particular vector "D3. Incentives", it was considered essential to encourage, through

⁴³ <https://eco.nomia.pt> (in Portuguese).

⁴⁴ <https://www.ccdr-a.gov.pt/feca/> (in Portuguese).

⁴⁵ <https://www.ccdr-a.gov.pt/circpro/> (in Portuguese).

⁴⁶ <https://circohubportugal.ineg.pt/> (in Portuguese).

⁴⁷ <https://www.fundoambiental.pt/apoios-2023/gestao-de-residuos-e-transicao-para-uma-economia-circular/aviso-premio-compras-publicas.aspx> (in Portuguese).

⁴⁸ https://encpe.apambiente.pt/sites/default/files/documentos/RCM_13.2023_ECO360.pdf (in Portuguese).

financial incentives, the adherence of public entities and market agents to green and circular purchases. For this purpose, the “Green Public Procurement Award – ECO360” was created, which responded to strategic and specific objectives of the aforementioned strategy by promoting its operationalization in the Public Administration. The aim was to reward local government entities, central administration entities and public companies that, during the years 2022 and 2023 and through their contracting procedures, contributed the most to the reduction of environmental impacts and promotion of efficient material and energy resources usage.

- **Food Sustainability School Program** ⁽⁴⁹⁾

Winner of the 2nd prize in the “Local Government Entity” ECO360’S Award category in 2023, this program, promoted by Torres Vedras Municipality, has been one of the drivers of green public procurement applied to **school meals**. The Food Sustainability School Program, in operation since 2014, is an integrated strategy to promote the local economy, environmental sustainability and quality school meals in Torres Vedras. By procuring local, seasonal food for schools, the municipality aims to create jobs and generate local wealth, as well as educate students, their families and the school community about the importance of sustainable food consumption.

- **Green Deal Center project** ⁽⁵⁰⁾

The Green Deal Center project, coordinated by the Regional Coordination and Development Commission of Centro (CCDR Centro), is part of the Centro's Regional Circular Economy Agenda. It was inspired by the Dutch model ⁽⁵¹⁾, integrating, at an initial stage, two basic assumptions: **the launch of pilot procurement procedures that integrated circularity principles, and the sharing of knowledge and experiences acquired during the process**. The collaborative learning network created has several advantages, namely that most circular solutions are “tailor-made” and that participants learn more effectively by sharing experiences and discussing best practices, including international ones. The project has been including training courses in green and circular public procurement, regular meetings to share the state of the art, the promotion of workshops dedicated to specific needs identified by the participants and the creation of a virtual platform with relevant information about the project.

→ *Good practice example: local initiatives*

- **Sustainable Companies Platform** ⁽⁵²⁾

The **Lisbon Sustainable Companies Platform** is a **commitment** made by companies and organisations, within the scope of their activity for the 2020-2030 period, **to adopt measures that contribute to achieving sustainability** (namely environmental, social and governance) **goals** in the city. The Platform aims to mobilize the business community to take concrete actions to achieve the objectives set, with **305 organizations currently registered**. Additionally, Lisbon municipality has been the first organization (public and private) in Portugal, since the end of 2022, to obtain recognition for the implementation of the Sustainable Procurement system through the ISO 20400 Standard.

- **Shared Green Deal** ⁽⁵³⁾

The **Shared Green Deal** is a **Horizon 2020 project** that brings together 22 organisations from different countries of the EU and aims to stimulate shared actions on specific priority Green Deal topics (such as circular economy) across Europe, by providing social sciences and humanities tools to support the implementation of eight EU Green Deal policy areas, at the local and regional level.

⁴⁹ <https://www.cm-tvedras.pt/educacao/saude-e-alimentacao/programa-de-sustentabilidade-na-alimentacao-escolar> (in Portuguese).

⁵⁰ <http://agendacircular.ccdr.pt/centro-green-deal/> (in Portuguese).

⁵¹ See: <https://www.copper8.com/wp-content/uploads/2018/10/Circular-Procurement-in-8-steps-Ebook.pdf>

⁵² <https://lisboaparticipa.pt/pt/lisboa-sustentavel-empresas> (in Portuguese).

⁵³ <https://sharedgreendeal.eu/>

In 2023, four local partners, including the **Portuguese municipality of Santo Tirso**, were chosen to work together within the **Shared Green Deal on Circular Economy**. Within this project, the municipality assessed the potential for circular synergies between the most significant economic sectors of the city: clothing and textiles, agri-food, and rubber and plastic. Through a series of three workshops the project gathered local entities (public and private), promoted synergies, and collected good practices already implemented by the involved entities.

