EoRPA
European regional policy research consortium

Circular Economy Policies in Europe: Assessing Regional Policy Integration

Report for State Secretariat for Economic Affairs (SECO), Bern

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EXECUTIVE SUMMARY

This report explores the integration of Circular Economy (CE) principles into regional and national policies across Europe, emphasising the benefits of resource efficiency, waste reduction, and job creation, alongside the challenges of implementation, particularly for regional actors.

Key findings include the significance of tailoring CE strategies to local and regional contexts, leveraging funding mechanisms and territorial cooperation to address disparities, and fostering innovation through business models and networks. The report also identifies persistent gaps in regulatory frameworks, financial resources, policy coherence, and capacity-building, which hinder progress.

Recommendations for enhancing CE adoption focus on strengthening governance structures, providing targeted financial support, and fostering public-private partnerships. The importance of integrating CE metrics into monitoring frameworks to measure progress and align with broader sustainability goals is also underlined.

For **Switzerland**, the report underscores opportunities to advance CE through its New Regional Policy and regional development frameworks. Specific actions include **promoting regional CE portfolios, supporting cross-border collaborations, and enhancing data systems for monitoring and evaluation**. Drawing on best practices from across Europe, Switzerland can accelerate its transition to CE by aligning national strategy with its unique regional characteristics.

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1 INTRODUCTION

In the context of the climate crisis and the need for future sustainable and resource sparing economic development, the principles of a circular economy (CE) have emerged as a cornerstone of sustainable development policy in Europe and globally. This approach, which aims to decouple economic growth from resource consumption, represents a paradigm shift from the traditional linear model of "take, make, dispose" to a more regenerative 'loop' system. The 2021 status report on the circular economy in **Switzerland** cites the building blocks of a circular economy as: increasing resource efficiency using fewer resources per product; the slowing down of resource cycles by lengthening the product lifespan; and the closing of resource cycles through recycling and reuse (Stucki & Wörter, 2021).

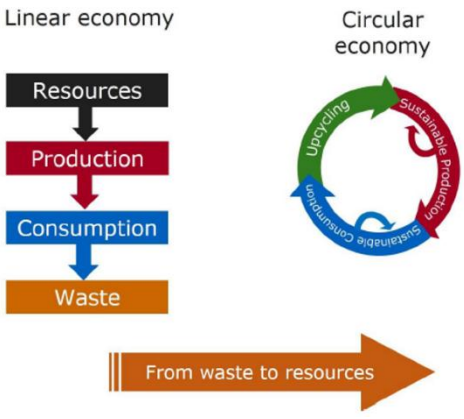
The urgency of transitioning to a circular economy is underscored by alarming trends in resource use and waste generation, and the alarming toll of this linear model. Over the past 35 years, global resource extraction has surged by 65 percent, with more than half of this volume comprising non-renewable resources (Circular Economy Working Group, n.d.). Resource extraction and processing also account for half of global greenhouse gas (GHG) emissions and over 90 percent of biodiversity loss and water stress.[1] Within the EU, the annual disposal of 58 million tonnes of food and 12.6 million tonnes of textiles exemplifies the wastefulness of current consumption patterns.[2] Moreover, the scarcity of strategic commodities crucial for modern technologies poses significant economic risks. For instance, 97 percent of rare earth elements, essential for green technologies, are concentrated in China (Circular Economy Working Group, n.d.), highlighting the need for more sustainable and diversified supply chains. The EU's heavy reliance on imports, now six times the volume of its exports, highlights its vulnerability to supply chain disruptions and geopolitical tensions (ibid.).

Estimates project the creation of 700,000 new jobs and an increase in GDP by 0.5 percent by 2030 in the EU if circular economy elements are integrated. Circular principles could also help face its significant resource dependencies and waste challenges. At a national level, countries are also recognising the potential of CE and integrating it into existing policies or, going a step further, creating national strategies and roadmaps for the transition to a circular economy. Most of these consider regional specificities, leading to CE integration into regional policy and development pathways. At the regional level, CE requires governance and economic support frameworks which encourage a shift towards sustainable production and consumption patterns, new business models and holistic, cross-sectoral policy approaches. There are many opportunities for regional economic development associated with CE, but also many challenges for policymakers driving the change.

This report seeks to explore how EoRPA[1] partners are integrating the concept of the circular economy in its national and regional strategic frameworks, highlighting both the challenges and opportunities it presents for actors in regional policy. It firstly discusses the evolution of the circular economy concept and its integration in global, EU and wider European agendas. This is followed by an exploration of CE-related support at the EU-level, and its take-up at the national level among MS, particularly focusing on EoRPA partner countries. CE implementation is further explored at the regional and local levels, as well as the role of businesses and networks as enablers in the transition. Finally, CE overall progress is discussed, and recommendations for CE integration in policy provided in the last chapter.

2 CONCEPTUALISATIONS OF THE CIRCULAR ECONOMY

The concept of the circular economy has garnered significant attention among academics, policymakers, and practitioners, particularly in the context of sustainable development (Kirchherr et al., 2017). While its roots trace back to the 1960s and 70s, when early discussions on closed-loop systems and regenerative design principles emerged (Kara et al., 2022), the term was formally introduced in the 1990s. By the early 2000s, the idea gained traction globally and in Europe, building on concepts and disciplines like industrial ecology, cradle-to-cradle design, biomimicry, the performance economy, blue economy, and permaculture (Andrade et al., 2021; Ellen MacArthur Foundation, n.d.; Ghisellini et al., 2016). However, despite its growing use in the past three decades, the concept has been defined and applied in multiple ways.



CE is broadly characterised as an emerging economic system that aims to keep resources in use for as long as possible, extract the maximum value from them, and then recover and regenerate products and materials at the end of their service life – forming a sort of loop or cycle where waste produced becomes the input of another process. This represents a transformative approach to economic development, aiming to shift away from the traditional "take-make-dispose" model, which is characterised by linear resource use and significant waste generation (Andrade et al., 2021). Increasing resource scarcity and the growing environmental impact of waste and pollution have posed CE as an alternative and solution to

[1] The European Regional Policy Research Consortium (EoRPA) is funded by twelve national government ministries and agencies responsible for regional policy in Austria, Finland, France, Germany, Italy, Netherlands, Norway, Poland, Portugal, Sweden, Switzerland and the United Kingdom. It is managed and run by the European Policies Research Centre and produces comparative research and knowledge exchange on regional policy in 30 European countries.

the extractive and exploitative linear model, no longer considered sustainable (Tashtamirov, 2023). With growing environmental concerns, the concept of CE has expanded beyond waste management to a more comprehensive framework for sustainability and economic regeneration.

As the concept of CE (circular economy) gained popularity among diverse stakeholders, its meaning began to blur, similar to what has happened with terms like sustainable development and the green economy (Kirchherr et al., 2017). Although their vagueness allows for more flexibility and broad application, it risks enabling superficial efforts that fall short of real transformation. Studies have identified and explored the multiple CE conceptualisations (Andrade et al., 2021; Ghisellini et al., 2016; Kirchherr et al., 2017). Some definitions and applications of CE have focused on the more technical aspects of the concept, such as waste management, energy use, and product design (Bocken et al., 2016; Geissdoerfer et al., 2017; Yuan et al., 2006). Others have opted for a more comprehensive approach, emphasising environmental quality, regeneration, and systemic change (Kirchherr et al., 2017). In general, scholarly and policy debates on the circular economy transition have tended to focus more on the technological and industrial aspects, rather than the broader economic, social and environmental implications (Kirchherr et al., 2017).

Figure 1: Representation of a linear economy model, and a circular economy model.

Source: Adapted from Ellen MacArthur Foundation (2013)

The most common definition of the circular economy is attributed to the Ellen MacArthur Foundation (2013):

> "an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."

This comprehensive definition focuses not just on harm reduction, but on environmental restoration. Additionally, it highlights the technical foundation of CE, encouraging innovative approaches to industrial processes. However, it lacks a connection to the broader goals of sustainable development, which include also economic and social dimensions, missing the broader systemic changes needed. This has led to the following definition (Andrade et al., 2021):

> "The circular economy is an economic system that seeks to contribute to sustainable development (covering current needs without compromising those of tomorrow), by dissociating economic growth from environmental impact and social inequalities, redesigning the way how it consumes, produces and interacts with the environment and with society itself, through innovative business models and a sustained public

policy seeking an optimal implementation of the 4 Rs, namely «reduce, reuse, recycle and recover», always aiming to minimise the consumption of resources, with a systemic approach when it is deployed at the micro (companies and households), meso (industrial synergies, regions), macro (country and global) and supply chain levels (interaction between previous levels)".

The European Court of Auditors (ECA, 2023, p. 6) defines 'circular economy' as "the concept of preserving the value of products, materials and resources for as long as possible and minimising waste." The emphasis is on the product's entire life cycle, from design to disposal, and the importance of preserving the value of products, materials, and resources for as long as possible, aligning circular economy practices with sustainability goals. This perspective underscores CE's potential benefits for both citizens – through more durable and repairable products – and businesses – through enhanced resource efficiency and reduced exposure to resource price volatility. According to the OECD (2020) CE is underpinned by three core principles: (i) **designing out waste and pollution**, with products and processes designed to minimise waste and environmental impact from the outset; (ii) **keeping products and materials in use** through practices such as reuse, repair, refurbishment, and recycling, in which materials are kept in circulation for as long as possible; (iii) **regenerating natural systems**, in which economic activities are structured to restore and enhance natural ecosystems, rather than depleting them. These definitions highlight the systemic shift required at various levels, to reconfigure services, economic activities and infrastructure to minimise waste and optimise resource use.

The CE concept addresses resource efficiency and sustainability by extending resource life cycles and regenerating natural systems. There are multiple definitions and interpretations of CE, potentially hindering meaningful progress in the area. Comprehensive approaches to the framework integrate technical, economic, and social dimensions are essential for achieving systemic change.

3 CIRCULAR ECONOMY AGENDA AND APPROACHES

The potential of transitioning to CE has been underscored by several studies and organisations in the last few decades. According to the OECD (2020), adopting CE could unlock an estimated USD 4.5 trillion (€4.02 trillion) in economic growth by 2030. This transition could also result in significant material savings – estimated at USD 700 billion (€626.6 billion) globally for consumer goods alone – and create hundreds of thousands of new jobs, particularly in sectors related to recycling, remanufacturing, and sustainable product design.

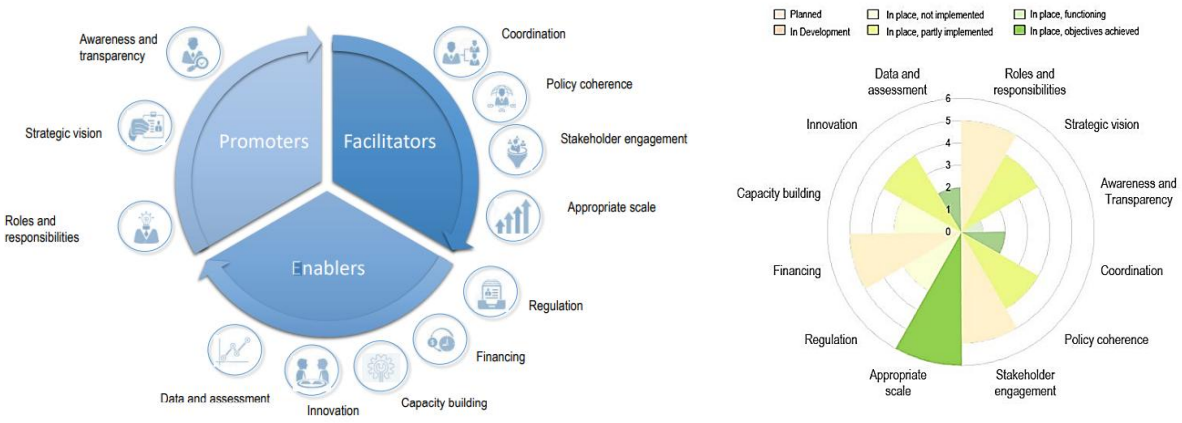
However, despite these promising prospects, CE adoption is considered still in its infancy stage (Arsova et al., 2022; Dąbrowski et al., 2019; Kirchherr et al., 2017). In the EU, which has been a

leader in promoting CE policies, transition progress has been slow and uneven. For instance, the EU's circularity rate, which measures the share of materials recycled and fed back into the economy, increased by only 0.4 percentage points between 2015 and 2021 (ECA, 2023). This slow progress reflects the deep-rooted challenges of moving away from entrenched linear practices, which are still predominant in many industries and sectors.

3.1 Global and EU-level perspectives

At the international level, bodies like the OECD have been great advocates for the circular economy, emphasising the need for a systemic shift and promoting policies that encourage resource efficiency, waste reduction, and sustainable materials' management. The OECD has championed the integration of CE thinking into its recommendations for sustainable and inclusive growth and has highlighted the economic potential of CE, including job creation, material savings, and resilience against resource scarcity and price volatility (OECD, 2020). This also reflects the post-pandemic and crisis discourse to not only build back better but build back greener. The OECD has also created a scoreboard and checklist of action towards CE, as shown in below:

Figure 2: OECD checklist of action (left) and scoreboard (right) for circular economy



Source: OECD (2020)

The OECD has underlined the need for local and regional action for implementing the circular economy. The Rural Agenda for Climate Action[3] includes the circular and bioeconomy as areas of opportunity and action, alongside improving the evidence base at the regional and local level, building local capacity, fostering renewable energy, promoting sustainable land management and higher valorisation of ecosystem services, and decarbonising transport (OECD Centre for Entrepreneurship, SMEs, Regions and Cities, 2023). This demonstrates a particular line of action for a specific category of region – rural regions. The synthesis report on CE in cities and regions further emphasises this, with the OECD arguing that they "have an important role to play in making this happen, as they are at the centre of key decisions

determining economic growth, social well-being and environmental benefits" (OECD, 2020, p. 16).

Indeed, both cities and regions are central in human activity and resource consumption. Projections estimate that 55 percent of the global population will live in urban areas by 2055 (ibid.), and already significant portions of energy demand, pollution and waste are due to increase even further due to this. The urban and regional scale is considered a key area of action also because of the key CE-related competencies in policy areas at these levels, including water management, waste handling, land use planning, and climate mitigation. The OECD (2020) analysis demonstrates that cities and regions are increasingly setting long-term objectives, building partnerships with businesses and academic institutions, and promoting circular practices like reusing, repurposing, and sharing. However, there remains a significant need to scale up these efforts and expedite their implementation.

