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Resource efficiency and the circular economy in Europe 2019 – even more from less

An overview of the policies, approaches and targets of 32 European countries

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Dedication

This report is dedicated to the memory of the EEA's long-standing colleague Paweł Kaźmierczyk, project manager of this report, who passed away suddenly in 2019 before its completion. Paweł was both a knowledgeable colleague and a friend to many at the EEA, across Eionet and internationally. He will be missed.

To Paweł: mind, motor, motivator and master of even more from less

Key messages

- **A dynamic policy landscape.** Since the EU circular economy action plan was adopted in 2015, there has been a clear shift from a national policy development focus on resource efficiency policies towards the broader circular economy perspective.
- **Related, supportive and synergistic policies.** Although policies on resource efficiency, raw material supply and the circular economy have different focuses, all three are strongly related and mutually supportive, with resource efficiency and raw material supply addressing the relationships between nature and Europe's socio-economic system, and the circular economy addressing the socio-economic system itself.
- **Indicators, monitoring frameworks and targets.** The introduction of robust indicator frameworks that quantify progress towards a more circular economy is challenging, with countries showing widely different approaches and degrees of advancement. Specific targets for the circular economy have not been adopted yet, unless one considers existing waste targets as supportive of circular economy targets. Given the objectives and systemic challenges of a circular economy, it is not easy to define and implement the monitoring of generalised targets. It is arguably easier to define concrete targets within specific policies, for example those related to waste, products or specific sectors.
- **Changing role of governments.** The need for stakeholder involvement and societal buy-in is growing. In some countries, the role of government is slowly shifting from that of regulator and enforcer to that of facilitator and promoter, typically involving wide-reaching stakeholder engagement in policy development, a negotiated consensus with the business community and other key stakeholders, and often a reliance on voluntary agreements.
- **International dimension.** The EU's principal role is seen as providing a policy framework, ensuring better integration between related policy areas, and adapting EU financial mechanisms to support circular economy activities. The global nature of challenges is recognised, along with the roles of the Sustainable Development Goals and the International Resource Panel. Understanding the complexity of international value chains is important when developing national policies for resource efficiency/the circular economy.
- **Societal concerns.** It is important to identify societal groups that may be losing out in the transition to a circular economy. Their needs can be addressed through, for example, socially just policy interventions and innovation.

Executive summary

This report presents an updated and extended assessment of approaches and identifies trends, similarities and new directions taken by countries in the connected policy areas of resource efficiency and the circular economy. It is based on information provided in 2018 by 32 participating countries of the EEA/Eionet (European Environment Information and Observation Network) (Annex 2, Map A2.1). This report directly builds on the 2016 EEA report *More from less — material resource efficiency in Europe* ([1]) by reflecting the changing policy agenda with respect to the circular economy.

The main objectives of this 2019 updated assessment are to:

- stimulate exchange of information and share good practice examples among country experts;
- support policymakers in Eionet countries, the European institutions and international organisations by providing an updated catalogue of resource efficiency and circular economy actions being undertaken in European countries.

The report, comprising a compilation of extensive survey responses from countries, is accompanied by 32 country profiles ([2]).

The scope of this report, and the country profiles that lie behind it, includes raw material resources, such as minerals, metals, biomass and fossil fuels, together with secondary raw materials, and the transformations that they undergo throughout their entire life cycles from extraction, through design, production, use and consumption, to recycling and disposal. Following feedback from Eionet, specific energy efficiency and climate change policies were excluded from the assessment, unless there was an explicit link to resource efficiency or the circular economy.

Approaches to the circular economy and resource efficiency vary greatly from country to country. Nevertheless, certain trends can be identified that are characteristic across many participating countries.

Economic interests, such as competitiveness, jobs, growth, security of supply and reduced import dependency, continue to be the predominant driving forces of material resource efficiency and circular economy policies, followed by environmental concerns and regulatory requirements.

When it comes to dedicated strategies or roadmaps for resource efficiency, there has been relatively little change since 2016. However, there has been a noticeable shift in the focus of policy development in recent years, from resource efficiency towards the circular economy. Many elements of resource efficiency and the circular economy are currently covered in other policies, such as waste management and waste prevention policies, along with environmental and sustainable development strategies, innovation policies and economic programmes.

At the present time, good practice in the transition to a more circular economy tends to have a non-mandatory character; circular public procurement and green deals/voluntary agreements are gaining ground; and the use of internet-based information tools and platforms is also growing and has the potential to grow still further.

National policy initiatives have increasingly been developed for raw material supply and national critical materials. Such initiatives aim to support the national economy by making domestic industries less dependent on imports, rather than by targeting the competitiveness of the extraction sector itself. The importance of policies and strategies aimed at raw material supply and management has been recognised

([1]) https://www.eea.europa.eu/ds_resolveuid/ff62707e226f46009930024ebf6f8111
([2]) https://www.eionet.europa.eu/etcs/etc-wmge/products/country-factsheets-on-resource-efficiency-and-circular-economy-in-europe

and translated into real policy initiatives, and in many cases long before similar initiatives relating to circular economy policy. At the same time, it is vital that secondary materials can compete with virgin raw materials from a host of different perspectives: economic, regulatory, environmental, technical and international.

Synergies are frequently sought between resource efficiency/the circular economy and economy-focused and climate- and energy-related policies. Synergies with the climate and low-carbon agendas, however, are driven by a combination of environmental considerations, climate change mitigation, regulatory pressures, national greenhouse gas reduction targets and security of supply issues.

Targets for resource productivity or resource efficiency continue to be used, whereas hardly any targets for the circular economy have been set. As one of the objectives of the circular economy is improving resource efficiency, the need for resource efficiency targets remains equally relevant for circular economy policies. When it comes to material resource efficiency, meanwhile, waste targets continue to predominate.

The introduction of indicator frameworks that specifically focus on progress towards a more circular economy is particularly challenging. Widely different approaches and degrees of advancement exist, which, in part, can be explained by the absence of a broadly accepted framework for monitoring circularity. Nevertheless, this report highlights a growing emphasis on the importance of establishing indicators and setting targets and on the systemic approach needed to address these complex policy issues.

Institutional arrangements exist to support the development and implementation of policies on resource efficiency and the circular economy. A typical national set-up would see two ministries leading the resource efficiency/circular economy portfolio. However, a greater emphasis on stakeholder involvement and societal buy-in is emerging, while the role of government seems to be slowly shifting from that of regulator and enforcer to that of facilitator and promoter. This typically involves wide-reaching stakeholder engagement in policy development, a negotiated consensus with the business community and other key stakeholders, and often a reliance on voluntary agreements.

With resource efficiency and the circular economy being a relatively new and cross-cutting issue, there are comparatively few examples of *ex post* policy evaluations in these two areas. Potential aspects to consider include the benefits from the circular economy in terms of reduced resource use, greenhouse gas emissions, and water and land use. The EU's main role is seen as providing a policy framework, ensuring better integration between related policy areas and adapting EU financial mechanisms to support circular economy activities. On the international level, there is an acknowledgement of the global nature of the challenges and a recognition of the roles of the Sustainable Development Goals and the International Resource Panel in shaping and delivering the circular economy and resource efficiency agendas.