Examples of private policy initiatives (sectoral)

→ Good practice example: textiles, footwear and natural resin

Within the framework of the Integrated Projects funded by the Recovery and Resilience Plan for Portugal (RRP), the following examples of good practices can be highlighted:

- **Initiatives under the be@t - Bioeconomy at Textiles Integrated Project** ⁽⁵⁴⁾:

- **Online Platform for the establishment of industrial symbiosis** (under development) ⁽⁵⁵⁾. Developed by the Technological Center for Textile and Clothing Industries of Portugal - CITEVE, with collaborative efforts from co-promoters KORTX and IOTECH, it seeks to **facilitate the communication and cooperation between industries from different sectors**, maximizing interactions, promoting the exchange of information and waste/by-products. Ultimately it aims to create an ecosystem that significantly reduces waste production through the reintroduction of unused industrial residues into the production cycle, reducing raw material usage, diminishing environmental impact, and boosting the circular economy. This platform aims to support decision-making processes and improve data interoperability, making industrial symbiosis a viable component of sustainable business models.

The Online Platform is designed to be **adaptable to emerging technologies and evolving market dynamics**. Continuous feedback loops and data analytics enables the platform to evolve in response to changing needs and opportunities. Machine learning algorithms enhances matchmaking capabilities, identifying synergies between industries with precision and efficiency, while blockchain technology ensures transparency and traceability in material transactions, further strengthening trust among participating entities.

The long-term vision for this platform extends beyond its initial industrial applications within Portugal. The goal is to **scale the system across various sectors nationwide, establishing a replicable model of industrial symbiosis** that can amplify the reach and impact of sustainable practices across the country.

By fostering a network of interconnected industries on a global scale, the platform not only catalyses resource efficiency, but also cultivates innovation through cross-sector collaboration.

- **Development of processes for obtaining new materials and functional ingredients from waste and/or by-products from other industries, for use in the textile and clothing sector** (under laboratorial testing) ⁽⁵⁶⁾. This initiative started in July 2022 and it is expected to be completed in 2025; it is led by CITEVE with various other partners, and focuses on the development of innovative physical, chemical, and biotechnological processes to create new materials and functional ingredients (namely for cotton, lyocell and recycled polyester) using recycled materials and waste. By repurposing waste streams such as eggshell, limestone powder, peanut skin, and residues from the meat industry, the project

⁵⁴ <https://bioeconomy-at-textiles.com/> For the description of the whole project, see the section “Future plans”.

⁵⁵ <https://beat.iotech.pt/>

⁵⁶ Some of the results of this initiative are available at the following link: <https://bioeconomy-at-textiles.com/explica/b2b/informacao-tecnica-e-cientifica/>

not only mitigates environmental impacts, but also unlocks latent value in overlooked resources. Through meticulous laboratory testing, researchers aim to optimize processes for scalability, ensuring the feasibility for industrial adoption without compromising performance. In this way, it is possible to enhance environmental sustainability, reduce the reliance on virgin resources, and cutting the carbon footprint.

Moreover, and as intended in the previous example, **the initiative plans to extend its methodologies to other sectors across Portugal**, aiming to establish a scalable and replicable model for circular economy practices nationwide, catalysing a paradigm shift towards resource efficiency and environmental stewardship.

The project emphasizes the importance of knowledge sharing and capacity building. Through workshops, training programs, and dissemination activities, stakeholders from diverse sectors are empowered to embrace circularity and adopt innovative practices in their operations.

- **Sustainable Supply Chains in Textile and Clothing Manufacturing** - This initiative, started in 2022, aims at the establishment of sustainable supply chains in the textile and clothing manufacturing sector. Key aspects include: supplier engagement and transparency, material traceability, circular design principles, local sourcing and production, and collaborative innovation. This involves collaborating with suppliers to ensure adherence to environmental and social responsibility standards, implementing material traceability systems, incorporating circular economy principles into product design, emphasizing local sourcing and production, and encouraging collaborative innovation to drive sustainability in the industry. These practices aim to minimize environmental impact and promote ethical practices in the textile and clothing manufacturing sector.
- **Initiatives under the BioShoes4All Integrated Project - Innovation and empowerment of the footwear industry for a sustainable bioeconomy** ⁽⁵⁷⁾
 - **Development of new recycled polymeric/plastic materials for footwear (soles and fully injected footwear)** - This initiative, which is under development since 2022, is led by APICCAPS (the Portuguese Footwear and Allied Value Chain Nacional Industrial Association) and coordinated by CTCP (the Portuguese Footwear Research and Technological Center). It promotes the **use and recycling of thermoplastic material** (thermoplastic rubber, thermoplastic polyurethane and polyvinyl chloride), **scraps, non-compliant materials and products** resulting from production processes, in soles and fully injected footwear. Considering that thermoplastic material constitutes 40% to 50% of the material used in those products, this initiative represents a good practice of valuing materials and by-products, which allows reducing the consumption of virgin raw materials, of which Portugal and Europe are deficient, and can contribute to reducing the environmental footprint of the soles and the footwear itself. Results show that, by incorporating 98% of recycled material, a reduction of 70% on the CO₂ emissions is accomplished, compared to the use of virgin material.
 - **Development of biobased circular sustainable materials, processes and products** - The BioShoes4All project is **developing and deploying materials and processes that valorise agri-food, agroindustrial and forest bio-wastes**. Some examples are: i) pine bark and leather production wastes are transformed in tanning and filling agents to produce leathers with good aesthetic and comfort properties; ii) bio-based materials such as olive stones and chestnuts shells are being embedded in innovative biocoatings (biopoliols) (with content above 70%, according to ASTM D6866) ⁽⁵⁸⁾, to produce high durability coated textiles; and iii) natural rubber soles with high abrasion and fatigue performance are being produced with bio-based material content above 80%.