The EU has been at the forefront of driving the circular economy policy agenda. The European Commission's Circular Economy Action Plans (CEAP) (European Commission, 2020) have served as a key driver for Member States (MS) to develop national circular economy strategies and align policies accordingly, outlining actions across the entire product lifecycle. The first, introduced in 2015, focused on maintaining the value of products, materials, and resources in the economy for as long as possible while minimising waste generation. The second CEAP updated this foundation in 2020, aiming to accelerate the transition to a regenerative growth model, reduce the consumption footprint, and increase the use of recycled materials. The second CEAP is particularly noteworthy for its ambitious target of doubling the EU's circular material use rate by 2030. This plan also emphasises integration with other EU initiatives, such as the Skills' Agenda,[4] the Social Economy Action Plan,[5] and Cohesion policy.

The CEAP is integral to the European Green Deal,[6] an EU-wide specialisation and growth strategy launched in 2019 that aims for climate neutrality in Europe by 2050 while reducing waste and pollution and halting biodiversity loss. The circular economy is seen as a crucial enabler for achieving this goal, with specific targets for increasing the circular material use rate, promoting sustainable product design, and reducing resource dependency. The EU has also implemented various directives to support circular economy practices. The Ecodesign Directive stands as a cornerstone piece of legislation, setting requirements for circular product design in energy-related products (EU, 2024). Subsequent directives, including the Single-Use Plastics Directive (EU, 2024), the Plastics Strategy,[7] the Waste Framework Directive,[8] the Packaging and Packaging Waste Directive,[9] have further strengthened the legislative framework for circularity.

3.1.1 EU Regional Policy and Cohesion Funds for the Circular Economy

EU Cohesion policy, specifically, is a key vehicle for investing on and implementing circular economy initiatives across MS. The European Regional Development Fund (ERDF), the Cohesion Fund (CF), and the Just Transition Fund (JTF) are some of the instruments that support

CE implementation projects across Europe. These funds are particularly crucial for less developed regions, where the transition to CE can also drive regional economic development and social inclusion (Arsova et al., 2022).

The **ERDF is the largest source of EU funding for circular economy and waste management initiatives in both the 2014-20 and the 2021-27 programme periods**, providing substantial financial support for projects across MS. The fund promotes research and innovation in sustainable technologies and practices, namely through the **Smart Specialisation** framework and strategies. These region-specific innovation strategies often incorporate CE priorities, promoting resource efficiency and sustainable development tailored to local contexts, and promoting the development of circular solutions. ERDF also provides **targeted assistance for SMEs**, which can help them transition to more circular business models, and some **dedicated funding (at least 6 percent) to addressing economic, environmental and social challenges in urban areas**, particularly relevant for circular city initiatives (European Court of Auditors, 2023). Through **INTERREG programmes**, ERDF also facilitates transnational collaboration, with joint cross-border initiatives on shared challenges to promote industrial symbiosis, awareness-raising, and the exchange of best practices, important elements for sustainable development and CE projects (see iii). In the 2021-27 period, the **Just Transition Fund** was also introduced, focusing on supporting regions transitioning away from fossil fuels (see ii).

The Cohesion Fund also plays a significant role in supporting CE investments and implementation across the EU, particularly in less developed regions. CF funds support large infrastructure investments in transport and the environment and waste management, targeting the less developed Member States (GNI pc less than 90 percent of the EU average). Its high co-financing rate of 85 percent also make it an attractive option for countries with limited national resources.

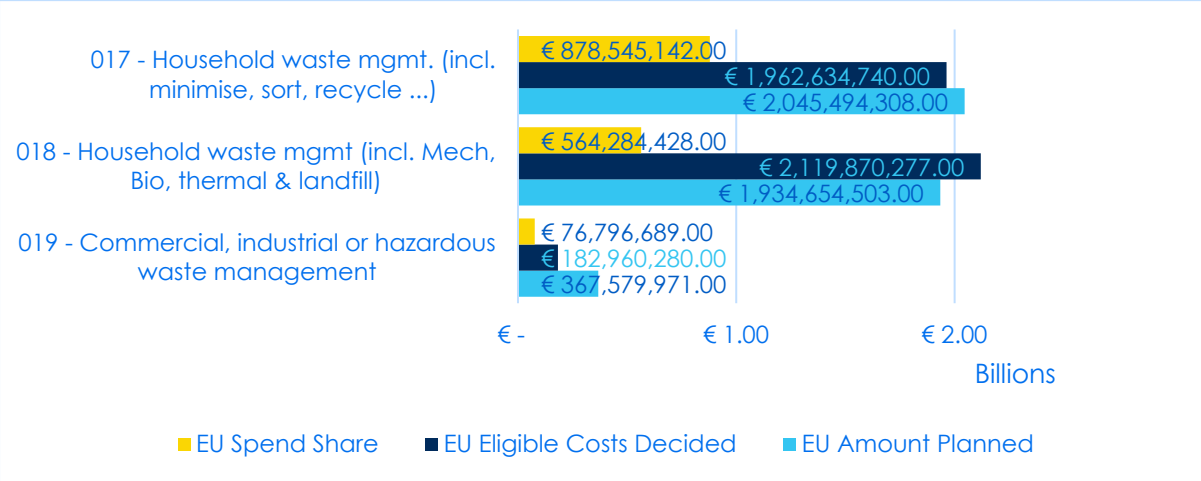
i. Cohesion funding for Circular Economy in 2014-20

In the 2014-20 period, sustainable growth investments accounted for 37 percent of total Cohesion Policy funding, with €273 billion allocated to key areas like a low-carbon economy, climate change adaptation, environmental protection, and infrastructure support. In this period, **CE was considered mainly under the theme of waste management**, with over €4.3 billion allocated. The main priority was solid waste management, followed by waste prevention, re-use, recycling, energy recovery from waste (including incineration) and disposal (landfilling and incineration without energy recovery).

Figure 3 further highlights the **focus on waste management in ERDF and CF** investments, with the largest investments supporting household waste management (over €4 billion in eligible costs decided, and €1.4 billion spent in total), and with less funding directed at commercial and industrial waste management comparatively. Nonetheless, consideration of commercial and industrial waste signals an acknowledgment of the role of businesses in the CE transition and indicates an integrated waste management approach.

Significant support for **CE was also provided under the themes of innovation, SME competitiveness, resource efficiency, and low-carbon investments**. Over €1.5 billion was invested in environmentally friendly production processes and resource efficiency for SMEs. MS also identified CE as a crucial priority in their Smart Specialisation Strategies, suggesting a long-term commitment to embedding CE concepts into regional economic planning and innovation strategies.[10]

Figure 3: ERDF and CF investments in waste treatment in 2014-20



Source: Cohesion Open Data Portal[11]

ii. Cohesion funding for Circular Economy in 2021-27

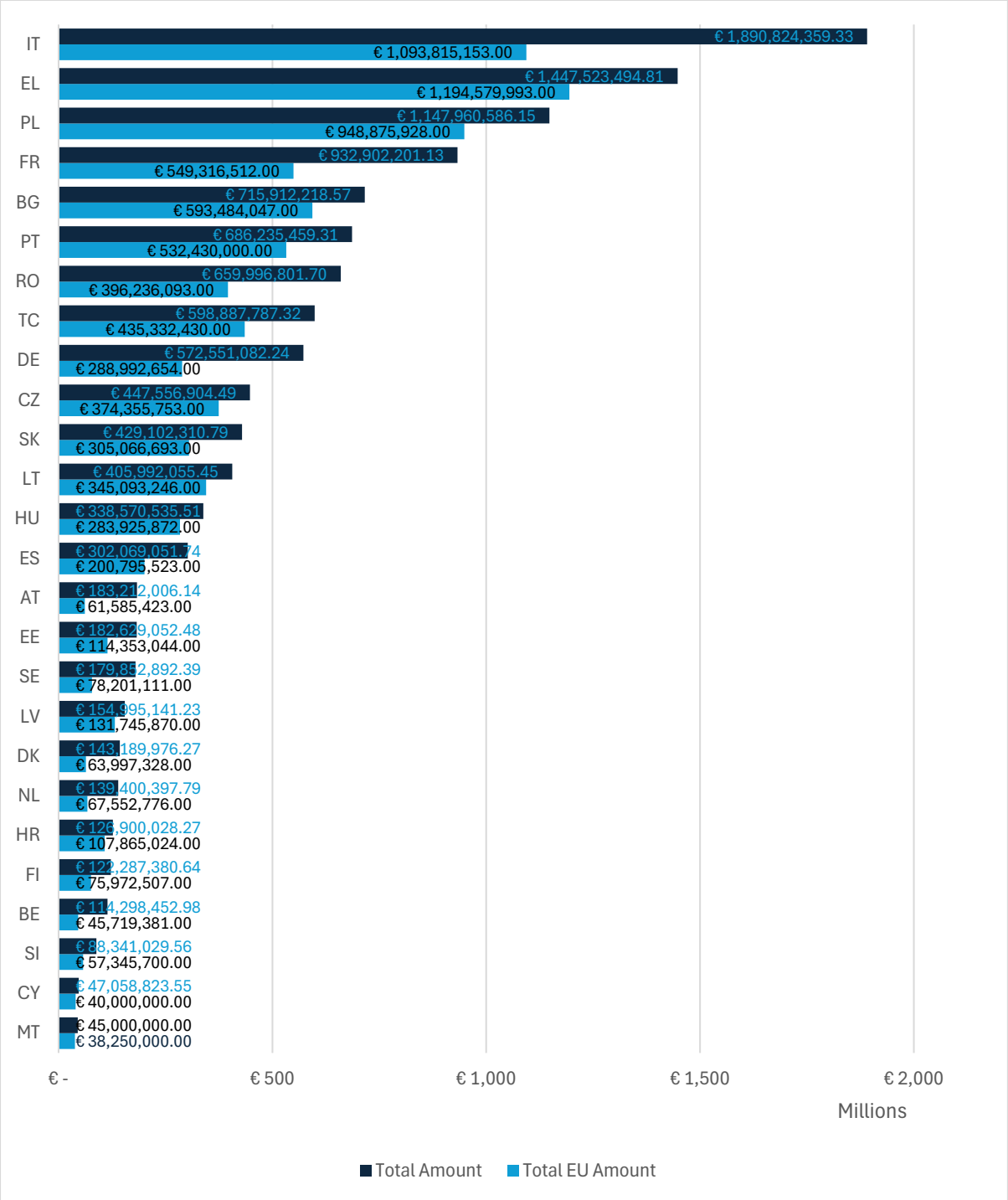
For the 2021-2027 period, almost €12.5 billion has been allocated to circular economy and waste management projects (Figure 4), focusing on resource efficiency, wastewater services, job creation and sustainability. This represents a 2.5 percent share of the total allocation of the funds programmed.[12] This increase from the 2014-20 programme period was driven by several factors, namely the EU's commitment to the European Climate Law, the European Green Deal and the associated increased budget for climate and environmental objectives, and the inclusion of a specific objective for circular economy in the new regulations. In line with circular economy goals, investments will target recycling systems and alternative consumption and production patterns.

At least 30 percent of the 2021-27 EU Budget is required to target climate mitigation and adaptation, with the ERDF and CF providing around €94 billion for climate action, an increase from the 20 percent in the 2014-20 period.[13] When combining the allocations from the JTF and the European Social Fund Plus (ESF+), the total amount of cohesion funding dedicated to climate action and the climate transition exceeds €110 billion. This figure rises to €152 billion when factoring in national co-financing contributions from MS (European Commission, 2023). As shown in Figure 4 below, **Italy** is leading in CE allocated investments with nearly €1.9 billion in overall funding, followed by **Greece** with over €1.4 billion and **Poland** with €1.1 billion.

When considering overall investment by intervention type related to CE, Cohesion data[14] indicates that **household waste management is the primary category of support**, receiving most of the funding – over €4 billion of the total amount of CE funding. This substantial allocation points to an increased recognition of the pivotal role that individual consumers play in the CE ecosystem. The inclusion of this category within EU CE funding reflects consideration for its role in resource recovery and recycling, energy recovery, waste production and prevention, and broader environmental protection. The second largest area of financial support **are environmentally friendly production processes in SMEs** (just under €4 billion). The mid-tier of funding is occupied by initiatives targeting commercial and industrial waste prevention, along with household residual waste treatment. A lower share of funding promotes the use of recycled materials as raw inputs in manufacturing processes. These investments, while more modest, signals a growing recognition of the need to close the loop in material usage – a core tenet of circular economy principles.

Considering the different types of CE interventions by Member States, Figure 5 reveals **a varied approach in how different MS allocate their resources, reflecting national priorities, existing infrastructure, and environmental challenges specific to each country**. A prominent trend across is the substantial allocation to environmentally-friendly production processes in SMEs (**Austria**, **Italy**, **Poland**, and **France)**. This focus on SMEs suggests a widespread recognition of their key role in transitioning to a more circular economy, as well as the potential challenges they face in adopting new, sustainable practices without financial support. On the other hand, other countries (e.g. **Lithuania)** show more balanced investments in environmentally friendly processes for both SMEs and large enterprises compared to the general trend. Another group of countries (**Cyprus**, **Malta**, **Romania**, **Hungary** and **Portugal)** focus significant – if not all – investment in household waste management, indicating a shared understanding of the importance of addressing waste at the consumer level, and potentially reflecting both environmental concerns and public pressure for improved waste management systems. Interestingly, there are marked differences in how countries approach commercial and industrial waste management. Some countries (**Estonia**, **Latvia** and the **Czech Republic)**, allocate substantial resources to this sector, while others seem to place less emphasis on it. This variability could stem from differences in industrial composition, existing waste management infrastructure, or varying policy priorities.