This report synthesises a significant amount of data from participating countries, and distils common considerations for policy based on different countries' experiences. These considerations for policy can be found in full at the end of the report.

1 Introduction

The last decade has been a turbulent period with respect to the use of materials. The economic crisis, which started in 2008, wildly fluctuating prices of raw materials and commodities, growing concerns about access to critical raw materials (CRMs) and the swift rise of climate change up the policy agenda have all had a significant impact on how resources are used in Europe and what policies have been adopted.

The European Commission adopted both its flagship resource-efficient Europe initiative and its Communication on a Roadmap to a Resource Efficient Europe in 2011, with the ultimate policy goal of producing more value with less input, using resources in a sustainable way and managing them more efficiently throughout their life cycles. The Seventh Environment Action Programme (7th EAP) also referred to 'reduced overall resource use' and the intention to 'strive towards an absolute decoupling of economic growth and environmental degradation'.

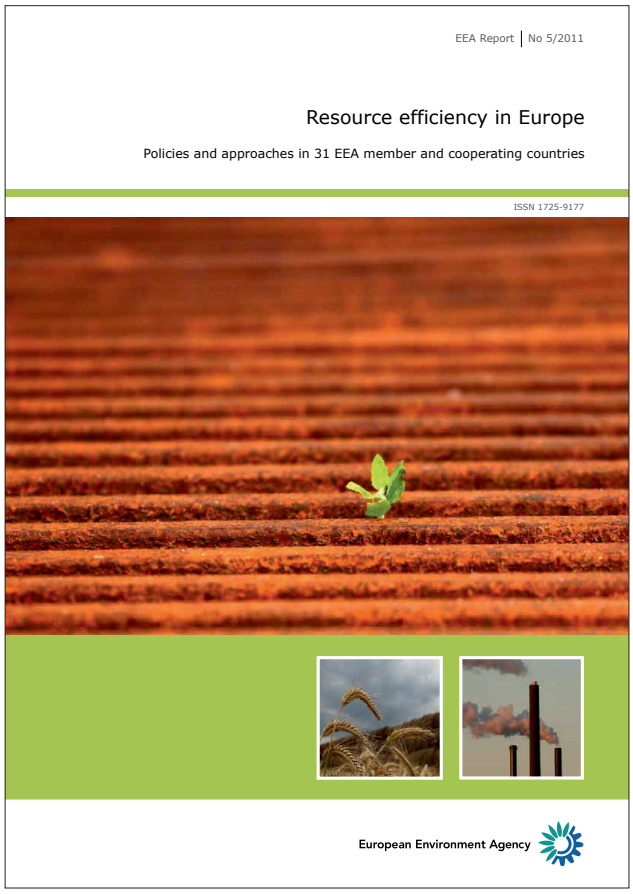
Resource efficiency policies have continued to evolve. *Closing the loop: an EU action plan for a circular economy* was adopted in December 2015, with the key objective of a 'transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised'. It is also in line with key EU priorities, including jobs and growth, investment, climate and energy, the social agenda and industrial innovation, as well as global efforts on sustainable development.

Meanwhile, in the light of rising commodity prices, increased global competition for access to resources, and periodic problems with securing stable access to selected raw materials, the efficient use of raw materials has taken on strategic economic importance. In 2008, the European Commission presented the raw materials initiative — Meeting our critical needs for growth and jobs in Europe. The European Commission pointed out that, 'while the rising costs of energy and the high dependence of the EU on energy imports is already high on the political agenda, comparable challenges regarding certain non-energy raw materials have not yet received full attention.'

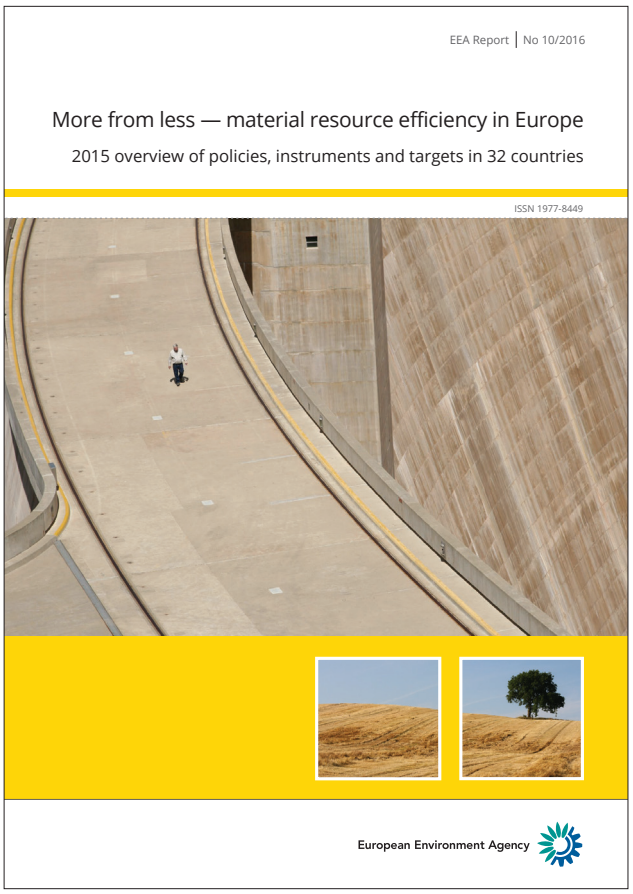
The raw materials initiative called for the development of a list of CRMs that warrant special attention. This list is now in its third iteration.

Last but not least, in September 2015, heads of state adopted the United Nations 2030 agenda for sustainable development, with 17 Sustainable Development Goals (SDGs) and 169 targets that address the three pillars of sustainable development: economic, social and environmental. In November 2016, the European Commission outlined its strategic approach towards the implementation of the 2030 agenda, deciding to include the SDGs in EU policies and initiatives across the board, with sustainable development as an essential guiding principle for all European Commission policies.

Throughout this period, the EEA has been an active participant in the shaping of the policy agenda, monitoring progress and reflecting on future activities.



In 2011, the EEA conducted a detailed survey among its member countries to collect, analyse and disseminate information about national experiences of developing and implementing resource efficiency policies and to facilitate the sharing of this experience and good practice. The resulting report, *Resource efficiency in Europe*, and its accompanying 31 individual country profiles provided an overview of resource efficiency policies and instruments in member and cooperating countries of Eionet (European Environment Information and Observation Network).



In 2015, the EEA, together with Eionet and the European Topic Centre on Waste and Materials in a Green Economy (ETC/WMGE), set out to review national approaches to material resource efficiency and explore similarities and differences in policies, strategies, indicators and targets, policy drivers and institutional set-ups. The 2016 More from less — material resource efficiency in Europe report included a number of considerations for the development of future policies on material resource efficiency and the circular economy. The analysis was illustrated with some 60 examples of countries' policy initiatives, described in more detail in the 32 country profiles published alongside the main report.