⁵⁷ <https://bioshoesforall.pt/> For the description of the whole project, see the section “Future plans”.

⁵⁸ Standard test method developed by ASTM International to determine the biobased carbon/biogenic carbon content of solid, liquid, and gaseous samples using radiocarbon analysis.

- **Platform for circularity** - The platform, that is still under development, allows the **traceability from raw material to product**, supporting the selection of raw materials with less impact, which could contribute to the reduction of GHGs, and will enhance the possibility of selecting materials and components (e.g. reduction in fuel consumption). The platform will include information related to: i) product post-use, ii) recommendations in order to extend product lifespan (such as repair), iii) circularity-oriented design, iv) evaluation of critical raw materials and chemicals, v) consumer decisions regarding the purchase, and vi) the use of the product.
- **Initiatives under the BioShoes4All Integrated Project - Innovation and empowerment of the footwear industry for a sustainable bioeconomy** ⁽⁵⁹⁾
Valorisation of industrial by-products - This initiative is being carried out since 2022 and is led by NARES in partnership with PRORRESINA and other project partners. It is aimed at valorising wastes of the natural resin first transformation industry (tree bark and muds), by classifying them as by-products for other industries. Through this initiative the amount of waste landfilled will significantly decrease and new by-products, with added value, will be made available for other industries. The industrial applications of these by-products are presently under study.
- **Industrial Symbiosis between the Textile, Footwear and Natural Resin, sectors** – These three sectors, through the Consortia established in the framework of the RRP funding, are collaborating, since 2022, in order to develop and implement innovative formulations with rosin-based resins to be used in footwear adhesives and finishings, to substitute synthetic resins and solvents.

→ *Good practice example: glass packaging*

The Vidro+ Platform ⁽⁶⁰⁾ is a collaborative initiative, launched in 2022, that aims to **create a commitment between the different agents in the glass packaging value chain** that operate in the national market, including government entities, academia and research centres, associations and NGOs, **defining targets and objectives to promote the glass recycling rate** in Portugal. Vidro+ Platform has the Institutional Support of FEVE (European Packaging Glass Federation).

→ *Good practice example: a digital market promoting the exchange of waste*

myWaste, Digital Resource Management Platform ⁽⁶¹⁾ is a **platform/digital market for a national exchange of waste, by-products and materials classified as end of waste status (FER)**, coming from distinct sectors and capable of being valued, in a logic of marketplace. In this way, the reuse and recycling rates of different material flows are accelerated, promoting greater circularity. It was developed within the scope of the “*Be Smart – Be Circular*” Project, promoted by the Smart Waste Portugal Association (ASWP) and co-financed by COMPETE 2020, in partnership with InspireIT.

→ *Good practice example: evaluating CE performance of organisations*

eCIRCULAR ⁽⁶²⁾ is a classification system, developed by ADENE – Agency for Energy, launched in 2023, which allows the **evaluation of performance and improvement of management practices of organizations regarding the circular economy**. This system is applied to organizations to streamline actions and obtain practical and evolutionary results in terms of the circular economy. eCIRCULAR uses a comprehensive model that comprises the assessment of how materials, energy and water are managed, as well as the organisation's strategic options to promote circularity. This assessment is performed by eCIRCULAR auditors, with the issuance of a classification document that includes the classification obtained (from A+, the best, to F, the worst) and some practical

⁵⁹ <https://rn21.forestwise.pt/> (in Portuguese). For the description of the whole project, see the section “Future plans”.

⁶⁰ <https://vidromais.pt/> (in Portuguese).

⁶¹ <https://smartwasteportugal.com/2022/11/15/mywaste-plataforma-digital-gestao-recursos/> (in Portuguese).

⁶² <https://ecircular.adene.pt/> (in Portuguese).

measures to improve performance. eCIRCULAR is applicable to multiple sectors of the economy. Presently, 32 professionals (with specific training) were recognized as eCIRCULAR auditors, 38 organizations were classified and 240 measures to improve circularity were proposed to those entities.