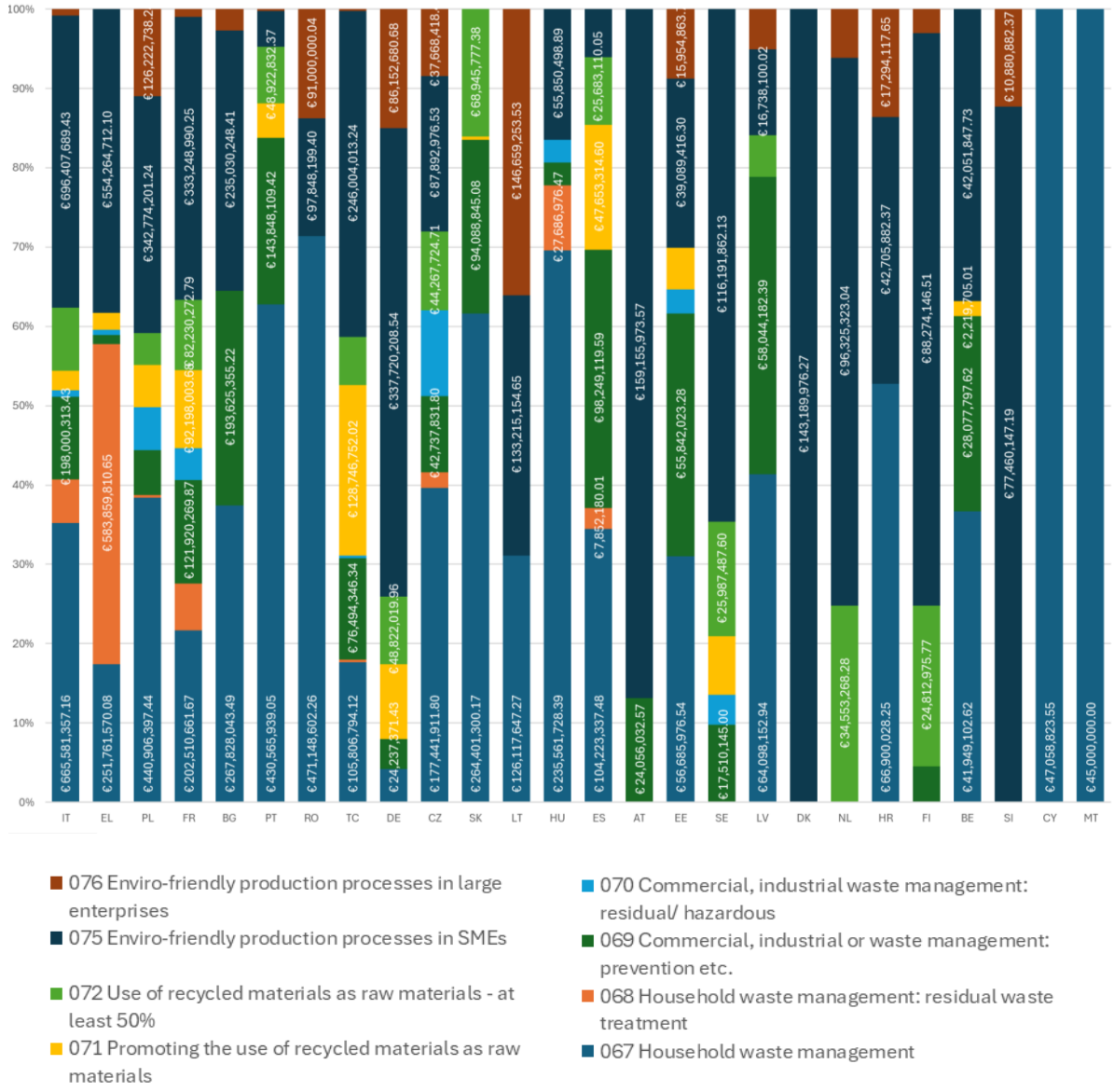
Figure 4: Circular economy allocations per Member State in 2021-27



Note: TC stands for 'Territorial Cooperation'.

Source: Cohesion Open Data Portal[15]

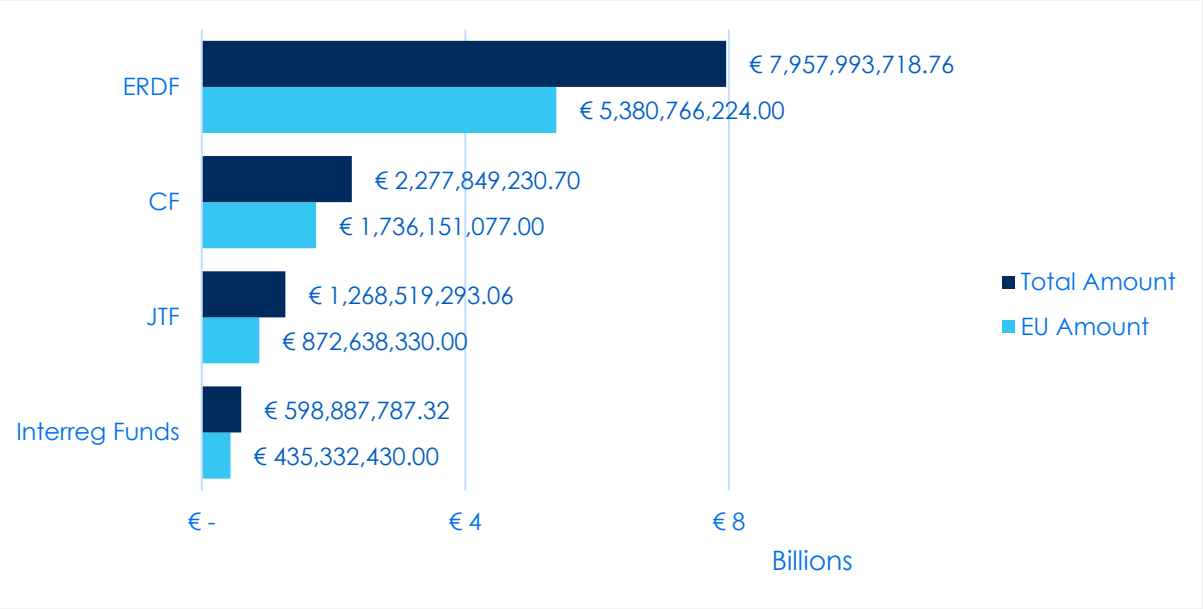
Figure 5: Circular economy and waste management interventions by MS in 2021-27



Source: Cohesion Open Data Portal

As previously mentioned, the ERDF continues to be the largest source of EU funding for CE and waste management in 2021-27 (€5.3 billion EU, and €8 billion total planned allocation), followed by CF (€2.2 billion total), the JTF (€1.2 billion total) and Interreg funding (nearly €600 million) (the two latter still co-funded by ERDF) (Figure 6). This significant funding largely suggests a concerted effort to embed CE principles into the fabric of local and regional economies, particularly in less developed regions.

Figure 6: Circular economy and waste management 2021-27 planned amounts by fund



Source: Cohesion Open Data Portal

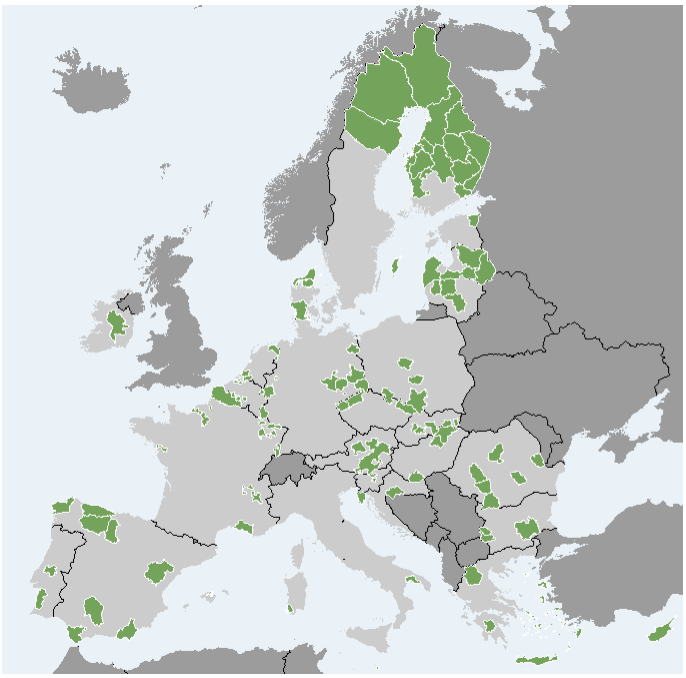


Figure 7: JTF targeted territories by Spring 2024
Source: EU Commission DG REGIO website

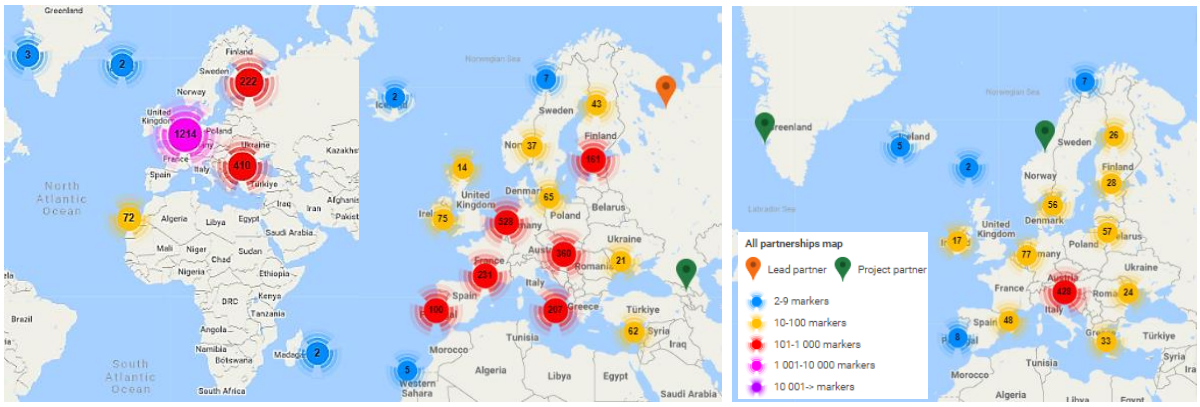
The inclusion of the JTF in CE and waste management funding signals recognition of **the role that CE can play in mitigating the socio-economic impacts of transitioning away from carbon-intensive industries.** The fund was introduced in the 2021-2027 period[16] as one of the three pillars of the Just Transition Mechanism policy framework, developed by the EU as part of the European Green Deal and mobilising €55 billion.[17] While primarily focused on supporting regions transitioning away from fossil fuels, the JTF also supports circular economy initiatives as part of broader economic diversification efforts, with around €1 billion for the regeneration of sites and around €0.7 billion in supporting new business models in carbon-intensive sectors, such as cement or glass production. Based on the specific needs of the territories it will also support investments in mobility, social infrastructure and public administrations. Such investments will take place only in 11 MS (**CZ**, **DE**, **EE**, **EL**, **FR**, **NL**, **PL**, **PT**, **RO**, **SI** and **SK**), with 96 territories identified in these countries by the Commission as regions expected to be the most negatively impacted by the transition towards climate-neutrality. Some tangible results of JTF support to CE implementation include the use of 2.9 million tonnes of waste as raw material.[18]

Several cooperative initiatives have been created under the Cohesion policy framework to support CE implementation at the local and regional levels. These include the Circular Cities and Regions Initiative (CCRI),[19] the Green City Accord,[20] and the European Urban Initiative,[21] which aim to enhance knowledge sharing, build capacity, and promote innovation linked to CE principles at sub-national levels. CE is also a key theme in the Urban Agenda for the EU,[22] where cities collaborate with the Commission, MS, and other stakeholders on issues like waste management, resource efficiency, and the sharing economy. Overall, but particularly in the CCRI, the approach in these initiatives recognises the **importance of collaboratively addressing specific challenges faced by different areas, such as islands or rural regions with unique waste management needs or resource dependencies**. This is an important contributor to the local implementation of the European Green Deal.

iii. INTERREG funding for the Circular Economy

Cross-border collaboration has played a significant role in CE implementation under EU Cohesion policy, promoting knowledge sharing and joint initiatives among regions. Interreg programmes can be considered as 'early adopters' or promoters of circular economy projects, providing public authorities with a platform where to experiment relatively risk-free with new ideas and approaches in regional development and boost policy learning. The cross-border and transnational nature of Interreg projects also allows for testing solutions in diverse contexts. Successful initiatives tested through Interreg can then be transferred to other regions

Figure 8: Mapping of all Interreg-funded circular economy partnerships in 2014-20 (two on the left) and 2021-27 (right, with legend) by September 2024.



Source: Interreg keep.eu portal

The maps above display the geographic distribution of CE-related partners funded through INTERREG programmes for the 2014-20 (two on the left) and 2021-27 (one on the right) programme periods. The search result focused only on the term "circular economy" for the respective periods. The legend includes symbols for lead partner and project partner, but this is only relevant when exploring the results more in-depth in the Interreg portal. For the present purposes, the maps present a good overview of where projects and funding were most concentrated.

Between 2014-20, there were 277 circular economy projects, 1,925 partnerships, and 65 programmes in total. Not all these partnerships were confined to Europe, with partners present in both Northern and south-east Africa. Nonetheless, circular economy partnerships and projects have been mostly concentrated in Central Europe, with hotspots in **the Netherlands**, **Austria**, **Slovenia**, **France** and **Italy**. Northern Europe showcases more moderate activity under this theme, apart from **Finland**.

A notable example of an Interreg-funded CE initiative in this period was the 'Strategies to Reduce Food Waste in Central Europe' **(STREFOWA) project**. This partnership was led by Austria's ABF-BOKU Institute of Waste Management and Circularity, and had a total budget of around €2.3 million, with €1.94 million from ERDF. The project's achievements included facilitating knowledge exchange, producing educational materials on food waste, and organising innovative "hackathons".[23] Another relevant initiative in this period is the **Circular Ocean project** (2015-2018) under the Northern Periphery and Arctic (NPA) region Interreg programme.[24] The initiative sought to test sustainable solutions to collect and reprocess discarded fishing nets, assisting towards CE progress. Training and guidance sessions were also provided to SMEs to advise on the development and retention of jobs within the sector, and a transnational knowledge exchange programme organised.

For the 2021-27 period, there have been 126 circular economy projects, 818 partnerships, and 27 programmes. These are more limited given that the programme is still ongoing. The majority of partnerships and projects still appears to be concentrated in Central Europe, namely around **Austria** and **Slovenia**. As noted in Figure 6, Interreg funding accounts for over €435 million of EU planned amounts in the 2021-27 period, with an added €130 million in MS co-financing. Some examples of INTERREG-funded partnerships and initiatives in the new period include: **Green-Tex** under the Interreg Danube programme (€1.7 million),[25] which sought to enhance green textile and garment production and consumption; **Circular WEEEP** under the Interreg Central Europe programme (€2.3 million),[26] on designing and testing of policies for reducing, repairing, and reusing waste from electrical, electronic equipment and plastic; and the NPA programme's **ENFORCE** project (€1.3 million), focusing on energy and resource recovery from wastewater.

Some INTERREG programmes also have specific objectives on the circular economy. This is the case with the **Baltic Sea** programme's Objective 3.1 under Priority 3 on Climate-Neutral Societies.[27] Actions under this objective (and other programmes with similar objectives) should facilitate the shift from the linear extractive model to the circular resource use model, and can include: testing public procurement models, transforming business models, helping businesses to adopt circular approaches, rethinking urban and regional planning processes, integrating circular economy policies, supporting entrepreneurial and civil society initiatives, and linking bio and circular economy.

EU Cohesion Policy has been instrumental in funding CE initiatives, with substantial allocations from the ERDF, Cohesion Fund, and INTERREG programmes. These funds support projects ranging from waste management to industrial symbiosis, particularly in less developed regions. The inclusion of CE objectives in the 2021–27 funding period reflects a stronger commitment to sustainability, with increased focus on recycling systems and circular business models.