This report follows on from *More from less — material resource efficiency in Europe*. Some of the questions are the same as those asked in 2015, for example those on dedicated strategies for material resource efficiency, driving forces, targets, institutional set-ups and barriers to implementation. However, about half of the questions explore some new aspects, reflecting the changing policy agenda.

The main changes in this survey include:

- a strong focus on the circular economy and closing material loops;
- inclusion of raw material strategies;
- inclusion of regional- and local-level policy initiatives;
- initiatives that deliberately build synergies between resource efficiency, the circular economy and other policy areas;
- the approach to evaluation of policies on resource efficiency and the circular economy;
- inclusion of the SDGs;
- a main focus on initiatives since 2011 — for example since the adoption of the resource-efficient Europe flagship initiative and the resource efficiency roadmap.

This report is published as a key output envisaged in the EEA's multiannual work programme 2014-2018 (SA1.9): catalogue of material resource efficiency policies, objectives and targets. It is the product of close collaboration between Eionet, the ETC/WMGE and the EEA. Thirty-two participating countries provided detailed information (Map 1.1). There are some differences between the countries participating in 2015 and those participating this time.

1.1 The objective of this assessment

This report presents an analysis of approaches and identifies trends, similarities and new directions taken by countries in the policy areas of resource efficiency and the circular economy. It is based exclusively on information provided by 32 participating members of Eionet.

The main objective of the work is to stimulate exchange of information and good practice between countries and to support capacity building within Eionet. More details are available in the 32 country profiles.

Another key objective is to contribute to various policy processes, including the work carried out by the European Commission, the European Parliament and the International Resource Panel.

When possible, this report compares current responses with those published in the 2016 *More from less* report. However, this report is intended neither to assess progress nor to evaluate the success of specific policies.

1.2 Scope

The approach to and scope of this work were designed in close consultation with Eionet to reflect countries' priorities and needs.

The scope of this survey is material resources, such as minerals, metals, biomass and fossil fuels, together with secondary raw materials, and the transformations that they undergo throughout their entire life cycles from extraction, through design, production, use and consumption, to recycling and disposal. Following feedback from Eionet, energy efficiency and climate change policies were excluded, unless there was an explicit link to resource efficiency or the circular economy.

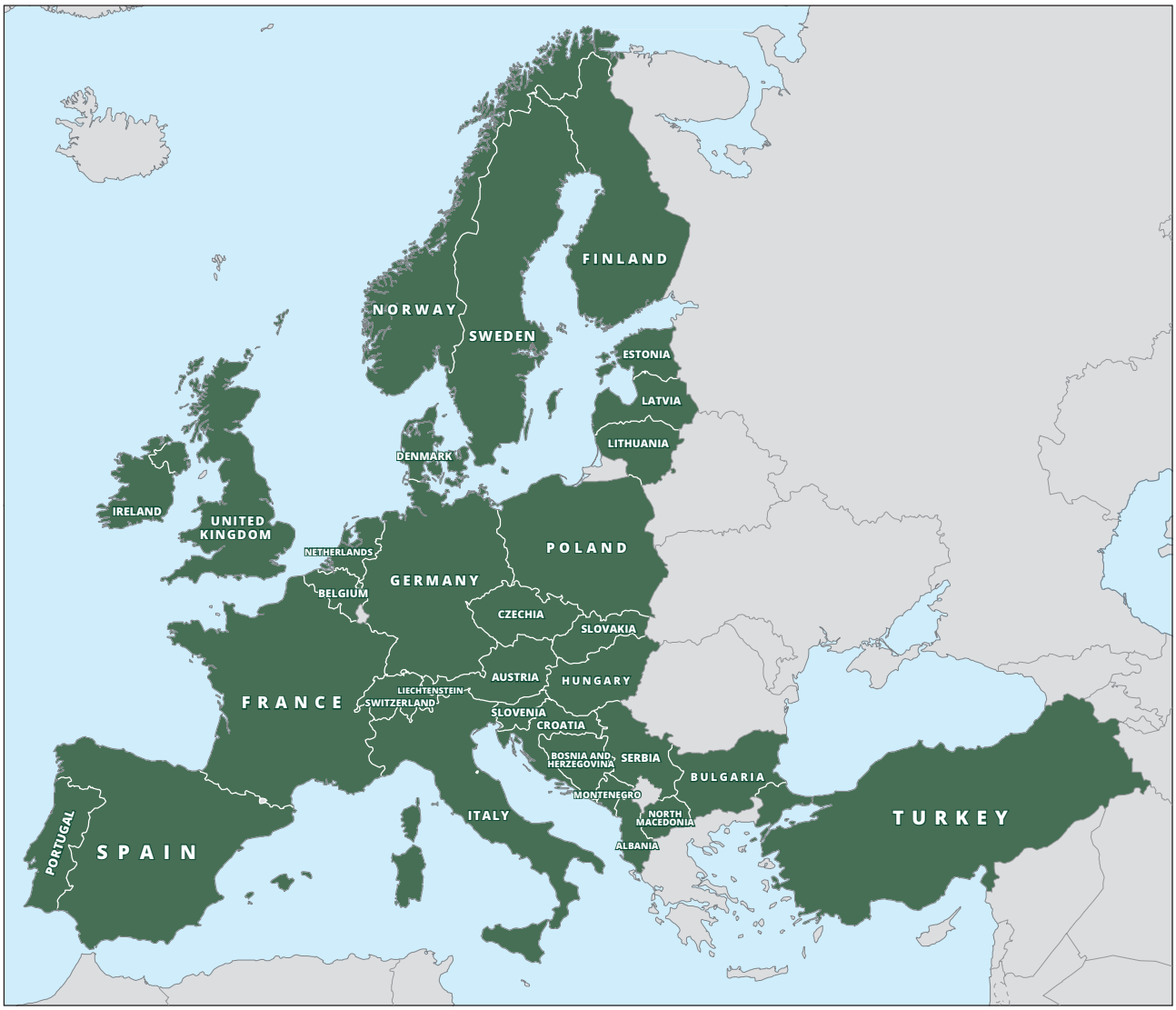
During the discussions about the scope, some countries expressed an interest in reporting on their resource efficiency/circular economy initiatives that go beyond material resources. Water was most commonly mentioned, followed by forests, rural development, soil and land use, air quality and climate change, and biodiversity. To accommodate this, an optional question was included that went beyond the scope of material resources.

1.3 Structure of the report

This report is structured in six parts, which address the following elements:

- Part 1, 'Material resource efficiency and circular economy in the EU', provides context on the state of play of the main trends in economic parameters and material flows that are the subject of the policies analysed in this report.
- Part 2, 'Policy framework', compiles the national policies, drivers and institutional set-up as reported by the countries contributing to this report.
- Part 3, 'Monitoring and targets', provides information on how countries are following up on progress and establishing goals for the policies at hand.