The way forward

Identifying and addressing barriers and challenges

Within the preparation of the PAEC 2030, the main barriers for a transition to a Circular Economy were identified⁽⁶³⁾ based on the “Assessment of PAEC Activities and Results Achieved between 2018 and 2020”⁽⁶⁴⁾, the study “General assessment of the reality of the enterprise network in Portugal in terms of circular economy”⁽⁶⁵⁾ carried out by the Portuguese Business Confederation (CIP), and the study “Which are the driving forces and barriers to the implementation of the circular economy in Portugal?”, carried out through a participatory process involving representatives of business associations, academia and environmental and consumer protection non-governmental organizations (NGOs).

The main barriers/challenges identified were the following:

- **Public policies mainly focused on economic growth,**
- Public policies with gaps or not aligned with the principles of the circular economy (CE),
- Some policy instruments with the potential to cause adverse environmental impacts,
- Public policies which do not provide adequate incentives to promote the implementation of CE and do not allow leveraging the positive externalities of CE,
- **Insufficient/lack of capital investment** to support circular solutions,
- **Insufficient/lack of public funding** to support industrial symbioses, clusters and private initiatives,
- Insufficient investment in eco-design,
- Lack of support systems for companies that facilitate funding,
- **Lack of knowledge of the CE concept and principles,**
- **Lack of CE-related skills,**
- Scarce entrepreneurial culture dedicated to CE, compromising the creation of circular systems, solutions and products,
- **Lack of technologies** to leverage CE,
- **Consumers not motivated and resistant to adapt behaviours** enhancing CE practices,
- **Education and awareness campaigns that are not very informative,**
- **Scarcity of digital platforms** to support the circular transition,
- **Insufficient/non-existence of infrastructures** to support circularity,
- Most products put on the market are not eco-designed, and thus hardly repairable, reusable, recycled and recovered,
- **Lack of business models/products/processes, based on CE** premisses,
- Weak or insufficient holistic assessment of products and services, from a life cycle perspective,
- **Scarce collaboration between companies** to promote solutions based on CE principles,

⁶³ <https://participa.pt/pt/consulta/plano-de-acao-para-a-economia-circular-paec> (in Portuguese). See also the general assessment of the current status of the business sector in Portugal in terms of Circular Economy. E+C survey results - “Avaliação geral da realidade do tecido empresarial em Portugal em matéria de Economia Circular. Resultados do inquérito E+C”: <https://cip.org.pt/wp-content/uploads/2021/09/Avaliacao-geral-da-realidade-do-tecido-empresarial-em-Portugal-em-materia-de-EC.pdf> (in Portuguese).

⁶⁴ https://apambiente.pt/sites/default/files/SNIAMB_A_APA/Iniciativas_transectoriais/PAEC_RelatorioFinal.pdf (in Portuguese).

⁶⁵ <https://cip.org.pt/wp-content/uploads/2021/09/Avaliacao-geral-da-realidade-do-tecido-empresarial-em-Portugal-em-materia-de-EC.pdf> (in Portuguese).

- Uncertainty in terms of availability of materials, prices and quality of products, which makes it difficult and delays the transition to a CE,
- **Markets for new circular products are still not competitive** and the price of recycled materials/repared products is usually higher than the one of virgin materials/new products, leading consumers to opt for cheaper and less sustainable materials/products,
- Difficulty in setting prices for by-products,
- **Lack of suitable equipment for separate collection of waste**, compromising its recovery,
- Limitations in waste management logistics (technological, among others),
- Difficulty in accessing and sharing information among companies regarding their waste and by-products generation,
- Lack of dialogue and coordination among entities, essential for sharing knowledge and establishing good circular economy practices,
- **Weak coordination among organizations and local government entities**, compromising the creation and operation of circular territories capable of reducing the ecological footprint,
- Lack of confidence in the circular system, particularly in waste management,
- **Legislation based on bureaucratic processes making circularity difficult**,
- Widespread marketing made by companies/economic sectors that appeal to “more and cheaper” consumption, not promoting the CE principles,
- **Lack of harmonised and standardized indicators for monitoring** circularity and sustainability.

With regard to new policy initiatives addressing the abovementioned challenges, at the national level, and within the framework of PAEC 2030, the identified barriers are supposed to be minimized or even overcome by the set of actions under the seven dimensions that are proposed to be developed along that Plan (for further details, see the section “Existing policy framework”). Particularly, the results expected to be achieved within the proposed dimensions and their associated actions will depend on the implementation of the policy instruments foreseen.