3.1.2 State Aid and the Circular Economy

EU State aid rules have been amended in recent years to facilitate support to transition-related projects. As well as amending regional aid maps to include areas covered by the Territorial Just Transition Plans, changes have been made to the General Block Exemption Regulation (GBER) and the European Commission's guidelines for environmental protection and energy (CEEAG). However, the overarching framework has been set by the current Temporary Transition and Crisis Framework (TCTF).

The European Commission's **guidelines for environmental protection and energy** (CEEAG) were revised in 2022, seeking to align State aid rules with the achievement of Green Deal goals.[28] The amendments extended the types of investment to include 'decarbonisation aid', aid for clean mobility, **aid to support transition to a circular economy**, among others, and adding new eligible aid instruments. **CEEAG explicitly link the Green Deal and regional policy agendas** by offering scope for higher rates of award to be granted in designated 'a' areas and 'c' regions for various eligible investments:

- Aid for the improvement of the energy and environmental performance of buildings;
- Aid for clean mobility;
- Aid for resource efficiency and for supporting the transition towards a **circular economy, in line with the Circular Economy Action Plan[29]**;
- Aid for the prevention or the reduction of pollution other than from greenhouse gases.

The chapter on aid for resource efficiency was revised to address the challenges of ensuring the transition towards a circular economy.[30] State aid for waste management, i.e. aid for the collection, sorting and processing of waste, remains possible. The CEEAG also include specific provisions on aid for the reduction, prevention, preparing for re-use, recovery and recycling of waste and other products, as well as aid for other investments improving the resource efficiency of production processes by reducing the amount of resources consumed or by replacing primary raw materials with secondary raw materials.

In March 2023, the Commission amended the **General Block Exemption Regulation** (GBER) to provide more flexibility to support green transition sectors. The revisions extended GBER until the end of 2026 and increased and streamlined aid possibilities for environmental protection and energy projects (including renewable energy, decarbonisation projects, green mobility and biodiversity, renewable hydrogen and energy efficiency). Article 47 covers investment aid for resource efficiency and for **supporting the transition towards a circular economy**.[31]

The Commission also adopted in March 2023 a new **Temporary Crisis and Transition Framework** (TCTF) (one of a series of successive temporary frameworks) supporting measures in sectors which are important for the green transition.[32] The TCTF extended the possibility until 31 December 2025 for MS to further support measures needed for the transition towards a net-zero industry. These were introduced under previous temporary frameworks related to the energy crisis and concern schemes for accelerating the rollout of renewable energy and energy storage, and for the decarbonisation of industrial production processes. The TCTF also made it easier to design and implement such measures.

The State aid register includes 59 "circular"-related schemes funded, with the earliest starting in 2017 (see Annex).[33] The great majority of these State aid schemes on circular economy are in **Spain** (70 percent) and most relate to energy efficiency projects, and research, development and innovation projects, both in the context of industrial transition and business support. In **The Netherlands**, schemes relate to several relevant sectors for the circular economy, namely plastics, water, agriculture, manufacturing, polymers, and maritime technologies.

> Revisions to EU State Aid rules have facilitated greater support for CE projects, enabling investments in resource efficiency, waste reduction, and decarbonisation. Updated regulations, including the General Block Exemption Regulation (GBER) and the Temporary Crisis and Transition Framework, provide flexibility for Member States to promote CE innovations. Examples include support for clean mobility and waste recycling initiatives.

3.2 National Strategies and Regional Policy Initiatives

The transition towards a circular economy in Europe is characterised by an interplay of supranational, national and sub-national policies and initiatives. European countries are striving to align with overarching global sustainability, EU and CE goals, developing diverse approaches tailored to their specific economic, social, and environmental contexts. This section examines the varied approaches to CE at the national level across Europe, specifically how the concept is being integrated into regional policy.

3.2.1 Circular Economy State of Play in European Countries

The transition to a circular economy represents both an opportunity and a challenge. On the one hand, CE offers a pathway to sustainable economic growth, reduced environmental impact, and greater resource security. On the other hand, the shift requires substantial changes in production processes, business models, and consumer behaviours. European countries are at different stages of adopting CE practices, with varying levels of success (and ambition). **Germany**, **France**, and the **Netherlands** have been leaders in this transition, developing comprehensive national strategies and supporting policies (see 3.2.2 below). However, other countries face significant challenges, including limited infrastructure, lower levels of industrial innovation, and insufficient regulatory support (see Section 4.1.1). The data presented in Table 1 below served as the basis for the POLITICO's circular economy ranking of European countries. It reveals a nuanced picture of progress and challenges in transitioning towards more sustainable economic models.

Table 1: Circular economy ranking

Country	Municipal waste (per year per person)	Food waste (per year per person)	Municipal recycling rate	Share of goods traded that are recyclable raw materials	Material reuse rate	Patents related to CE (since 2000)	Investment in CE sectors
Austria	564 kg	209 kg	**58%**	0.32%	9%	122	€3.5M
Belgium	420 kg	345 kg	54%	0.22%	17%	105	€2.8M
Bulgaria	404 kg	105 kg	32%	0.11%	3%	10	€0.5M
Croatia	403 kg	91 kg	21%	0.23%	5%	4	€0.6M
Cyprus	640 kg	327 kg	17%	0.13%	3%	4	€0.1M
Czech Republic	**339 kg**	81 kg	34%	0.25%	7%	72	-
Denmark	777 kg	146 kg	48%	0.31%	10%	53	€2.3M
Estonia	376 kg	265 kg	28%	0.26%	11%	3	-
Finland	504 kg	189 kg	42%	0.06%	7%	111	€2M
France	511 kg	136 kg	42%	0.24%	**18%**	**542**	**€21.3M**
Germany	627 kg	149 kg	**66%**	0.25%	11%	**1260**	**€28.7M**
Greece	498 kg	80 kg	17%	0.14%	1%	5	€0.6M
Hungary	379 kg	175 kg	35%	0.23%	5%	36	€0.9M
Ireland	563 kg	216 kg	41%	0.18%	2%	38	-
Italy	497 kg	179 kg	45%	0.19%	**19%**	294	€17.8M
Latvia	410 kg	110 kg	25%	0.18%	3%	11	€0.2M
Lithuania	444 kg	119 kg	48%	0.15%	4%	19	€0.4M
Luxembourg	614 kg	175 kg	48%	**0.97%**	11%	24	-
Malta	621 kg	**76 kg**	7%	0.12%	10%	1	-
Netherlands	520 kg	541 kg	53%	0.17%	**27%**	169	€5.2M
Poland	**307 kg**	247 kg	44%	0.18%	13%	**298**	€4.7M
Portugal	461 kg	132 kg	31%	0.26%	2%	22	€1.4M
Romania	**261 kg**	**76 kg**	13%	0.13%	2%	34	€1.1M
Slovakia	348 kg	111 kg	23%	0.15%	5%	10	€0.6M
Slovenia	466 kg	**72 kg**	**58%**	**0.41%**	8%	8	€0.5M
Spain	443 kg	135 kg	30%	0.20%	8%	210	€11M
Sweden	443 kg	212 kg	49%	0.19%	7%	49	€4.1M
Switzerland	671 kg	330 kg	52%	-	13.5%	-	-
United Kingdom	483 kg	236 kg	44%	**0.35%**	15%	292	**€31M**

Note: Figures emphasised in bold by the authors. These highlight the three best performing countries in this category.
Source: Adapted by the authors from POLITICO, Ginger Hervey (2018), and SECO (2019, 2024)

While **Poland**, the **Czech Republic**, and **Romania** demonstrate relatively low levels of **waste production** (307kg, 339kg, and 261kg per person annually, respectively), countries with strong environmental policies, such as **Denmark** and **Luxembourg**, paradoxically top the list with 777kg and 614kg per person. Indeed, the POLITICO ranking (Ginger Hervey, 2018) of the EU's most circular economies places **Poland** and the **Czech Republic** near the top, while ostensibly green **Nordic** countries lag behind. This counterintuitive result is due to factors such as waste production levels and the size of the economy, which influences CE scores without necessarily indicating better environmental outcomes. Therefore, while some countries may appear to be lagging in CE implementation, this does not necessarily reflect their overall environmental performance.

Recycling rates offer another layer of complexity to our understanding. **Germany** emerges as a clear leader with a 66 percent municipal recycling rate, closely followed by **Austria** and **Slovenia** at 58 percent. These figures suggest a well-established infrastructure and cultural acceptance of recycling practices. However, the stark contrast with **Malta** (7 percent), **Cyprus**, and **Greece** (both at 17 percent) highlights the persistent disparities in waste management capabilities across the continent. **Material reuse rates** further illustrate the circularity of economies, with **France** and **Italy** leading at 18 percent and 19 percent, respectively. However, **Greece**, **Bulgaria**, and **Latvia**, with reuse rates of just 1-3 percent, face challenges in adopting circular practices, suggesting the need for targeted policies to boost circularity in lagging regions.

CE innovation, as measured by patents, is concentrated in Central Europe, being dominated by **Germany** (1,260 patents), with **France** and **Italy** trailing at 542 and 294 patents. This regional disparity is echoed in **investment data in CE sectors**. **France** leads with €21.3M, followed by **Germany** and **Italy** at €7.8M each. The significant gap between these leading nations and others, particularly in Eastern Europe, underscores the need for policies and funding to ensure balanced development.

> European countries exhibit varied levels of CE adoption, reflecting differences in economic structure, infrastructure, and policy frameworks. Germany and France demonstrate high recycling rates and innovation in CE sectors, while countries with lower material reuse rates face significant barriers. Targeted policies and investments are essential to bridging these gaps and promoting balanced progress across the continent.

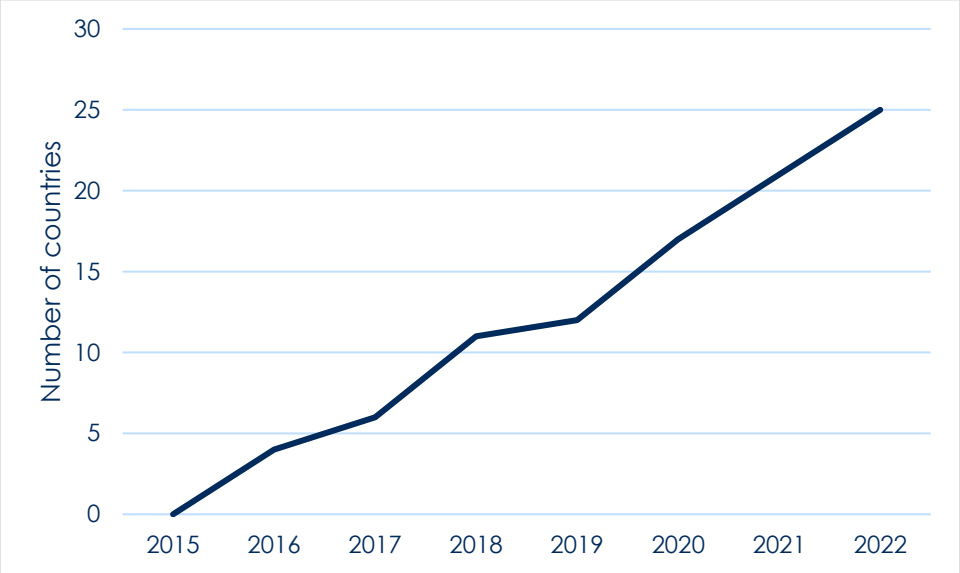
3.2.2 Regional Policy Approaches to Circular Economy

The international frameworks provided by the OECD and the EU play a crucial role in guiding the circular economy transition, offering both a vision and practical support for implementation. For countries, embracing CE offers a pathway to sustainable growth, but this requires coordinated action at both the national and regional levels, supported by robust

policy frameworks and financial investments. Our analysis suggests **the vast majority of European countries, and particularly EU MS, have either developed or are in the process of developing national circular economy strategies** (see Figure 9 and Table 2). This widespread adoption at the national level demonstrates the permeation of CE principles on the European and global stage and, notably, some countries have taken the initiative to develop strategies with a regional or urban focus and at those sub-national levels, indicating a multi-tiered approach to implementation.

The trajectory depicted in the graph below (Figure 9) reveals a steady and accelerating uptake of CE policies at the national level in the EU. In 2015 the concept was still in its nascent stages, particularly in the policy stage, explaining its lack of integration in formal national policy frameworks. However, its uptake accelerated in subsequent years. The period from 2016 to 2018 marks the initial wave of early adopters, with the number of countries implementing national CE policies rising from three to 11. Countries such as **Belgium**, **Finland**, the **Netherlands** and **Scotland** were frontrunners, recognising the potential for CE principles early on and setting a precedent for their European counterparts. Policy adoption of CE significantly accelerated in the following years, bringing the total to 24 in 2022. This coincides with increasing European-level focus on CE initiatives.

Figure 9: EU-27 Member States that have adopted national circular economy policies, by year and cumulative total



2015	2016	2017	2018	2019	2020	2021	2022
0	*4*	*6*	*11*	*12*	*17*	*21*	*25*
	Belgium	Italy	Denmark	Poland	Germany	Cyprus	Romania
	Finland	Portugal	France		Latvia	Czechia	Austria
	Netherlands		Greece		Malta	Ireland	Italy
	Scotland		Luxembourg		Spain	Norway	Bulgaria
			Slovenia		Sweden		

Source: Authors' own research and adaptation from Geerken et al. (2022)

The inclusion of **Germany**, **Latvia**, and **Spain** since 2020 indicates a broadening acceptance of CE principles across diverse economic and geographic contexts within the EU. Ultimately, the graph illustrates the diversity in timing of CE policy adoption across MS. While some countries (e.g. **Romania** and **Cyprus)** are recent adopters, others have had several years to refine and implement their CE strategies, presenting an opportunity for knowledge sharing and policy learning.

The graph depicts only the initial policies adopted to highlight the country's official commitment to CE. Several countries, such as **Belgium**, **Denmark**, **Finland**, **Italy**, **Luxembourg**, **Netherlands**, **Spain** and **Sweden**, have since introduced updates to their original CE policies, incorporating stakeholder feedback from consultations and offering more comprehensive action plans (Geerken et al., 2022). Additionally, aside from the published strategies highlighted in the graph, **Estonia**, **Hungary** and **Lithuania** currently have either drafts under consultation or finalisation, or are considering integrating the concept of CE into their national and regional policies.