Map 1.1 **The 32 countries that provided detailed information on their material resource efficiency, circular economy and raw material supply policies**



- Part 4, 'Examples of innovative approaches and good practice', identifies elements reported by countries that are seen as practices that merit scaling up or that are considered by others as good tools for making further progress. It also addresses complementary policies that could be synergetic, as reported by participating countries.
- Part 5, 'Other resources', addresses resources that go beyond material resources.
- Part 6, 'The way forward', offers expert judgement on the state of play and direction for the future that could enable a more circular and resource-efficient economy in Europe.

1.4 The process for collecting country information

The analysis in this report is based on information provided on a voluntary basis by the 32 participating countries.

A standard set of questions was used to elicit information. The questions are presented in Annex 1 and cover national strategies and action plans for (material) resource efficiency, the circular economy and raw material supply, as well as similar initiatives at the local level, examples of synergies between resource efficiency/the circular economy and other

policy areas, targets and indicators, institutional set-ups, and other topics of interest.

Countries were also invited to share their reflections on the challenges of and obstacles to the further development of resource efficiency and the circular economy and to make suggestions on how to address them.

The collection of country information took place between April 2017 and June 2018. During this period, countries were invited to update their draft country profiles, taking into account suggestions from a review carried out by the project team. The final information reported was current as of March 2019 for 18 countries that had already updated their profiles; for other countries the information is mainly from mid-2018.

1.5 The outcomes of the survey

The survey information resulted in the publication of this analytical report and a set of 32 country profiles.

- **This analytical report** was prepared by the EEA and the ETC/WMGE. It presents an overview of findings from the analysis of information provided by the participating countries. It reviews national approaches to material resource efficiency and the circular economy, and it explores similarities and differences in policy responses. It concludes with the EEA's thoughts on future policies concerning material resource efficiency and the circular economy, which could be taken into account when developing policies at the EU and country levels. Throughout the report, the analysis is illustrated with short examples of countries' policy initiatives, which are described in more detail in the country profiles.
- **Country profiles** are self-assessments prepared by the participating countries with assistance from the EEA and the ETC/WMGE. These documents describe the current (from mid-2018 to March 2019) status of material resource efficiency and circular economy policies in each country. The country profiles are available online ([3]).

Important note

The analysis in this report is based solely on the information provided in the country profiles by EEA member countries through the national reference centres on resource efficiency and the circular economy (NRCs) and the national focal points (NFPs). Substantial efforts have been made to ensure that the responses from the countries are as complete and comprehensive as possible, including providing detailed guidance on each of the questions. Countries were encouraged to seek input from other national institutions relevant to material resource efficiency. A thorough review of initial responses was carried out by the project team, which made suggestions for possible additional topics for consideration. Bilateral discussions were held with countries where necessary to clarify any outstanding issues. It was, however, ultimately left to the countries to determine the scope of their responses and the level of detail. Thus, no claim is made that this report covers all possible facets of material resource efficiency or the circular economy, as countries may have policies, instruments and targets related to these topics that remain unreported.

([3]) https://www.eionet.europa.eu/etcs/etc-wmge/products/country-factsheets-on-resource-efficiency-and-circular-economy-in-europe

Part I

Material resource efficiency and the circular economy in the EU

2 Trends in the use of material resources, resource productivity and the circular use of materials in the EU

This chapter provides an overview of trends in the use of material resources, resource productivity and the circular use of materials in the EU as a whole, using Eurostat data. Country-specific data and graphs on the use of material resources and resource productivity are presented in individual country profiles.

2.1 Overall use of material resources in the EU

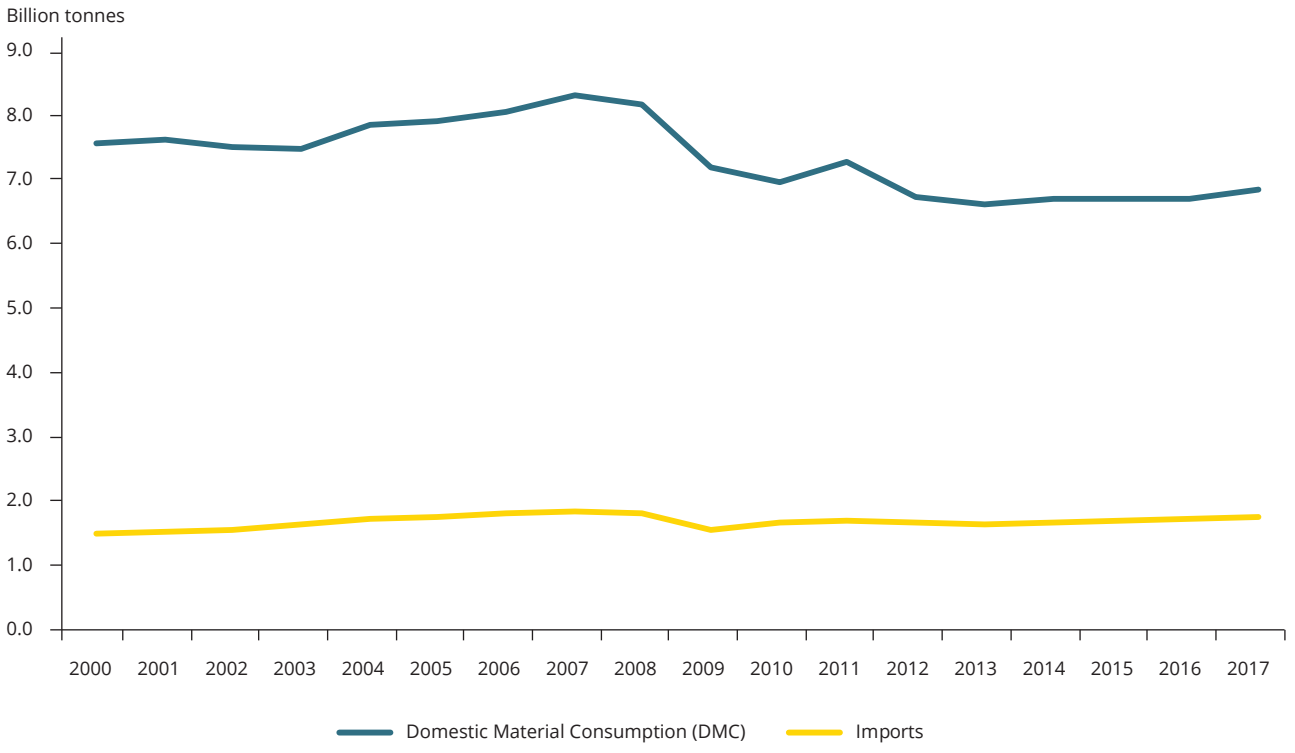
The total use of resources (domestic material consumption, DMC) in the EU declined from 7.61 billion tonnes in 2000 to 6.95 billion tonnes in 2017, a fall of 9 %. Over the same period, physical imports from outside the EU increased by about 20 % (Figure 2.1).

Per person DMC in the EU dropped by almost 13 % between 2000 and 2017. It initially increased from 15.6 tonnes in 2000 to a peak of 16.7 tonnes in 2007, but then it fell back to 13.6 tonnes in 2017. However, the levels of material consumption and trends in individual countries were quite variable, as shown in Figure 2.5.