Types of policy initiatives within the PAEC 2030 (cross-cutting nature) that could address the main barriers and challenges identified:

- **Policy Instruments for Circularity**
 - Evaluate tax incentives for products with the EU Ecolabel, products made with a high content of secondary raw materials, remanufactured components, or other products that meet relevant circularity criteria;
 - Evaluate tax incentives for reuse of goods and repair services;
 - Study possible regulations, economic-financial instruments or other mechanisms that encourage the use of by-products, and products and materials that incorporate secondary raw materials, as an alternative to primary raw materials;
 - Promote and reinforce tax incentives to R&D for circular economy;
 - Identify possible tax or financial incentives that discourage practices that are unfavourable to the circular economy with a view to their elimination/adaptation;
 - Develop technical guides in which circularity criteria are identified in the context of Ecological Public Procurement.
- **Funding the Transition to a Circular Economy**
 - Evaluate the creation of a public financing line for SMEs to promote circular economy;
 - Encourage partnerships with private financial institutions to finance SMEs;
 - Create specific financing lines for the conversion of production lines and requalification of human resources, aiming at resource efficiency;
 - Consider a new cycle of FITEC (Innovation, Technology and Circular Economy Fund), aimed at interventions within the scope of the circular economy;
 - Support financing for the implementation of measures under the Ecodesign Regulation;

- Assess the continuity of the Circular Economy Voucher ⁽⁶⁶⁾.
- **Education, Training and Awareness Raising for a Circular Economy**
 - Strengthen the circular economy component of school curricula for primary and secondary education;
 - Strengthen the circular economy component in higher education curricula;
 - Training and qualification of human resources in circular economy;
 - Develop and disseminate manuals with examples of good practices in circular economy;
 - Stimulate the education, awareness and communication campaigns for a circular economy;
 - Strengthen support for the creation of national contests for circular business ideas and leverage circular businesses.
- **Technology, Research and Innovation at the Service of Circularity**
 - Create a monitoring and reporting platform for PAEC, which integrates a dashboard with the main performance indicators for the circular economy;
 - Strengthen the technological R&D&I (Research, Development, and Innovation) areas to accelerate the circular economy;
 - Promote the creation of a portal that acts as an accelerator to support companies (particularly SMEs) in becoming more circular;
 - Make the ECO.NOMIA Portal a reference in terms of circular economy, aiming to share information and support the transition to a circular economy, as well as disseminating relevant information to consumers;
 - Create modelling tools to assess the effects of different circular economy strategies on the various environmental impact categories defined in the Product Environmental Footprint, to be applied to priority products to be defined;
- **Circularity in Organizations**
 - Promote the integration of circularity in business strategies and identify the entities that support circular transactions in companies;
 - Promote the implementation of a classification system for good management practices in circular economy.
- **Partnerships for a Circular Economy**
 - Promote the development of collaborative solutions that adopt circularity principles;
 - Support the voluntary implementation of the EU Corporate Sustainable Reporting Directive (CSRD) by SMEs;
 - Develop a strategic study to create potential Circular Business Zones;
 - Mapping the skills of Research Centres, Technology and Innovation Centres and Collaborative Laboratories as facilitators of circular and sustainable design and production;
 - Promote online platforms for digital markets for by-products and materials with the end of waste status.
- **Life Cycle**
 - Encourage projects that promote water and energy efficiency;
 - Encourage projects for water reuse;
 - Support R&D&I projects that explore the use of alternative critical raw-materials;
 - Stimulate the adoption of the EU Ecolabel;
 - Expand the CIRCO program (see the section “Existing policy framework”);
 - Promote the use of methodologies to assess environmental impacts and product circularity performance;
 - Assess the inclusion of circularity criteria in environmental permits;
 - Develop a tool to measure the performance of resources efficiency in industries;
 - Promote EMAS certification in manufacturing industries;
 - Establish measures to promote the reuse of specific products;

⁶⁶ The Circular Economy Voucher is a Portuguese initiative under the Incentive System for SME Qualification. It aims to provide companies with a diagnostic that leads to an action plan for implementing management and growth models aligned with national and international circular economy strategies.

- Reinforce and upgrade the waste collection network.

Future policy plans

The **Recovery and Resilience Plan for Portugal** enshrines several actions to promote circular economy:

- **C 9 – Water Management**

It includes aspects directly related to the CE. It aims to mitigate water scarcity and only includes the reform Integrated and Circular Management of Water Resources in Situations of Scarcity (RE-r22), which contributes to the objective of promoting the circular use of water resources through the use of treated wastewater.

- **C 10 - Sea**

It aims to develop a structural, lasting and impactful response paving the way for the construction of a more competitive, cohesive and inclusive economy of the sea, but also one that is more decarbonised and sustainable, with a greater capacity to take advantage of the opportunities arising from the climate and digital transitions. It provides support for the development of projects aimed at innovation, process modernisation, carbon footprint reduction, marine litter collection, and the circular economy of companies and organizations in the fish sector.