Table 2 further summarises EoRPA country's strategic approaches toward circular economy highlighting the different thematic approaches to CE, the sectors prioritised and any existing territorial targeting. Common themes highlighted include waste management, circular design, and raw material use. While the thematic focus and priority sectors vary—from construction and textiles in **Austria** and **France** to mining and extraction industries in **Finland** and **Norway**—most countries emphasise production and consumption stages as key points for intervention. Additionally, nearly all countries recognise the importance of local and regional engagement in CE implementation. Many incorporate regional waste management plans, municipal CE pilots, or localised ecosystems to ensure CE principles are implemented at different territorial levels. For example, **Finland**, **Italy**, and **Poland** target urban and regional ecosystems and municipalities for pilots and project implementation. Collaboration between national, regional, and local authorities and stakeholder engagement is also a common thread, enabling strategies to be adapted to urban, rural, and industrial contexts. **Germany** and **France** emphasise regional collaboration through local authorities and CE ecosystems. This strong emphasis on territorial targeting in most strategies – whether through spatial planning, regional ecosystems, or specific local initiatives – indicates that CE is indeed being integrated into regional policies. Countries are recognising the importance of adapting CE actions to local contexts, making it a key component of their broader CE agendas.

While **Switzerland** does not currently have a dedicated CE national strategy, CE efforts in the country are supported through the "Ordinance on the Avoidance and the Disposal of Waste" (2015), the Environmental Protection Act, the 2030 Sustainable Development Strategy, and regional policies that promote the transition to CE, particularly in rural, mountainous, and border regions. Cantons and municipalities also play a crucial role in implementing waste management and CE-related responsibilities, showing that regional efforts are being prioritised even without a national framework. Similarly, in **England**, while a national strategy is lacking, the "Waste Prevention Programme for England" (2013) provides a framework for CE-related

activities, particularly focused on production, circular design, and waste management. There is growing support for local community initiatives and a trend toward cities developing their own local CE actions, indicating that regional policy is an essential driver of CE activities in the absence of a national strategy. These examples suggest that while a national strategy provides a comprehensive framework, regional and sectoral policies can still drive substantial progress in integrating CE at local levels.

There is also evidence of countries integrating CE principles across a wide spectrum of government policies and strategies, whether they have created a specific CE national policy or not. Geerken et al. (2022, p. 12) highlight that 17 countries have introduced CE elements into other policies, the majority of which related to waste management, followed by energy and climate, public procurement and waste prevention. Across countries, other policy areas such as environment policy, industrial and R&I policy, agriculture, and raw materials policy, have also integrated CE elements, but to a lesser extent. Examples of this wider integration include **Denmark**'s National Strategy for Green Public Procurement 2020, **Italy**'s financial policy and Italian Sovereign Green Bonds, and **Ireland**'s National Skills Strategy 2025. Integration of CE has also occurred with National Recovery and Resilience Plans (NRRPs), notably in **France**, **Finland**, and **Sweden**.

Regional policies play a vital role in tailoring CE solutions to local contexts. Many countries integrate CE into regional waste management plans, industrial ecosystems, and urban initiatives. Collaborative approaches between national and local authorities enable targeted implementation, addressing the specific challenges and opportunities of different regions.

Table 2: Overview of EoRPA partners' national circular economy strategies

Country	National CE strategy	Thematic focus	Priority areas	Territorial targeting
Austria	National Circular Economy Strategy (2022)	Circular design and consumption stages. Raw material use, waste planning and management, and education.	Construction, mobility, plastics and packaging, textiles, electronics and ICT, biomass, RTI, public procurement.	Yes, by indicating the importance of spatial planning and the establishment of local and regional CE ecosystems.
Finland	Material Efficiency Programme (2013, reviewed in 2017) Roadmap to a Circular Economy (2016) Strategic Programme to Promote a Circular Economy (2021)	Raw material use, production and consumption stages. Circular design, waste planning and management, and education.	Mining and extraction industries, trade, food and forest, mobility, RTI, public procurement.	Yes, with municipalities designated for implementing CE pilots, consideration of rural regions in the green economy, and establishment of regional CE ecosystems (e.g. Arctic industries ecosystem).
France	Roadmap for the Circular Economy (2018)	Production stages, consumption stages, waste planning and management, and education.	Construction, textiles, plastics, food, electronics and ICT, RTI, mining and extraction industries, public procurement.	Yes, with consideration of local/regional level for pilot project implementation, regional CE ecosystems and regional waste plans.
Germany	Resource Efficiency Programme (ProgRess, 2020) Circular Economy Status Report (2024) National Circular Economy Strategy (draft)	Production and consumption stages. Raw material use, circular design, waste planning and management.	Consumption domains – working and living; mobility' information and communication.	Yes, considering collaboration between the Federal Gov., local authorities and regional companies to promote CE initiatives tailored for rural areas (e.g. pilots).
Italy	National Strategy for the Circular Economy (2022)	Raw material use, waste planning and management, production stages,	Mining and extraction industries, construction, public procurement, paper, electronics and ICT, batteries and vehicles, RTI, plastics, textile, blue economy, and chemistry.	Yes, consideration of urban and regional ecosystems for regeneration and waste management, and capacity-building initiatives.

Netherlands	A Circular Economy by 2050 (2016) Raw Materials Agreement (2017) Transition Agendas (5 in 2018, following from Raw Materials Agreement)	Production and consumption stages. Raw material use, circular design, education, waste planning and management.	Plastics, consumer goods, manufacturing, construction, textiles, biomass and food.	Yes, considered in the Green Deal approach and the intergovernmental programme in the country.
Norway	White paper on waste and the circular economy (2017) Strategy for Developing a Circular Economy (2021)	Production and consumption stages, waste planning and management	Food, plastics, agriculture and forestry, process industries, construction, service industries, mining and extraction industries, blue economy, and electronics and ICT.	Yes, municipalities are responsible for waste management, and local and regional targets are integrated in regional policies and connected to national legislation.
Poland	Circular Economy Roadmap (2019) Productivity Strategy (2022)	Circular design, production and consumption stages, education. Raw material use, waste planning and management, and education.	Bioeconomy, food, mining and extraction industries, RTI, mobility, batteries and vehicles, and public procurement.	Yes, via regional waste management plans and targeting of municipalities for project implementation.
Portugal	National Action Plan for the Circular Economy (2017) National Strategy and Action Plan to Combat Food Waste	Education, consumption stages, and waste planning and management.	Construction, plastics, textiles, tourism, consumer goods, distribution and retail, food, public procurement.	Yes, such as industrial symbiosis networks, circular cities and circular companies.
Sweden	Strategy for the Transition to a Circular Economy (2020) Circular Economy Action Plan (2020) Action Plan for Plastics (2020)	Production and consumption stages, circular design, raw material use, waste planning and management.	Plastics, textiles, food, renewable and biobased raw materials, construction and the real estate sector, innovation in critical metals and minerals.	Yes, there are grants for urban areas, for example. Regional and local climate and CE-related investment measures are also foreseen in the National Recovery Plan, and (nationally-established) networks support local authorities in these topics.

Switzerland	No national CE strategy. Ordinance on the Avoidance and the Disposal of Waste (2015) Status report of the Swiss Circular Economy (2021) at the company level 2030 Sustainable Development Strategy Revision of the Federal Act on the Protection of the Environment (2024)	Consumption stages, raw material use and waste planning and management.	Biomass, construction, plastics, RTI, public procurement, bioeconomy.	Yes, New Regional Policy supports the transition of mountain, rural and border regions. There is also a distribution of responsibilities across cantons and municipalities.
England (UK)	No national CE strategy. Waste Prevention Programme for England (2013)	Production stages, circular design, and consumption stages. Waste planning and management	Construction, food, plastics, electronics and ICT, and public procurement.	Yes, funding and support available for local communities. Trend towards cities developing local CE actions.
Scotland (UK)	Safeguarding Scotland's Resources (Waste Prevention Programme, 2013) Circular Economy Strategy (2016)	Production and consumption stages, circular design. Waste planning and management, education, and raw material use.	Construction, manufacturing, food, bioeconomy, energy infrastructure.	Yes, with trialling of a cities and regions approach.

Source: Authors' own research from strategy documents and adaptation from Geerken et al. (2022)

3.2.3 Country-specific Circular Economy Initiatives: regional integration and practices

Building on the analysis of national CE strategies and the role of regions, this section explores specific practices from EoRPA countries, based on primary research and the work of the European Environment Information and Observation Network on CE in Europe.[34]

3.2.3.1 Austria

Austria demonstrates a strong commitment to CE through the integration of regional networks and financial incentives. Several national and regional platforms, including the CE Forum Austria and Circular Futures, foster knowledge exchange and competence-building. A notable example of an initiative is the **Repair Bonus programme**, funded by the EU Resilience and Recovery Facility, which offers eco-vouchers to citizens for repairing household appliances such as smartphones and dishwashers. By 2022, over 78,000 repair vouchers had been issued, incentivising repair over replacement.

Regional CE efforts in Austria also emphasise waste reduction and sustainable consumption. The **Urban Mining Cadastre (UMKAT)** pilot project in Graz maps anthropogenic deposits in buildings, identifying potential materials for reuse. Additionally, Austria's **Resourceneffiziente Gemeinde** project promotes resource efficiency at the local level, offering workshops and interactive tools for municipalities to assess and improve their resource usage. The focus on both urban and rural areas reflects a comprehensive approach to integrating CE principles across diverse regions.

3.2.3.2 Finland

Finland has developed an advanced regional approach to CE, exemplified by its **CIRCWASTE** initiative, a seven-year project involving 20 partners aimed at reducing waste and improving material efficiency. This project operates across five key regions, including Southwest Finland and Karelia, where regional stakeholders collaborate to create roadmaps for waste reduction and resource management. Additionally, the **FISU Network** (Finnish Sustainable Communities) connects municipalities aiming for carbon neutrality and zero waste by 2050, supported by the Finnish Environment Institute.

In rural regions like Lapland, Finland's **Model on Sustainable Green Economy** project focuses on developing local-level sustainability indicators, integrating bioeconomy principles to reduce fossil energy demand through local biomass energy production. This regionalised approach to CE not only drives waste reduction but also strengthens local economies by creating green jobs and fostering sustainable industries.

3.2.3.3 France

France integrates CE into regional policies through various innovative programmes. The **National Programme for Inter-business Synergy** (PNSI) promotes industrial symbiosis, facilitating collaborations between businesses in regions like Brittany and Normandy to optimise resource use and minimise waste. This initiative brings businesses together through workshops to identify synergies, such as reusing industrial by-products.

France's **Regional Plans for Waste Prevention and Management** also play a significant role, with local authorities required to develop action plans that incorporate CE goals. Regions like Aquitaine have gone further by embedding CE into their broader economic strategies, supporting sustainable supply chains, eco-design, and industrial symbiosis. Additionally, the **Zero Waste, Zero Wastage** initiative encourages municipalities to engage local stakeholders in waste reduction efforts, such as Roubaix's programme that mobilises families to halve their annual waste production.

3.2.3.4 Germany

Germany's regional CE initiatives complement its federal efforts. The German "**Circular Rural Regions"** pilot, a part of the Territorial Agenda 2030, supports rural areas in developing CE models between 2024 and 2027. At the state level, initiatives like the **Hessian ReUse Network** promote the reuse of products, fostering synergies between recyclers and consumers.

North Rhine-Westphalia's **Circular Economy and Resource Efficiency Programme** supports businesses in adopting circular practices, providing funding for novel recycling technologies. Moreover, the **Repair Bonus** in Thuringia encourages residents to repair household electronic devices by reimbursing up to 50 percent of repair costs, promoting a shift away from a throwaway culture.

Other collaborative initiatives worth highlighting are the **BiookonomieRevier** initiative in the Rhenish mining district, aimed to create a model region on bioeconomy and circular business models in collaboration with regional stakeholders, and the **Lippe zirkular** that focuses on circular construction and CE-related education initiatives.

3.2.3.5 Italy

Italy's regional CE practices are diverse. In **Emilia-Romagna**, the **Green Economy and Sustainable Development project** has piloted industrial symbiosis, fostering cross-sector collaboration to turn agro-industrial waste into valuable products. This initiative connects production sectors, research, and local authorities to implement circular models that minimise waste and encourage resource reuse. Also, the **Ecoinnovation Sicily project** created Italy's first industrial symbiosis platform, focusing on key sectors such as waste electrical and electronic equipment (WEEE) and plastics. The Apulia region has prioritised wastewater reuse, investing

approximately €120 million in projects to recycle treated wastewater for agriculture and industry.

3.2.3.6 Netherlands

The Netherlands employs a highly collaborative, regionalised approach to CE, centred around its **Green Deal** framework. This initiative facilitates partnerships between businesses, local governments, and civil society to address regional economic profiles. Provinces such as Friesland and North Brabant have developed action plans focusing on agriculture, biomass, and manufacturing. Additionally, the **City Deal Circular City** brings together cities, ministries, and knowledge institutions to accelerate CE transitions in at a local and regional level, with local governments piloting projects like **Schiphol Airport's** circular waste management system.

In the **Amsterdam Metropolitan Area**, regional strategies focus on closing loops for raw materials and boosting product reuse through initiatives like separate household and industrial waste collection. This is echoed in the **Circles initiative in East Netherlands**, which seeks to create industrial symbioses in the region and is supported by the regional business development organisation. These efforts are integral to the national strategy, emphasising circular business models and collaboration across governance levels to stimulate economic and environmental sustainability.

3.2.3.7 Norway

In Norway, local authorities are responsible for managing household waste. Regional authorities are also integrating CE into broader policy frameworks. For example, **inter-municipal waste management companies** have developed advanced sorting and processing systems that help meet Norway's national CE goals.

The **Romerike Biogas Plant** near Oslo also exemplifies regional investment in green technologies, converting food waste into biogas and fertiliser. Moreover, the **RoAF sorting plant**, which utilises advanced near-infrared technology, demonstrates how Norwegian municipalities are innovation is being pursued to increase recycling rates and reduce landfill dependence.

3.2.3.8 Poland

Poland's regional CE efforts are gaining traction, particularly through initiatives like the **National Fund for Environmental Protection and Water Management (NFEP & WM)** pilot programme. This programme, which operates in five municipalities including Krasnobród and Wieluń, focuses on circular solutions for households, agriculture, and municipal management. The initiative promotes separate waste collection, material and water savings, and eco-friendly public transport, serving as a model for future CE projects across Poland.

Furthermore, Poland's **regional waste management plans** integrate CE principles by standardising waste collection processes and establishing repair points at municipal collection centres. In regions like Łódzkie and Podkarpackie, these centres help extend product lifecycles by offering repair services, supporting Poland's transition to CE from the ground up.

3.2.3.9 Portugal

Portugal's regional CE efforts are deeply embedded in its waste management and sustainability practices. Portugal's **National Action Plan for the Circular Economy** promotes CE at a regional level through projects like **industrial symbiosis networks** and the **Circular Cities initiative**, encouraging municipalities to integrate CE principles into their waste, resource, and urban planning strategies. This is also evident in the **Eco-Innovation Action Plan** of Lisbon, which integrates CE principles into urban planning and industrial operations, such as improving the efficiency of waste management in the city's industrial areas.