Comparing the figures for 2000 and 2017 tells only part of the story, as all long-term trends were disrupted by the global economic crisis that started in 2007/2008. It is therefore important to examine trends before and after the onset of the crisis and the ensuing global recession.

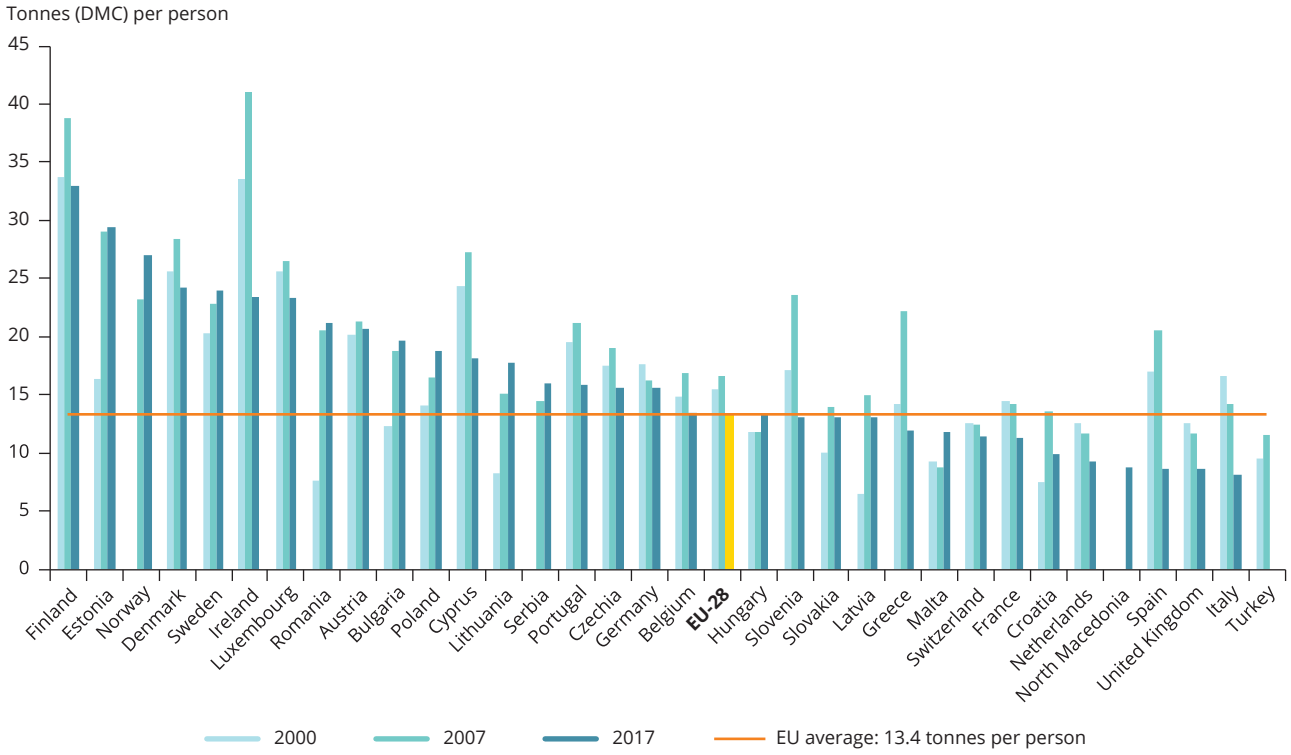
In the period 2000-2007, the total DMC of the EU increased by 10 %, while imports grew by 24 %. Economic growth and rising resource use went hand

Figure 2.1 Total EU domestic material consumption and physical imports, 2000-2017



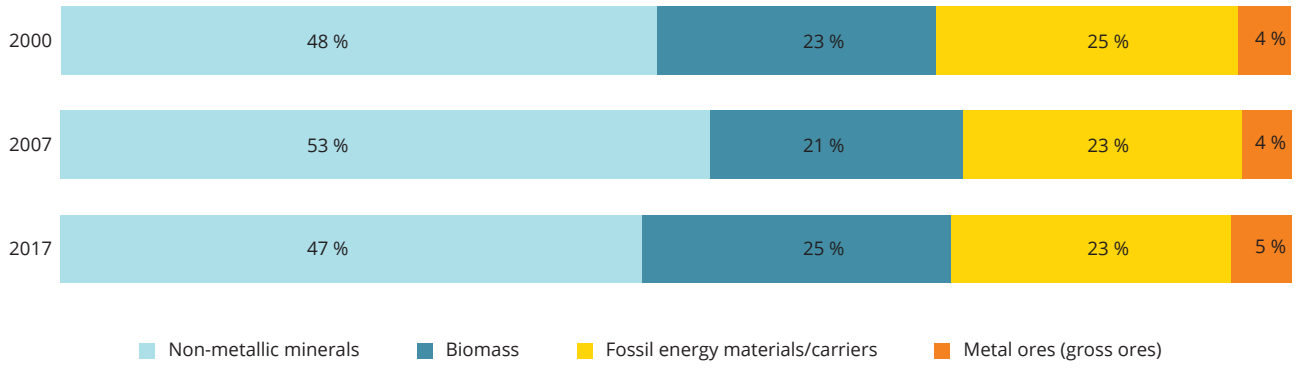
Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 5 April 2019.

Figure 2.2 Domestic material consumption per person, 2000, 2007 and 2017



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 4 April 2019.

Figure 2.3 EU domestic material consumption by share of components, 2000, 2007 and 2017



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 5 April 2019.

in hand, in line with the historical long-term trend. It was only after 2007 — and the onset of the global recession — that a decline occurred in both total DMC (-17 % between 2007 and 2017) and imports (-3 %).

The impact of the economic crisis was even more dramatic with respect to resource productivity, as discussed in Section 2.4.

2.2 Resource use by type of material

Although the shares of the four main components of total DMC of the 28 EU Member States (EU-28) fluctuated somewhat between 2000 and 2017, the overall picture remains consistent (Figure 2.3). By far the largest category is non-metallic minerals — mostly materials used in construction — with a share of total DMC of 47-53 %.

Individual materials with a significant share of total DMC in the EU-28 are:

- sand and gravel, 31-34 %;
- liquid and gas energy carriers, 13-14 %;
- coal/solid energy carriers, 10-11 %;
- fodder crops and grazed biomass, 9-11 %;
- non-fodder crops, 8-10 %;
- limestone and gypsum, 7 %;
- marble, granite and sandstone, 4-5 %;
- wood, 4 %.

As shown in Figure 2.4, the overall trend in total DMC in the EU is almost entirely determined by non-metallic minerals, mainly used for construction. This is not only because non-metallic minerals constitute the largest single category in DMC but also because they are the category most susceptible to changes in the overall economic situation. The sharp drop in the use of non-metallic minerals in some countries (Figure 2.5) was mostly caused by the decline in the construction sector from 2007 onwards.