- **C11 – Decarbonization of Industry**

It aims to decarbonise the industrial and business sectors and promote a paradigm shift in the use of resources, implementing the measures of the National Energy and Climate Plan 2030 (PNEC), a central strategic objective in the RRP, in the sense that it contributes to accelerating the transition to a carbon neutral economy and, at the same time, to promoting the competitiveness of industry and companies by reducing energy consumption and promoting renewable energy sources.

- **C12 – Sustainable Bioeconomy**

It provides support for developing projects aimed at accelerating the production of high added-value products from biological sources (as alternatives to fossil-based materials), promoting the climate transition and a sustainable and efficient use of resources.

With regard to the **key objectives and main initiatives that are being implemented** under the above-mentioned components, the following has to be noted:

- **C 9 – Water Management**

The investments made in Component 9, concerning the **implementation of the Algarve Regional Water Efficiency Plan**, namely for the promotion of the use of treated wastewater allowed to finalize the projects for four water treatment, lifting and supply subsystems. It is expected that these four infrastructures would be finalized in 2026, allowing to face regional water availability problems.

- **C 10 - Sea**

This component includes only one reform, **Reform of the Blue Economy Support Infrastructure Ecosystem**, which aims to develop new sectors of the blue economy, such as the blue bioeconomy, aquaculture, fish processing, robotics and ocean digitization. Concerning this reform, **several laws were approved namely the revision of the “Blue Fund” organic structure** (Decree-Law no. 71/2023, of August 22) **and legal framework** (Decree-Law no. 123/2021, of December 30).

One of the planned **investments** under this component concerns the **Green and Digital Transition and Fisheries Safety** providing support for development of projects aimed at innovation, process modernisation, carbon footprint reduction, marine litter collection and the CE of companies and organisations in the fish sector. Currently, **73 projects have already been approved**, mostly linked to the fishing sector. One of the milestones defined for Component 10 is a final report on the projects approved within the scope of support for innovation, energy transition and reduction of environmental impact, aimed at entities in the fishing sector (2025).

- **C11 – Decarbonization of Industry**

The **main reform of the industry sector aims "to develop innovative and competitive industry"** through a set of activities, including **"promoting the CE in industry"**, through the promotion of the circular and low carbon economies, industrial symbioses and new circular, low-carbon products and

services". The investment planned for this component is intended to promote and financially support the initiative of national industry for multidimensional action in the environmental plan, structured for the development of projects in four aspects. These include the aspect of "low carbon processes and technologies in industry" through the use of industrial symbioses and CE measures, incorporating innovation.

The targets defined for Component 11 include **financial support to at least 300 projects** related to at least one of the measures that actively **contribute to the decarbonisation of industry** – low carbon processes and technologies in industry; adoption of energy efficiency measures; and incorporation of energy from renewable sources and energy storage (2025).

22 sectorial roadmaps for decarbonisation were approved, which indicate, among others, proposals for cost-effective trajectories for reducing greenhouse gas (GHG) emissions, compatible with national objectives, identification of the main decarbonization technologies available, or costs and benefits analysis. Milestones defined for Component 11 include the opening of a tender for financial support to industry decarbonisation projects related to at least one of the following typologies: low carbon processes and technologies in industry; adoption of energy efficiency measures; and incorporation of energy from renewable sources and energy storage (2021). **Until 2023, more than 1,700 projects were approved for support** ⁽⁶⁷⁾.

- **C12 – Sustainable Bioeconomy**

Within the scope of this component, **contracts were signed with three consortia from distinct sectors: Textile and Clothing, Footwear and Natural Resin.**

Textile and Clothing - be@t - Bioeconomy at Textiles Integrated Project ⁽⁶⁸⁾

The Consortium, led by the Technological Center for Textile and Clothing Industries of Portugal – CITEVE, encompasses several partner entities with complementary skills.

The be@t Integrated Project defined three main general objectives. The **work planned for the be@t Project is subdivided into four axes of strategic intervention (or pillars), under which nine initiatives are distributed, each one composed of several measures (58)**, as presented in the Table below.

All the measures of the Integrated Project have started and the ongoing work allowed to:

- Establish **two partnership agreements for industrial symbiosis** for the development of processing and treatment of fibres from leaves waste and stems of several plants.
- Establish **three partnership agreements for industrial symbiosis** for the development of biotechnological, chemical and physical processes to obtain materials and ingredients that can be of interest to the sector.
- Develop the structure of an **IT platform that would foster the establishment of industrial symbiosis**, enhancing collaboration and resource utilization among industries.
- Upgrade a previously developed IT platform and develop a digital model, system architecture and tools based on blockchain technologies to enable the implementation of a **digital product passport (DPP) for the textile products**. The DPP will enable the visualisation of the origin of the product, the composition of the material, the supply chain, the global sustainability index (and the specific consumption of water, energy and chemicals), as well as its recyclability, all included into a single identifier. Therefore, the developed DPP will enable the traceability and transparency in the value chain, as well as providing real data relating to the use of a given textile product and its environmental, social and economic impacts, with the primary objective of encouraging responsible consumption and the transition to a truly sustainable and circular textile industry.
- Create training resources dedicated to sustainability, ecodesign and eco-engineering, fostering **knowledge dissemination and capacity building within the industry**.