3.2.3.10 Sweden

Sweden's regional CE activities commonly involve networks and organisations that collaborate with local authorities on environmentally sustainable consumption. The Swedish Agency for Economic and Regional Growth is tasked with assisting regions in **transforming local economies to embrace CE principles**, leveraging investment grants and research. These initiatives typically focus on areas such as waste prevention, local travel, energy efficiency, and urban cultivation.

Sweden has also made grants available for **advanced system solutions in urban environments**, with SEK 68 million (€6.8 million) allocated for projects like biogas chains and water recycling systems. The **Platform for Sustainable Urban Development**, involving multiple government agencies, aims to enhance cooperation and knowledge-sharing between municipalities and regions, fostering the transition to circular, sustainable cities. This platform strengthens regional engagement with CE principles and supports long-term green growth initiatives.

3.2.3.11 Switzerland

Switzerland's **New Regional Policy (NRP)** promotes sustainability through regional development projects. The NRP, which focuses on mountain, rural, and border regions, supports the structural transition of these areas by fostering competitive, circular, and resource-efficient businesses. The **2030 Sustainable Development Strategy** emphasises sustainable consumption and production as one of its three priority topics. The document also refers to CE work underway under the parliamentary initiative 20.433 "Strengthening the Swiss circular economy", and CE-related actions planned for the next few years. Since the 2016-19 Sustainable Development Strategy, all federal agencies are called upon to contribute to its implementation, with cantons and municipalities assuming key roles in waste management and promoting CE. Regional variations in CE implementation reflect Switzerland's decentralised political structure

and the recognition of regional variation in terms of resources and capabilities. But the shared emphasis on sustainability and resource efficiency is consistent across the country.

3.2.3.12 United Kingdom: England

In England, regional initiatives led by organisations like the **Waste and Resources Action Programme (WRAP)** drive CE efforts. WRAP supports local governments and communities in adopting circular models, with programmes such as the **Litter Innovation Fund** and **Financial Support for Local Authorities**, which help implement recycling services and pilot projects that encourage resource efficiency.

Rural regions also benefit from initiatives like the **Rural Community Energy Fund (RCEF)**, which promotes the development of renewable energy projects that have both economic and environmental benefits. These regional efforts reflect England's commitment to embedding CE principles into local governance and waste management practices, even in the absence of a national framework.

3.2.3.13 United Kingdom: Scotland

Scotland has made significant efforts to integrate CE principles at the national and regional level. Its **Circular Economy Cities and Regions programme** supports the transition to circular models in urban areas like **Glasgow**, **Edinburgh**, and **Tayside**, leveraging the density of populations and resources to create efficient recycling, reuse, and reverse logistics systems. These efforts are supported by **Zero Waste Scotland**, which provides funding and guidance to local authorities and businesses to foster cross-sector collaboration. The **Zero Waste Towns** initiative has expanded from rural communities like **Dunbar** to higher-density urban areas in **Perth** and **Edinburgh**. These towns aim to drastically reduce waste by fostering community engagement, promoting reuse, and establishing sustainable waste management practices.

Examples of regional CE initiatives highlight the diversity of approaches across Europe. **Austria**, **Finland**, and the **Netherlands** have implemented innovative projects ranging from industrial symbiosis to regional waste reduction plans. These efforts demonstrate how regional strategies can complement national policies, fostering local innovation and collaboration in the transition to CE.

4 IMPLEMENTING THE CIRCULAR ECONOMY

Implementing CE requires a systemic approach that engages stakeholders at multiple levels, from regional governments to SMEs. The transition towards circularity relies heavily on the capacity of regions and cities to serve as innovation hubs for sustainable practices. These sub-

national entities play a key role in embedding circular principles into local economies, infrastructure, and governance, but they also face significant challenges that require coordinated solutions.

Equally critical to this transition are the businesses operating within these regions, particularly SMEs, which form the backbone of many local economies. Business model innovation, collaboration within networks, and the establishment of public-private partnerships are all essential to enabling CE. This section explores the importance of regions and cities in driving CE adoption, the challenges they face, and the vital role of businesses and networks in fostering a sustainable economic transformation.

4.1 The Importance of Regions and Cities

Regions play an important role in CE transition, capable of identifying and addressing key challenges that often necessitate inter-institutional policy responses across various governance levels. Moreover, regions play a key role in supporting the implementation of both national and EU strategies, laws, and regulations, while also coordinating local actors (Arsova et al., 2022; Morgan & Henderson, 2002).

Indeed, regions and cities are frequently recognised as pioneers in the sustainability transition. They often initiate changes before the formulation of national policies, a phenomenon attributed to several factors: their manageable scale and controllable economic systems; their proximity to environmental, social, and economic issues; their ability to leverage the local experience of relevant stakeholders (Florida, 1998; Morgan & Henderson, 2002). Furthermore, the OECD (2020; 2023) has emphasised the need for a holistic and systemic approach, where cities and regions act as facilitators and enablers of CE practices, working in close coordination with businesses, national governments, and other stakeholders.

Some researchers (Arsova et al., 2022; Strat et al., 2018) argue that the regional circular economy (RCE) serves as the cornerstone of a functional global CE. However, it is important to note that the adoption of CE at the regional level remains largely underexplored and is in its nascent stages (Arsova et al., 2022; Dąbrowski et al., 2019). Because of this, consideration must be given to implementation.

4.1.1 Challenges in Implementation

Cities and regions face numerous and multifaceted challenges in promoting and implementing CE strategies. A survey of 51 cities and regions highlighted several key areas of difficulty (OECD, 2020):

	**Financial gaps:** a significant majority (73 percent) of surveyed entities reported insufficient funding as a major challenge. Other financial hurdles included perceived financial risks (69 percent), lack of critical scale for business and investments (59 percent), and limited private sector engagement (43 percent).
	**Regulatory gaps**: inadequate regulatory frameworks and inconsistent regulations across different levels of government pose significant challenges, reported by 73 percent and 55 percent of respondents respectively. The report highlights a lack of clear guidelines for the use of sludge, reclaimed water, and recycled materials in line with health and ecological standards; inadequate frameworks for material reuse and waste categorisation; a price-focused approach in public procurement processes; and local regulations that often fail to support innovative projects or pilot schemes.
	**Policy gaps**: the absence of a holistic vision for CE implementation was identified as a major obstacle by 67 percent of respondents. This is often attributed to poor leadership, inadequate coordination, or a lack of political will.
	**Awareness gaps**: cultural barriers (67 percent), lack of awareness (63 percent), and inadequate information for decision-making (55 percent) were identified as significant challenges. These gaps affect policymakers, businesses, and residents alike, hindering the adoption of sustainable consumption patterns and innovative business practices.
	**Capacity gaps**: a majority (61 percent) of surveyed cities and regions reported a lack of human resources skilled in circular models as a significant challenge in CE implementation.

These findings highlight the need for comprehensive strategies that address not only technical and financial aspects but also cultural, educational, and capacity-building dimensions.

Regions and cities are central to implementing CE principles, given their proximity to key stakeholders and their role in managing economic and environmental systems. Local authorities are pivotal in aligning regional policies with national strategies, fostering partnerships, and piloting sustainable initiatives tailored to their specific challenges and opportunities. Despite their critical role, regions and cities face significant challenges in

adopting CE practices. Financial constraints, regulatory gaps, and a lack of clear policy vision hinder progress. Additionally, cultural barriers and limited human resources with expertise in CE exacerbate these issues. Addressing these challenges requires comprehensive strategies that combine technical, financial, and capacity-building measures.

4.2 The Role of SMEs, Business Models, and Networks

The transition to CE involves significant shifts at various levels, and the meso and micro-level – where industrial parks, companies and households operate – play a key role. This section examines the importance of innovative business models, and particularly the barriers and opportunities for SMEs in CE, as they are a significant component of national and regional economies. It also considers the role of networks in facilitating this transition.

4.2.1 Business Model Innovation

Business model innovation is emerging as a critical pathway to achieving the necessary socio-technical transitions for CE (Geissdoerfer et al., 2017). Traditional business models, which are often linear – extracting raw materials, producing goods, and generating waste – are incompatible with CE principles. In contrast, circular business models prioritise resource efficiency, reuse, and recycling, turning waste into valuable inputs for other processes.

Several case studies illustrate the potential of innovative and circular business models. One notable example of business model innovation is the **Kalundborg Eco-industrial Park** in **Denmark**, which has promoted industrial symbiosis by waste products from one company being utilised as resources by another (Tashtamirov, 2023). This type of initiative has been integrated in several national CE strategies, as evidenced in the previous section of this report. The closed-loop system it creates not only reduces waste and resource consumption but also creates jobs and economic opportunities in regions. It is an ecosystem approach where businesses work together to optimise resource use and minimise waste through synergies across different sectors.

Similarly, companies like **KCP Ltd.** in **Scotland**, **Philips** in the **Netherlands** and **Stora Enso** in **Finland** have implemented circular business models that have led to reduced environmental impact and increased profitability (Tashtamirov, 2023). For KCP Ltd., the implementation of a circular model resulted in a 40 percent reduction in waste and a 30 percent reduction in energy consumption. For Philips, it resulted in a 7 percent increase in profitability and a 60 percent reduction in its carbon footprint. For Stora Enso, it led to a 37 percent reduction in water usage and a 49 percent reduction in greenhouse gas emissions. This demonstrates that circular practices can align with economic growth objectives.

4.2.2 Challenges and Opportunities for SMEs in the Circular Economy

SMEs face substantial challenges in adopting CE practices. Research indicates that these enterprises encounter several significant barriers, including limited financial resources, insufficient awareness of circular economy principles, inadequate regulatory support, and technical constraints (Fonseca & Baugh, 2024; Rizos et al., 2016). While SMEs are crucial for advancing CE, adoption remains limited in **Switzerland**, with only around 10 percent of companies engaging in circular practices (SanuDurabilitas, 2024).

The implementation of CE practices and the change in business models often requires upfront investment in new technologies and systems, which many SMEs find difficult to afford without targeted support. Systems may also be more targeted towards larger scale operations, which may limit access to SMEs, and therefore require more ecosystem approaches for feasibility (Fonseca & Baugh, 2024). Additionally, navigating often-complex regulatory frameworks can be a challenge, particularly when policies are not designed with smaller businesses in mind.

Despite these challenges, SMEs are uniquely positioned to drive circular innovation. Their smaller scale allows for more agile responses to changing market conditions and sustainability demands. They are also often embedded within local communities and supply chains, making them crucial actors in regional and sectoral CE ecosystems. When supported by targeted policies, funding, and training, SMEs can become key drivers of the transition to more sustainable production and consumption patterns (Fonseca & Baugh, 2024; Rizos et al., 2016). A study on the **Swiss** context suggests that SMEs pioneering CE overcome hurdles by leveraging local resources, adopting innovative business models, and forming collaborative networks (SanuDurabilitas, 2024). These practices enable them to navigate regulatory and financial barriers effectively.

Several Interreg projects are exploring the sustainable transition, and specifically the role of companies like SMEs in this shift. One example is the **Interreg Europe project COMMIT** (Low Carbon SME Development and Transition, April 2024 - March 2028). It aims to guide local and regional authorities in creating SME support ecosystems, focusing on improving SME access to information, innovation, finance, and skills.[35]

4.2.3 Networks and Individual Actors as Enablers of the Circular Economy

Networks provide stakeholders with access to knowledge, resources, and partnerships that are critical for overcoming the barriers to CE adoption. These networks can be formal, such as industry associations and public-private partnerships, or more informal, such as peer-to-peer networks that facilitate the exchange of best practices and innovative solutions. One of the key factors in enabling the transition to CE is the creation of a supportive ecosystem where businesses like SMEs can collaborate, share resources, and jointly address common challenges, as in the example of an eco-industrial park.

The SanuDurabilitas (2024) study on the Swiss context highlights the importance of infrastructure and spatial planning in enabling circular business models for SMEs. Recommendations include establishing temporary storage hubs for materials awaiting reuse, creating eco-yards to support remanufacturing and repair activities, and fostering reverse logistics systems. Collaboration between public and private sectors, such as municipal real estate management and logistics companies, can provide the necessary support for SMEs to scale circular practices effectively.

The power of networks in promoting CE practices is also demonstrated by initiatives between higher education institutions and the public and/or private sector. For instance, researchers from **Swiss** universities (Bern, Neuchâtel, and Basel) are engaged in theoretical and applied research on the circular economy, with links to policy-making bodies such as SECO. This **interface between academia and policymakers** provides a strong foundation for aligning business strategies with national and regional circular economy goals. Initiatives include:

- **CE in construction**: The CE group at ETH Zurich's SusTec is involved in the SWIRCULAR project, which aims to transform the Swiss construction sector by integrating digitalisation and CE principles. This project involves multiple research institutes and industry partners to create a sustainable digital ecosystem for construction.[36]
- **CE Status Report:** A collaborative effort between the Berner Fachhochschule (BFH) and ETH Zurich focuses on compiling a comprehensive report on the status of CE in Switzerland. This project aims to identify untapped potential and discuss strategies for enhancing circularity across various sectors.[37]

Moreover, educational initiatives, such as the Circular Innovation and Sustainability Master's programme in Berne, which enrols 50 students annually, contributes to developing a skilled workforce, linking with industry and cultivating the expertise needed to implement and advance circular practices across various sectors.[38] The Zurich University of Applied Sciences (ZHAW) also offers a Master's programme in CE Management.[39] This interdisciplinary programme prepares students to manage the transition from a linear to a circular economy by combining technical, environmental, social, and economic dimensions.

4.2.3.1 Support Tools and Networks

A range of support tools and networks have been established at various levels to support the transition to CE. One of the key resources is **JASPERS**, which provides advisory services on solid waste and circular economy strategies to EU MS, alongside multi-country assignments to support specific CE actions. Additionally, the **Technical Assistance from the Cohesion for Transitions Groundwork** helps leverage synergies with other EU instruments, such as the Technical Support Instrument and DG REFORM.

Several platforms and initiatives foster collaboration and knowledge-sharing among stakeholders. The **European Circular Economy Stakeholder Platform**, established in 2017, serves as a hub for information exchange, hosting annual conferences and maintaining an online presence to facilitate policy dialogues, and the **EU Circular Economy Finance Support Platform**

provides critical financial insights. The **Circular Economy Coalition for Europe (CEC4EU-rope)** unites scientists and industry leaders to provide evidence-based information for decision-makers, and the **European Circular Economy Research Alliance (ECERA)**, founded in 2018, aims to pool expertise in CE practices.