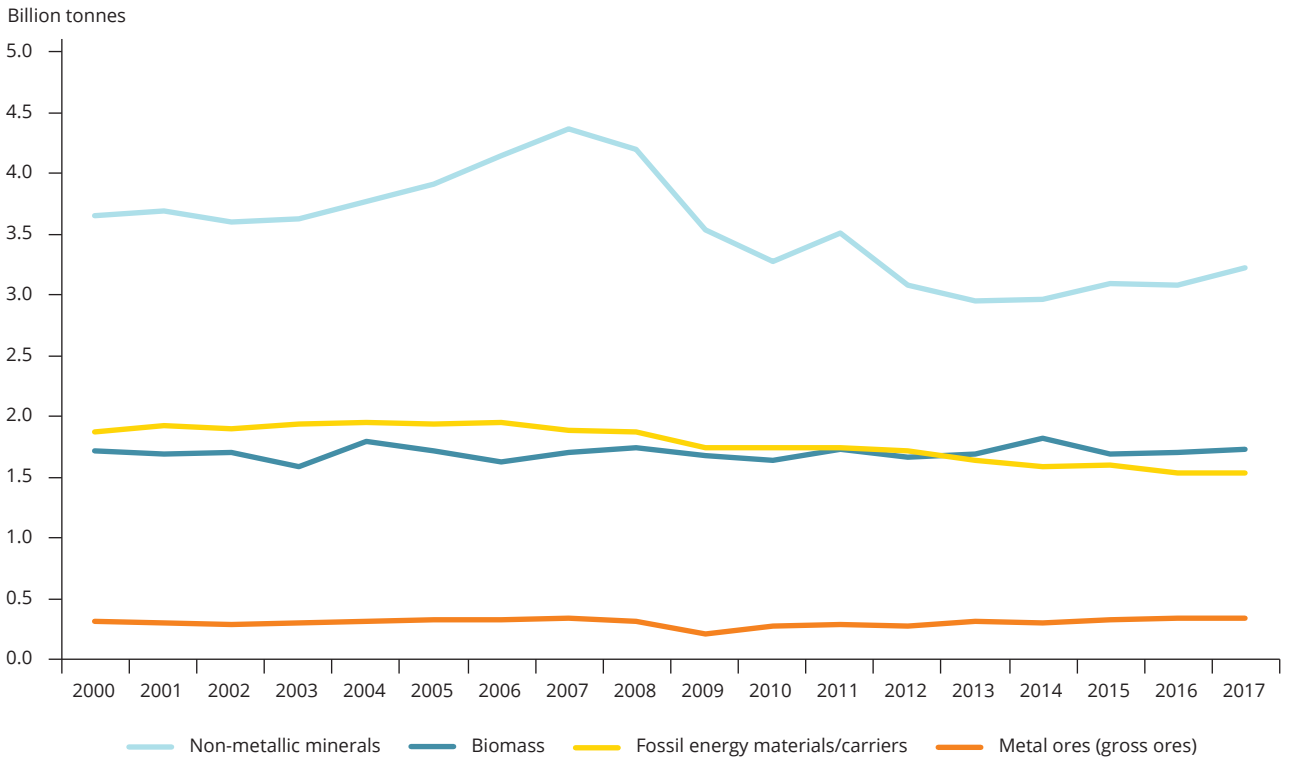
Between 2000 and 2007, the consumption of non-metallic minerals in the EU-28 grew by 19 % compared with an overall increase in DMC of 10 %. Between 2007 and 2017, however, the use of non-metallic minerals declined by 25 % and total DMC decreased by 17 %.

Similarly, the use of metal and metal ores grew by 5 % during the period 2000-2007, but it then declined by 19 % between 2007 and 2012, although by 2015 it was back to 2003 levels.

A different — and noteworthy — trend occurred in the EU's use of fossil fuels, which declined by 17 % between 2000 and 2017. Beginning in 2004, the decrease was initially rather slow, accelerating only after 2008. Here, it appears that three forces were at play:

- a decrease in overall economic activity from 2008 onwards, resulting in lower consumption of energy;
- a long-term trend in the EU of increasing the use of energy from renewable sources;

Figure 2.4 EU domestic material consumption by type of material, 2000-2017



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 5 April 2019.

- the improving overall energy efficiency of the economies.

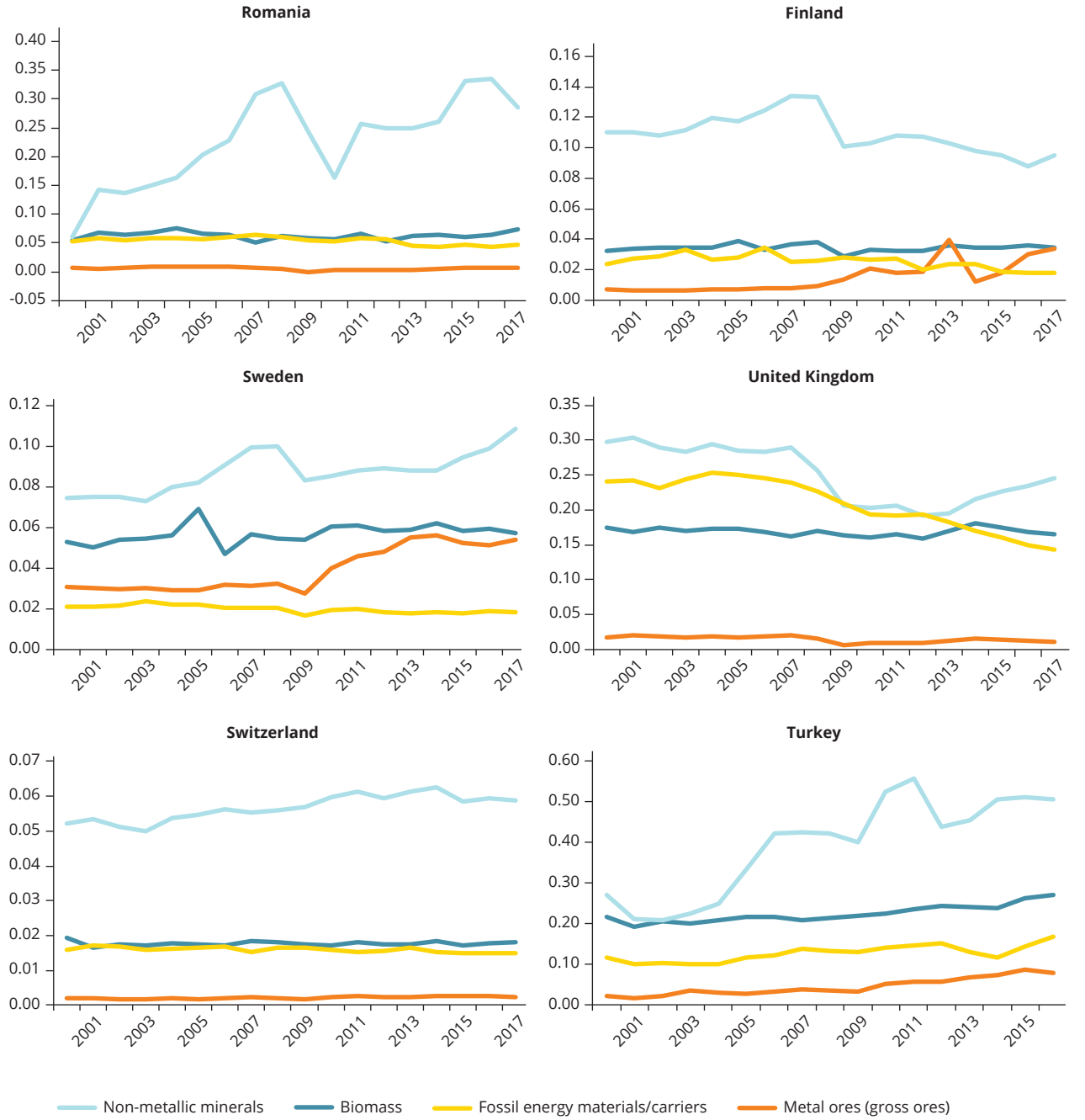
All in all, one should keep in mind that aggregating figures for a large group of countries such as the EU will inevitably miss the large variety of trends in individual countries, as demonstrated by selected examples in Figure 2.5. A more detailed analysis at the country level is, however, outside the scope of this report.