Furthermore, the **project has initiated 80 lines of research and development**, aiming to drive innovation and address key challenges within the Textile & Clothing sector. Additionally, 13 scientific

⁶⁷ The full list of approved projects is available at: https://www.iapmei.pt/getattachment/PRODUTOS-E-SERVICOS/Incentivos-Financiamento/Sistemas-de-Incentivos/Plano-de-Recuperacao-e-Resiliencia/Descarbonizacao-da-Industria/Componente-C11-Projetos-aprovados_15-07-2024.pdf.aspx (in Portuguese).

⁶⁸ <https://bioeconomy-at-textiles.com/>

articles have already been published in indexed journals, as part of the efforts to disseminate the project's findings and insights. Moreover, more than 30 communication and marketing campaigns have been undertaken to raise awareness and promote the objectives and outcomes of the project to a broader audience. It is worth highlighting that the be@t project encompasses a vital **societal pillar**, to foster consumer engagement and societal impact.

For further details on this project see also the section “Examples of private policy initiatives”.

Structure and objectives of the be@t Integrated Project

General Objectives	Strategic Objectives	Axes	INITIATIVES
Contribute to relocating the supply of textile raw materials back to Europe (reindustrializing Europe)	Lignin & forest cellulose – Fibers, non-woven fabrics (TNT) and matrices for bio-based composites; Agricultural fibrous biomass - Alternative natural fibers (mechanically and biochemically processed), for example banana from Madeira, pineapple from the Azores, hemp from the Center; flax from the North and rice straw from Alentejo	PI Biomaterial	I1. Regenerated cellulose fibers
	Circular (bio) processes – Recycling (biochemical and mechanical); Industrial symbioses – Valorization of waste from other industries such as collagen, hydroxyapatite, chitosan, plant extracts, cork, leather and wood		PII Circularity
	Ecodesign & Eco-Engineering in a closed cycle (zero waste); Validation and metrics – percentage of “Bio”, Recycled & recyclable, business and green equity and carbon footprint; Digital Tracking – Supply chain, being transparent and reliable	PIII Sustainability	I6. Ecodesign and eco-engineering training I7. New validation and measurement metrics
Increase the safety and traceability of textile products	Responsible Consumption – Consumer information and promotion of good consumption behaviors through conscious purchases and reuse/repair; Awareness raising for labeling - Awareness for the implementation of a Digital Product Passport and digital labels; Involvement of stakeholders from the value chain & brands; International markets - Promotion of the brand 'Responsible textiles From Portugal' (iTechStyle GreenCircle)	PIV Society	I8. Digital Tracking Tools I9. Actions to value national sustainable products
	Foster integrated cooperation for a truly circular and sustainable textile and clothing industry		

Footwear - BioShoes4All - Innovation and empowerment of the footwear industry for a sustainable bioeconomy Integrated Project ⁽⁶⁹⁾

The Consortium is led by the Portuguese Association of Footwear, Components, Leather Articles and their Substitutes (APICCAPS), and its project director is the Footwear Technological Center of Portugal (CTCP).

The “BioShoes4All” Integrated Project is based on general and strategic objectives and is organized around **five Intervention Axes, which correspond to 11 Initiatives and 23 Measures**, as presented in the Table below.