Additional resources include the **Platform for Accelerating the Circular Economy (PACE)**, which tests and implements best practices globally; the **European Raw Materials Alliance**, initiated in 2020 as part of the New Industrial Strategy; and the **Circular Cities and Regions Initiative**. The **European Resource Efficiency Knowledge Centre (EREK)** and **GreenEcoNet** also contribute valuable insights and support for resource efficiency initiatives. The latter platform has created a marketplace and community of practice for green SMEs, helping them to access funding, training, and other incentives.

On an international scale, the **OECD's programme on the Circular Economy in Cities and Regions**[40] assists national and subnational governments in their transition efforts. The **International Platform on the Circular Economy** also provides an open forum for project leaders to share experiences and access various tools related to CE projects. This platform is designed for a diverse audience, including public entities, entrepreneurs, and large corporations, and promotes networking through collaborative spaces linked to five territorial platforms across **France**.[41]

In **Switzerland**, several CE networks have emerged. For example, **Circular Economy Switzerland**[42] brings together CE stakeholders from the private and public sector to promote collaboration and knowledge exchange in the field. The **CircularHub**[43] is another useful platform in the country, supporting research, innovation and knowledge exchange in the CE construction sector.

Networks and collaborations among businesses, governments, and other stakeholders are critical for enabling circular practices and overcoming barriers like limited financial resources and technical knowledge. Transforming traditional linear business models into circular ones is essential for advancing CE goals. Examples of successful circular business models, such as industrial symbiosis parks and closed-loop production systems, demonstrate how companies can achieve economic and environmental benefits.

SMEs face unique challenges in transitioning to CE practices, including financial limitations, regulatory complexity, and access to technology. However, their flexibility and integration within local supply chains make them vital actors in driving CE innovation. Targeted policies, funding, and training programmes are necessary to empower SMEs and unlock their potential to contribute to sustainable economic transformation.

5 PROGRESS, MONITORING AND CHALLENGES

Monitoring progress toward CE is crucial for evaluating the effectiveness of policies and strategies aimed at sustainable development. At the EU level, the **Circular Economy Monitoring Framework**[44] has been established to track advances in this area, with key indicators such as the circular material use rate, or circularity rate, serving as essential metrics. This indicator measures the proportion of materials that are recycled and reintegrated into the economy, providing a clear benchmark for circularity efforts. However, while these EU-wide indicators offer a cohesive framework for assessing progress, **country-level indicators can vary significantly**. Different countries may prioritise distinct aspects of circularity based on their unique economic structures, resource availability, and environmental goals (Geerken et al., 2022).

Despite a robust policy framework, **progress towards CE in the EU has been slower than anticipated**. While the EU has led globally on CE implementation with a circularity rate reaching 11.5 percent in 2022, this value indicates that the vast majority of resources are still not being circulated back into the economy. The European Court of Auditors (2023) revealed that between 2015 and 2021, the average circularity rate for EU MS (EU-27) increased by only 0.4 percentage points. At the same time, between 2012 and 2018, the number of jobs linked to the circular economy in the EU grew by 5 percent, reaching around four million, with a potential growth in 700 thousand new jobs and 0.5 percent EU GDP by 2030 if CE principles are applied (European Commission, 2020). Data from the CEAP 1 implementation report (European Commission, 2019) also indicates that funding has faced hurdles. Around 75 percent of the planned €7.1 billion in 2014-20 Cohesion policy funding for CE initiatives was directed towards waste management. However, overall planned spending decreased by 19 percent in the same period, highlighting the need for more targeted and sustained investment.

These figures can at least partly be explained by the **various challenges identified by MS in their transition to CE** (DG REGIO, 2024). Related to more technical elements, MS report a **lack of harmonised standards** for reused materials across countries, leading to inconsistencies that hamper both trade and widespread adoption of CE practices. This is compounded by the **relatively low market demand for secondary raw materials**, which stifles the economic viability of recycling and reuse initiatives. On a more institutional side, the primary obstacles highlighted relate to **gaps in capacity-building**, where both public institutions and private sectors often lack the necessary expertise to fully implement CE practices; **regulatory barriers**, as many current regulations are not designed to accommodate innovative circular business models, creating friction for businesses attempting to adopt sustainable solutions; and the barriers posed by existing institutional and organisational structures, which are frequently not geared towards fostering the kind of cross-sectoral collaboration that CE requires.

Regarding business progress, OECD data indicates that over **90 percent of SMEs engage in some type of environmental or social sustainability initiative**, ranging from 61 percent in recycling or reusing materials to 52 percent in reducing energy and the consumption of natural

resources. However, **SMEs' sustainability efforts are still significantly lower compared to larger firms** (OECD Centre for Entrepreneurship, SMEs, Regions and Cities, 2023). Their engagement in CE initiatives remains a challenge, and less than one in four SMEs in the EU evaluate their societal impact. A **Swiss** policy brief on CE business models echoes this greater need for corporate engagement in CE, with data suggesting only 10 percent of companies in the country are integrating CE principles (SanuDurabilitas, 2024), despite significant progress in certain measures (e.g. 27 percent of these companies reduced material consumption in production processes).

Measuring progress toward CE requires robust monitoring systems, such as the EU's Circular Economy Monitoring Framework. Progress on CE remains slow due to limited data, funding challenges, and uneven adoption across regions. Improving data systems and ensuring targeted investments are vital for overcoming these barriers and advancing CE implementation.

6 POLICY CHALLENGES, QUESTIONS AND RECOMMENDATIONS

The analysis has identified several key challenges in the transition to CE. Firstly, the overall **pace of adoption has been slower** than initially envisioned. Secondly, there are significant **disparities in circularity rates** and implementation across MS, indicating uneven progress. Thirdly, stemming from multiple existing CE conceptualisations, some strategies tend to **emphasise less impactful stages of the product life cycle**, such as recycling, rather than addressing more fundamental changes in product design and business models. MS have also reported capacity building gaps and regulatory barriers as significant obstacles to implementing CE initiatives. Addressing these challenges will be crucial for accelerating progress.

The EU is focusing on several key areas to overcome these challenges and advance its circular economy agenda. These include **strengthening the sustainable product policy framework, empowering consumers and public buyers, and focusing on key product value chains** such as electronics, batteries, vehicles, packaging, textiles, and construction. Additionally, efforts are being made to improve waste management, boost markets for secondary raw materials, ensure circularity works for people, regions, and cities, and promote circular economy efforts on a global scale.

Nonetheless, it is important to consider that for transformation to occur, **multiple governance frameworks must align, economic incentives must be created, and institutional capacities developed**. The integration of CE principles into regional policy involves rethinking traditional economic activities and infrastructure to align with sustainable development goals. The

growing popularity of the circular economy model stems from the opportunity it presents for places, particularly regions and cities, to develop sustainable economies that are resilient to environmental and economic shocks, by minimising the input of non-renewable resources and maximising the reuse and recycling of materials. While its multiple conceptualisations reflect the model is still largely under discussion, they also demonstrate its flexible nature, allowing for different interpretations and applications depending on regional needs and priorities. For policy actors, this means that implementing CE principles requires a balanced approach that considers the specific aspects of circularity most relevant to their country and region.

Some recommendations for countries seeking to develop their CE strategic approach are presented:

- **Develop CE standards:** To address the issue of lack of a harmonised CE definition and standards for CE practices across countries and regions, the development of a national strategy based on EU guidelines and other national best practices can ensure consistency and lower risks in implementation. From a regulatory perspective, countries could benefit from a more integrated approach to circularity, mirroring the European Union's CEAP, which promotes a comprehensive lifecycle approach from product design to end-of-life management. Incorporating CE goals into existing regional development strategies, particularly in sectors such as construction, manufacturing, and waste management, would ensure a more comprehensive transition.

- **Tailor and adapt strategies to different regional contexts:** strategies need to consider the unique economic, social and environmental contexts of different regions, recognising their distinct resources, industries, and challenges. National strategies should provide an overarching framework for CE, but they must remain flexible enough to allow regional and local authorities to shape policies that align with their specific contexts. Integrating CE into regional policy and localised development strategies should also include targeted actions in key areas such as waste management, energy use, and local infrastructure. Regions can benefit from localized assessments of resource cycles, enabling authorities to identify specific gaps and opportunities. Mountain areas, rural regions, and cities will have different needs in their CE transition. For example, urban areas may focus on circular solutions for managing high volumes of waste and energy demand, while rural regions might explore circular bioeconomy practices, including the valorisation of organic waste and renewable energy projects.

- **Provide financial resources for innovation:** financial barriers for SMEs remain significant, as many lack the resources to invest in new technologies and business models. Regional policies could incorporate targeted financial incentives for SMEs, including subsidies for innovation in circular business models and tax breaks for resource-efficient practices.

- **Promote platforms and exchange:** enable CE networks, fostering strong public-private partnerships and other platforms for developing CE solutions and knowledge sharing could be of value. This can draw inspiration from initiatives such as the Cohesion Fund, which has successfully driven CE projects in less-developed regions.

- **Develop sector-specific policies:** focus on resource-intensive industries, such as manufacturing and construction, could leverage similar models of public investment to accelerate circular practices.

- **Develop education and capacity-building initiatives:** regional hubs for CE innovation, have been established in countries like Finland, providing training and knowledge exchange to local governments and businesses. Establishing regional centres of excellence for circularity, particularly in rural and industrial regions, could play an important role in creating the necessary skills and expertise to drive CE.

For **Switzerland**, specifically, the following recommendations are proposed to advance CE thinking and implementation in regional policy:

- **Strengthen regional CE portfolios:** Switzerland should integrate circular economy (CE) principles into its regional development strategies under the New Regional Policy (NRP). By embedding CE objectives tailored to rural, mountainous, and border areas, the country can enhance the competitiveness of these regions while promoting resource efficiency. For example, establishing regional hubs for industrial symbiosis could foster collaboration among businesses to optimise resource use and encourage innovation in circular practices.

- **Integrate CE into cross-border collaborations:** given Switzerland's central location in Europe, fostering cross-border collaborations with neighbouring countries like France, Germany, and Italy is essential. These partnerships can tackle shared challenges such as waste management and stimulate the development of joint solutions for CE. Leveraging initiatives like INTERREG, Switzerland could co-develop industrial symbiosis platforms or eco-innovation projects, benefiting from knowledge exchange and collective investment in CE technologies.

- **Enhance monitoring and data systems for CE:** CE monitoring varies largely across countries, and it can largely depend on the CE definition that is being considered. Switzerland should develop a comprehensive national framework for monitoring circular economy progress, incorporating key metrics such as material reuse rates and recycling efficiency, and considering the metrics used across Europe. A robust data system is critical for evaluating the impact of CE initiatives and identifying areas for improvement. Drawing from the EU's Circular Economy Monitoring Framework, Switzerland can adapt relevant indicators to suit its unique context, enabling targeted policy adjustments.

- **Incentivise innovation and business model transformation:** support for SMEs and start-ups is crucial to foster innovation and enable the adoption of circular business models in key sectors such as construction, plastics, and bioeconomy. By providing financial incentives and technical assistance, Switzerland can address barriers that SMEs face in transitioning to CE practices (as mentioned in SanuDurabilitas, 2024). Inspiration can be drawn from Finland's CIRCWASTE programme, which promotes regional CE roadmaps and helps build SME capacity.

- **Embed CE principles in public procurement:** public procurement represents a significant lever for driving circular economy practices. Switzerland should mandate the inclusion of CE criteria in public procurement processes, ensuring that life-cycle considerations and sustainable materials are prioritised. For instance, adopting a framework like Ireland's Green Public Procurement strategy would encourage innovation while fostering market demand for circular products and services.

Addressing these challenges requires a coordinated and multi-level policy approach, where national and regional actors work collaboratively to overcome institutional, financial, and technical barriers. As argued by Henrysson & Nuur (2021), the institutional environment can be

both a driver and a barrier to CE transition, and for this reason it is crucial to create the appropriate supportive environment and strategic pathways for transformation.

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ANNEX: CIRCULAR ECONOMY SCHEMES FROM EC STATE AID REGISTER

Case number	Case title	Country	Aid instrument	Start date	End date
SA.107498	MIMAM - PERTE in Circular Economy: aid for the promotion of the circular economy (MRR)	Spain	Direct grant/ Interest rate subsidy	08.12.2022	30.06.2026
SA.104904	ENER - CEEAG on Hydrogen 2022 - Industry Wave	Spain	Direct grant	30.06.2023	31.12.2040
SA.63972	INV - Ayudas para la realización de proyectos de ecoinnovación circular 2021	Spain	Direct grant/ Interest rate subsidy	01.07.2021	31.12.2021
SA.63481	INV - Actividades de investigación industrial y desarrollo experimental en proyectos de Economía Circular, en el ámbito de los residuos 2021-2023	Spain	Direct grant/ Interest rate subsidy	21.04.2021	31.12.2023
SA.62203	NL_BZK_CSDO_OV Adhoc subsidie project Dutch Circular Polymer Valley (DCPV)-Regiodeal regio Zwolle	NL	Direct grant/ Interest rate subsidy	18.02.2021	
SA.59662	INV - Fomento de la Economía Circular	Spain	Direct grant/ Interest rate subsidy	19.10.2020	31.12.2021
SA.58712	Programa "Ambiente, Alterações Climáticas e Economia de Baixo Carbono" Aviso de Concurso#2 - Projetos para a promoção da Economia Circular no Setor da Construção	Portugal	Direct grant/ Interest rate subsidy	09.09.2020	
SA.58711	Programa "Ambiente, Alterações Climáticas e Economia de Baixo Carbono" Aviso de Concurso#2 - Projetos para a promoção da Economia Circular no Setor da Construção	Portugal	Direct grant/ Interest rate subsidy	17.08.2020	
SA.58710	Programa "Ambiente, Alterações Climáticas e Economia de Baixo Carbono" Aviso de Concurso#2 - Projetos para a promoção da Economia Circular no Setor da Construção	Portugal	Direct grant/ Interest rate subsidy	10.09.2020	