2.3 Imports of resources into the EU and growing reliance on imported fossil fuels and metals

Figure 2.6 presents the share of imported materials in the overall direct material input of the EU-28. Direct material input — which is the sum of imported and domestically extracted resources required by the economy — is better suited to measuring reliance on imports than DMC.

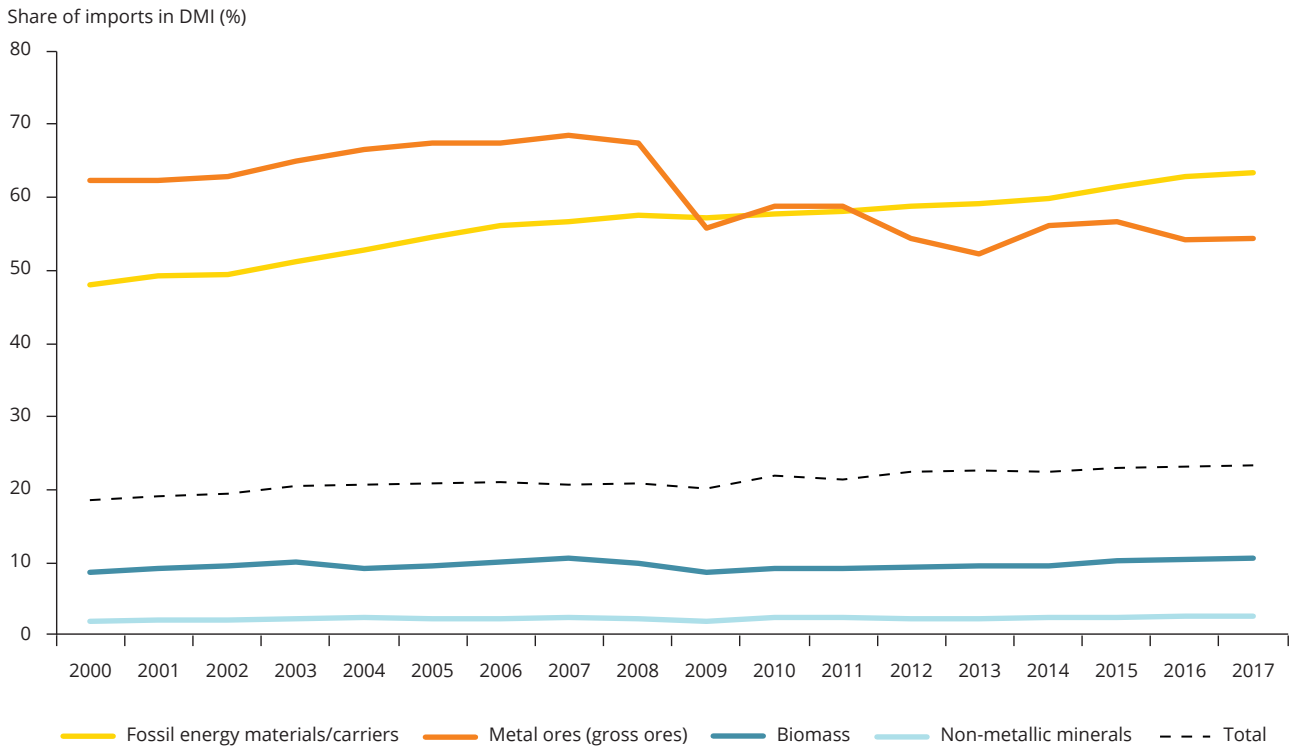
Figure 2.5 Domestic material consumption by type of material in selected European countries, 2000-2017

Figure 2.5 **Domestic material consumption by type of material in selected European countries, 2000-2017 (cont.)**



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 5 April 2019.

Figure 2.6 EU reliance on imports of materials from outside the EU, 2000-2017



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa]; extracted 5 April 2019.

Overall, imports account for almost one quarter of the resources used in the EU, and their share of DMI has grown steadily from 18 % in 2000 to 23 % in 2017. The share of imports of non-metallic minerals remains rather insignificant, at about 3 % of their total use. The situation is similar for biomass, for which imports account for about 11 % of the total. In both cases, this is understandable given the good availability of biomass and non-metallic minerals within Europe, as well as the high cost of transporting bulk materials from outside the region.

Highly significant for a number of policies, from resource efficiency and energy to security of supply, are trends in the imports of fossil fuels and metals and metal ores.

The share of imported fossil fuels grew from 48 % in 2000 to 64 % in 2017. Although the consumption of fossil fuels in absolute terms went down during this period (their share of DMI decreased by 10 % and of DMC by 17 %), the amount of imported fossil fuels actually grew by 20 % at the same time. This indicates that the EU is becoming more dependent on imported fossil fuels.

In the case of metals and metal ores, dependence on imports grew steadily during the period 2000-2007, from 62 % to 69%, but it then declined to 54 % in 2017. The high dependence on imports of metals, combined with the fact that the production of several hi-tech metals is concentrated in one or two countries, generated concerns about the security and stability of access to resources and resulted in European Commission policy work on raw materials, including compiling the EU list of critical raw materials. Several countries also compile their own lists of critical materials.

Securing access to resources through recovery and recycling is also one of the collateral benefits of a more circular economy (Box 2.1).

2.4 Resource productivity in the EU-28

Resource productivity in the EU — as measured by the lead indicator relating gross domestic product (GDP) to DMC — increased by 39 % between 2000 and 2017 (Figure 2.8). In this period, GDP grew by 18 %, while DMC declined by 12 %. Thus, the EU is clearly doing more with less and has achieved something that appeared unthinkable a mere decade ago — an absolute decoupling of economic growth from resource use.