Structure and objectives of the BioShoes4All Integrated Project

General Objectives	Strategic Objectives	Axes	Initiatives
<p>1) Satisfy and anticipate human, environmental and economic needs and promote the potential of new and emerging bio-resources and technologies in the development of innovative solutions for materials, processes, products and services, useful for society and marketable by the cluster in the market global.</p> <p>2) Promote the evolution of the cluster towards the production of biomaterials and circular products, advanced and digital technologies and new business and commercialization models, with high technological content and potential for differentiation, capable of generating significant, transversal and comprehensive impacts across the entire cluster, contributing to the country's recovery, resilience and competitiveness.</p> <p>3) Contribute to the increase of applied research; the transformation of knowledge into processes, products and services required by companies and society; the demonstration of industrializable solutions to enhance the multiplier effect in the economic system; and the qualification of human resources aiming at the creation and internalization of a culture that encourages qualified employment and innovation.</p> <p>4) Consolidate the Portuguese footwear industry as one of the main European producers, maintaining a strong national production base, guided by high standards of sustainability and social responsibility, contributing to the objectives of sustainable development, promoting economic prosperity and well-being, based on the efficient reuse of resources, carbon neutrality and digitalization.</p>	<p>Production of new biomaterials and components</p> <p>Creation of new concepts for eco-products in footwear and leather goods</p> <p>Application of new approaches and technologies aimed at minimizing and valuing production and post-consumption waste</p> <p>Use of advanced production technologies</p> <p>Dissemination and demonstration of innovations</p> <p>Qualification and broad communication</p>	1. Biomaterials	<p>1.1. Bioleathers for footwear and leather goods;</p> <p>1.2. Biomaterials and composites for the footwear cluster.</p>
		2. Ecological Footwear	<p>2.1. Ecological and sustainable footwear;</p> <p>2.2 Tools for sustainability.</p>
		3. Circular Economy	<p>3.1. Recycling and industrial symbiosis;</p> <p>3.2. Post-consumer footwear recycling.</p>
		4. Advanced Production Technologies	<p>4.1. Traceability and logistics;</p> <p>4.2. Advanced production systems.</p>
		5. Training and Promotion	<p>5.1. Advanced training and qualification;</p> <p>5.2. Cluster communication and internationalization program;</p> <p>5.3. Coordination.</p>

All the measures of the Integrated Project have started and the ongoing work allowed to:

- **Implement eco-design for the development of footwear** with smaller carbon footprint, which are durable, repairable and compostable;

⁶⁹ <https://bioshoesforall.pt/>

- **Develop the “Cluster of Footwear and sustainable fashion” platform** that will include several tools such as a “shoe agile footprint calculator” and the assessment of social, environmental and economic characteristics applicable to the cluster.

For further details on this project see also the section "Examples of private policy initiatives".

Natural Resin - RN21 - Innovation in the Natural Resin Sector to Strengthen the National Bioeconomy Integrated Project ⁽⁷⁰⁾

The Consortium, led by CoLAB Forestwise, intends to value natural resin as a “bio” product, enhancing a wider range of market applications and also promoting the revitalization of the entire value chain with a view to its modernization, sustainability and incorporation of technical and scientific knowledge. The RN 21 Integrated Project is based on **three guiding principles, four general objectives, three specific objectives (axes), seven initiatives and 22 measures**, as presented in the Table below.

Structure and objectives of the RN21 Integrated Project

Guiding Principles	General Objectives	Axes	Initiatives
<p>Cover the entire natural resin value chain, from the forest to the end consumer, with a special emphasis on markets and new products derived from natural resin</p> <p>Respond to the main needs and opportunities identified by the sector's stakeholders</p> <p>Contribute to RRP objectives, especially in the Sustainable Bioeconomy component</p>	<p>Economic resilience and the promotion of a sustainable bioeconomy in Portugal, by revitalizing the natural resin sector</p>	<p>PI. Promoting the production of national natural resin</p>	I1. Reinforcement of the resin productive capacity of the pine forest
			I2. Increasing resin extraction productivity
			I3. Making resin extraction more attractive for forest owners
	<p>Carbon neutrality and a more productive and resilient Portuguese forest</p>	<p>PII. Reinforcing the sustainability of the manufacturing industry</p>	II1. Support industrial investment and the natural resin value chain
			II2. New applications and market strengthening
	<p>Territorial cohesion</p>	<p>PIII. Positive differentiation of natural resin and its derivatives</p>	III1. Creation of a Seal of Guarantee and Traceability
			III.2 Communication and market
	<p>Strengthen science and technology through RD&I activities developed in collaboration by the industry and the academy</p>		

All the measures of the Integrated Project have started and the ongoing work allowed to:

- **Develop new methodologies designed to improve resin productivity in maritime pine** (*Pinus pinaster* Ait.) such as: genetic improvement program; new silvicultural practices, and the development of new resin extraction methodologies;
- **Certify natural resin from Europe**, with reduced carbon footprint;
- **Develop new biopolymer formulations** with the incorporation of gum rosin derivatives (increasing its biobased content) used to develop materials for the food, automotive, textile and footwear industries, thus increasing their sustainability;
- **Develop new industrial processes of gum rosin derivatives production** to make them compatible with polyolefins. These will allow natural resin derivatives to enter a market dominated by synthetic resins derived from hydrocarbons;
- **Develop new formulations of 100% biobased glycerol ester.**

For further details on this project see also the section "Examples of private policy initiatives".

⁷⁰ <https://rn21.forestwise.pt/>

European Topic Centre on
Circular economy and resource use
<https://www.eionet.europa.eu/etcs/etc-ce>

The European Topic Centre on Circular economy and resource use (ETC-CE) is a consortium of European institutes under contract of the European Environment Agency.