SA.58709	Programa "Ambiente, Alterações Climáticas e Economia de Baixo Carbono" Aviso de Concurso#2 - Projetos para a promoção da Economia Circular no Setor da Construção	Portugal	Direct grant/ Interest rate subsidy	09.09.2020	
SA.58109	INV - Ayudas para la realización de proyectos de ecodiseño y demostración en economía circular y ecoinnovación estratégica durante el ejercicio 2020.	Spain	Direct grant/ Interest rate subsidy	01.07.2020	31.12.2020
SA.55091	INV - Ayudas para la realización de proyectos de ecodiseño, demostración en economía circular y ecoinnovación durante el ejercicio 2019.	Spain	Direct grant/ Interest rate subsidy	24.07.2019	31.12.2019
SA.54314	INV - Programa I+C=+C 2019 - Fomento de la economía circular	Spain	Direct grant/ Interest rate subsidy	13.04.2019	12.09.2019
SA.53529	Subsidiebeschikking Stichting Holland Circular Hotspot	NL	Direct grant/ Interest rate subsidy	06.02.2019	
SA.52539	ERA-MIN Joint Call 2018 - RAW MATERIALS FOR SUSTAINABLE DEVELOPMENT AND THE CIRCULAR ECONOMY	Italy	Direct grant/ Interest rate subsidy	30.11.2018	30.11.2020
SA.52438	NL_BZK_CSDO_LB Circular PET Plastic Upcycling B.V.	NL	Direct grant/ Interest rate subsidy	01.11.2018	
SA.51686	INV - Ayudas para proyectos de demostración en economía circular durante el ejercicio 2017.	Spain	Direct grant/ Interest rate subsidy	13.07.2017	31.12.2017
SA.51656	INV-Línea de subvenciones a Núcleos de investigación industrial y desarrollo experimental en proyectos de Economía Circular, específicamente en el ámbito de los residuos.	Spain	Direct grant/ Interest rate subsidy	09.07.2018	31.12.2020
SA.50447	INV - Programa I+C=+C 2018 - Fomento de la economía circular	Spain	Direct grant/ Interest rate subsidy	02.02.2018	26.09.2018
SA.50339	NL_BZK_CSDO_NB Circular agriculture Sint Anthonis - Boxmeer	NL	Subsidised services Direct grant	19.02.2018	01.12.2020

SA.49145	INV - Ayudas para proyectos de demostración en economía circular durante el ejercicio 2017.	Spain	Direct grant/ Interest rate subsidy	13.07.2017	31.12.2017
SA.48898	NL_BZK_CSDO_LB Circular Science Centre	NL	Direct grant/ Interest rate subsidy	28.07.2017	
SA.115791	Sistema de Incentivos à Economia Circular	Portugal	Direct grant/ Interest rate subsidy	09.08.2024	31.12.2026
SA.115645	Belgium builds back circular (troisième appel à projets)	Belgium	Direct grant/ Interest rate subsidy	04.10.2023	31.07.2026
SA.115363	MIMAM - Proyectos de eficiencia energética y economía circular de las empresas turísticas (MRR)	Spain	Direct grant/ Interest rate subsidy	28.07.2024	31.12.2026
SA.115343	NL_BZK_CSDO_OV project Circular Manufacturing Program	NL	Direct grant/ Interest rate subsidy	25.07.2024	
SA.114319	ENER - Proyectos de eficiencia energética y economía circular de empresas turísticas (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	31.12.2026
SA.114026	MIMAM - Impulso de la economía circular en los sectores del textil y la moda y del plástico (MRR)	Spain	Direct grant/ Interest rate subsidy	10.04.2024	30.09.2025
SA.113878	INV - Programa de Fomento de la Economía Circular	Spain	Direct grant/ Interest rate subsidy	06.04.2024	31.12.2025
SA.113732	MIMAM - Transición de la actividad industrial hacia una economía circular.	Spain	Direct grant/ Interest rate subsidy	01.01.2024	31.12.2026
SA.112456	MIMAM - Actuaciones de eficiencia energética y economía circular en empresas turísticas (MRR)	Spain	Direct grant/ Interest rate subsidy	13.01.2024	31.12.2024
SA.112234	FöRL Ressourceneffizienz und Circular Economy [NW]	Germany	Direct grant/ Interest rate subsidy	01.01.2024	30.06.2027
SA.111133	ENER - Proyecto de Eficiencia Energética y Economía Circular en establecimientos de alojamiento turístico (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	31.12.2026

SA.111123	ENER - Mejora de la eficiencia energética y economía circular en establecimientos de alojamiento turístico (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	31.12.2026
SA.110940	MIMAM - Proyectos de Eficiencia Energética y Economía Circular de las Empresas Turísticas de Aragón (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	31.12.2026
SA.110915	ENER - Programa 3: Instalaciones innovadoras de reciclaje de palas de aerogeneradores (Programas Repotenciación Circular) (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	30.06.2026
SA.110910	ENER - Programa 1: Repotenciación de instalaciones eólicas (Programas Repotenciación Circular) (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	30.06.2026
SA.110909	ENER - Programa 2: Renovación tecnológica y medioambiental de minicentrales hidroeléctricas de hasta 10 MW, (Programas Repotenciación Circular).(MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2024	30.06.2026
SA.109675	EZK-B&I-VI-RVO-Circular-Plastics-NL	NL	Direct grant/ Interest rate subsidy	12.10.2023	01.09.2028
SA.109627	INV - Innovación en economía circular.	Spain	Direct grant/ Interest rate subsidy	27.09.2023	31.12.2023
SA.107121	INV - Fomento de la inversión en economía circular en proyectos empresariales	Spain	Direct grant/ Interest rate subsidy	23.03.2023	31.12.2026
SA.106963	MIMAM - Proyectos de Eficiencia Energética y Economía Circular de las Empresas Turísticas de Aragón (MRR)	Spain	Direct grant/ Interest rate subsidy	01.04.2023	31.12.2023
SA.106803	INV - Programa de fomento de la economía circular	Spain	Direct grant/ Interest rate subsidy	24.02.2023	31.12.2024
SA.106763	ENER - Proyecto de Eficiencia Energética y Economía Circular en establecimientos que realicen la actividad de alojamiento turístico (MRR).	Spain	Direct grant/ Interest rate subsidy	02.01.2023	31.12.2023
SA.106632	INV - Innovación en economía circular	Spain	Direct grant/ Interest rate subsidy	21.10.2022	30.06.2024

SA.106367	ECON - Implantación de soluciones avanzadas para el desarrollo de la economía circular	Spain	Direct grant/ Interest rate subsidy	01.03.2023	30.06.2023
SA.105950	MIMAM - Proyectos de eficiencia energética y economía circular de empresas turísticas (MRR)	Spain	Direct grant/ Interest rate subsidy	16.12.2022	29.11.2023
SA.105939	ENER - Proyectos de eficiencia energética y economía circular de empresas turísticas de Cataluña (MRR)	Spain	Direct grant/ Interest rate subsidy	17.01.2023	31.12.2023
SA.105937	ENER - Proyectos de eficiencia energética y economía circular de empresas turísticas, (MRR)	Spain	Direct grant/ Interest rate subsidy	30.12.2022	29.12.2023
SA.105508	CULT - Subvención destinada a proyectos de eficiencia energética y economía circular de empresas turísticas (MRR)	Spain	Direct grant/ Interest rate subsidy	01.01.2023	10.03.2023
SA.105335	NL_BZK_CSDO_Rotterdam_Verleningsbeschikking - Circular Maritime Technologies International B.V.	NL	Direct grant/ Interest rate subsidy	08.12.2022	
SA.104632	ENER - Subvenciones destinadas a proyectos de mejora de la eficiencia energética y economía circular en los establecimientos de alojamiento turístico (MRR)	Spain	Direct grant/ Interest rate subsidy	12.10.2022	31.12.2023
SA.104366	ENER - Ayudas a la inversión dirigidas a empresas para apoyar la transición de la actividad industrial hacia una economía circular	Spain	Direct grant/ Interest rate subsidy	29.08.2022	31.12.2023
SA.104117	INV.- Soluciones avanzadas para el desarrollo de la economía circular para el año 2022 en Galicia	Spain	Direct grant/ Interest rate subsidy	29.07.2022	30.12.2022
SA.102325	INV - Programa de Fomento de la Economía Circular	Spain	Direct grant/ Interest rate subsidy	10.02.2022	31.12.2023
SA.100784	NL_LNV_AGRO_PAV Leader in Circular Agriculture	NL	Direct grant Subsidised services		30.06.2023
SA.100468	INV - Realización de proyectos de I+D en cooperación internacional en el ámbito de las materias primas para el desarrollo sostenible y la economía circular. ERA-MIN 2021	Spain	Direct grant/ Interest rate subsidy	19.10.2021	31.12.2023

SA.100208	NL_BZK_CSDO KVW-00438-BlueCity Circular Water-R	NL	Direct grant/ Interest rate subsidy		
SA.100012	INV - Programa de fomento de la economía circular	Spain	Direct grant/ Interest rate subsidy	16.08.2021	31.12.2022

Source: https://competition-cases.ec.europa.eu/

Notes

[1] See https://www.iea.org/commentaries/reducing-the-impact-of-extractive-industries-on-groundwater-resources

[2] See https://ec.europa.eu/regional_policy/whats-new/panorama/2024/03/20-03-2024-cohesion-policy-powers-eu-circular-economy-shift_en#:~:text=With%20a%20%E2%82%AC%2012.5%20billion,focused%20on%20jobs%20and%20sustainability

[3] See more on OECD's Rural Agenda for Climate Action at https://www.oecd.org/en/topics/rural-development.html [Accessed on 16/09/2024]

[4] See more on the European Skills Agenda at https://ec.europa.eu/social/main.jsp?catId=1223&langId=en [Accessed on 16/09/2024]

[5] See more on the Social Economy Action Plan at https://social-economy-gateway.ec.europa.eu/eu-initiatives/seap_en [Accessed on 16/09/2024]

[6] See more on the European Green Deal at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en [Accessed on 16/09/2024]

[7] See more on the EU Plastics Strategy at https://environment.ec.europa.eu/strategy/plastics-strategy_en [Accessed on 16/09/2024]

[8] See more on the Waste Framework Directive at https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en [Accessed on 16/09/2024]

[9] See https://environment.ec.europa.eu/topics/waste-and-recycling/packaging-waste_en [Accessed on 16/09/2024]

[10] https://ec.europa.eu/regional_policy/policy/themes/environment/circular_economy_en

[11] https://cohesiondata.ec.europa.eu/stories/s/In-profile-EU-support-to-waste-management-2014-202/xqec-t5kv

[12] See Cohesion data portal on funding for the circular economy at https://cohesiondata.ec.europa.eu/stories/s/21-27-Circular-economy/t6h5-3fup#funding-for-circular-economy-and-waste-management-varies-between-member-states [Accessed on 20/9/2024]

[13] This is the aggregate amount from all policy objectives, including Interreg. More information at https://cohesiondata.ec.europa.eu/stories/s/FINAL-2021-2027-climate-story/mdt2-qvkd/ [Accessed on 20/09/2024]

[14] https://cohesiondata.ec.europa.eu/stories/s/21-27-Circular-economy/t6h5-3fup#funding-for-circular-economy-and-waste-management-varies-between-member-states [Accessed on 20/09/2024]

[15] Ibid.

[16] See the JTF regulation at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1056&qid=1694610663421 [Accessed on 20/09/2024]

[17] For more information on the Just Transition Mechanism, see https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en [Accessed on 20/09/2024]

[18] See https://ec.europa.eu/regional_policy/whats-new/panorama/2024/03/20-03-2024-cohesion-policy-powers-eu-circular-economy-shift_en

[19] See more on the Circular Cities and Regions Initiative at https://circular-cities-and-regions.ec.europa.eu/ [Accessed on 20/09/2024]

[20] The Accord is "a movement by European mayors committed to making cities cleaner and healthier". See more on the Green City Accord at https://environment.ec.europa.eu/topics/urban-environment/green-city-accord_en [Accessed on 20/09/2024]

[21] See more on the European Urban Initiative at https://www.urban-initiative.eu/ [Accessed on 20/09/2024]

[22] See more on the Urban Agenda for the EU at https://ec.europa.eu/regional_policy/policy/themes/urban-development_en [Accessed on 20/09/2024]

[23] See more on STREFOWA at https://programme2014-20.interreg-central.eu/Content.Node/STREFOWA.html [Accessed 20/09/2024]

[24] See more on the Circular Ocean project at https://circularocean.interreg-npa.eu/about-the-project/ [Accessed on 20/09/2024]

[25] See more on the Green-Tex project at https://keep.eu/projects/29492/Enhancing-Danube-Green-Text-EN/ [Accessed on 20/09/2024]

[26] See more on Circular WEEEP at https://keep.eu/projects/27723/Design-and-test-of-policies-EN/ [Accessed on 20/09/2024]

[27] See more on this objective of the Interreg Baltic Sea programme at https://interreg-baltic.eu/about/priorities-2021-2027/priority-3-climate-neutral-societies/3-1-circular-economy/ [Accessed on 20/09/2024]

[28] See the Commission's communication on State aid guidelines for climate, environmental protection and energy at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C_.2022.080.01.0001.01.ENG&toc=OJ%3AC%3A2022%3A080%3ATOC [Accessed on 20/09/2024]

[29] See more on the Circular Economy action plan at https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en [Accessed on 20/09/2024]

[30] See an overview of changes introduced with the revised State aid guidelines at https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_566 [Accessed on 20/09/2024]

[31] See Article 47 in https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32023R1315 [Accessed on 20/09/2024]

[32] See the Temporary Crisis and Transition Framework factsheet at https://ec.europa.eu/commission/presscorner/detail/en/fs_23_1575 [Accessed on 20/09/2024]

[33] See the search result in the State aid register at https://competition-cases.ec.europa.eu/search?caseInstrument=SA&caseTitleOrCompanyName=circular&pageSize=50&sortField=caseLastDecisionDate&sortOrder=DESC [Accessed on 20/09/2024]

[34] Access the Eionet Portal and the work on the circular economy in Europe at https://www.eionet.europa.eu/etcs/etc-ce/products/country-factsheets-on-resource-efficiency-and-circular-economy-in-europe [Accessed on 25/09/2024]

[35] See more on the Interreg Europe COMMIT project at https://www.interregeurope.eu/commit [Accessed on 26/09/2024]

[36] See https://sustec.ethz.ch/research/areas/circular-economy.html [Accessed on 26/11/2024]

[37] See https://www.bfh.ch/en/research/research-projects/2023-535-578-656/ [Accessed on 26/11/2024]

[38] See https://www.bfh.ch/en/studies/master/circular-innovation-and-sustainability/ [Accessed on 26/11/2024]

[39] See https://www.zhaw.ch/en/sml/study/master/circular-economy-management/ [Accessed on 26/11/2024]

[40] See more on this OECD platform at https://www.oecd.org/en/topics/circular-economy-in-cities-and-regions.html [Accessed on 25/09/2024]

[41] The general platform website can be accessed at https://www.economiecirculaire.org/index,en.html and this is one example of a territorial platform created https://www.grandpariscirculaire.org/ [Accessed on 25/09/2024]

[42] See https://www.circular-economy-switzerland.ch/ [Accessed on 26/11/2024]

[43] See https://circularhub.ch/ [Accessed on 26/11/2024]

[44] See the Circular Economy Monitoring Framework at https://ec.europa.eu/eurostat/web/circular-economy/monitoring-framework [Accessed on 25/09/2024]