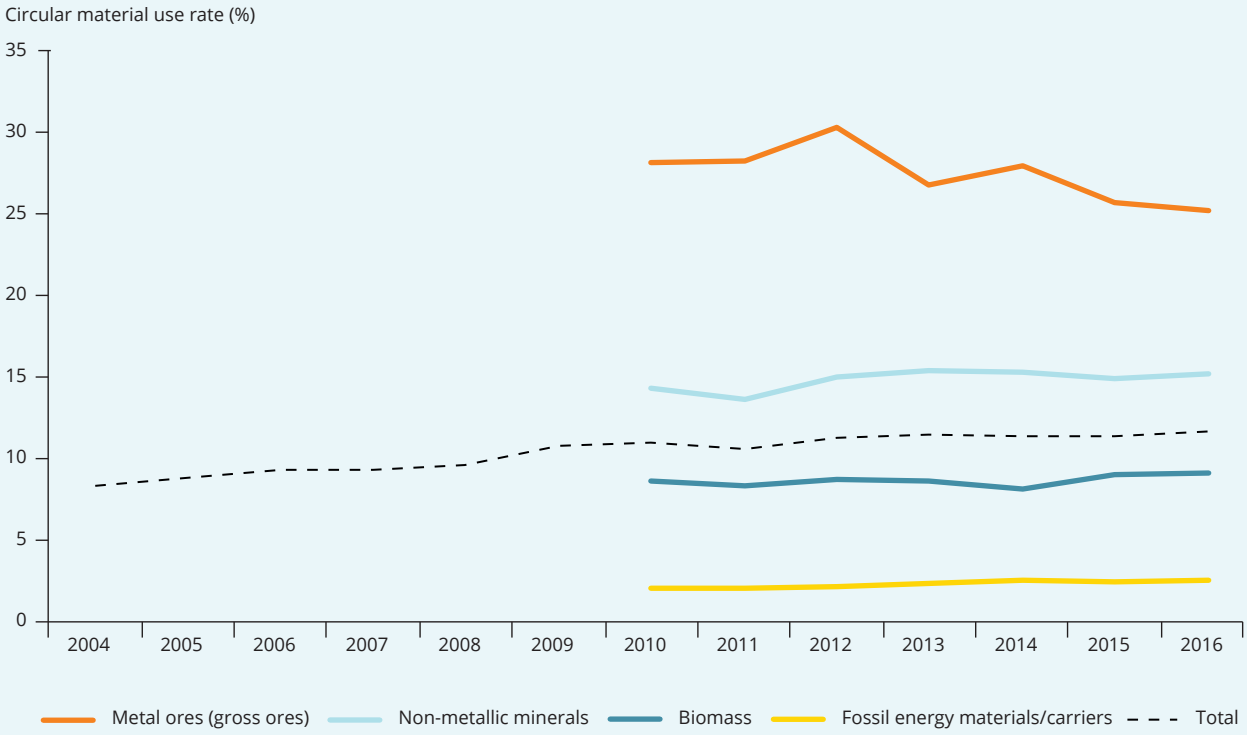
Box 2.1 Circular use of materials in the EU

Some of the key objectives of the circular economy are to keep resources in use for as long as possible, to extract the maximum value from them while in use, and to recycle and regenerate products and materials at the end of their life cycles. Achieving a more circular use of materials is also key to improving resource efficiency, in addition to avoiding environmental pressures related to the extraction of primary raw materials.

However, we are still at the early stages of developing a way of measuring the degree of circularity. In 2018, Eurostat published, only for the EU as a bloc, the circular material use (CMU) rate indicator. This shows the share of materials recovered and fed back into the economy in overall material use. The higher this rate is, the lower the need for virgin raw materials.

The CMU rate in the EU is relatively low. In the period 2004-2016, it increased from 8.3 % to 11.7 % overall. At 25 %, the CMU rate was highest for metals and metal ores, followed by non-metallic minerals at about 15 % (Figure 2.7).

Figure 2.7 Circular material use rate in the EU, 2004-2016



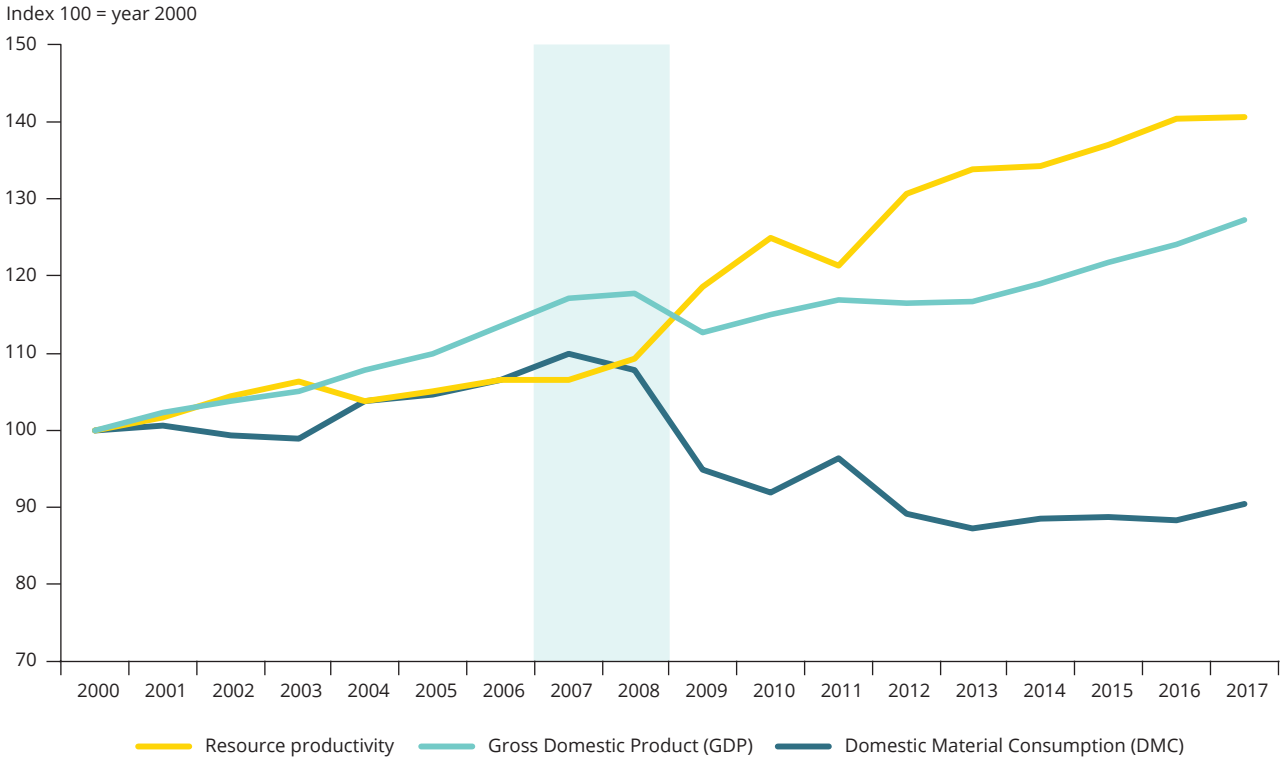
Source: Eurostat (2019), dataset for circular material use rate [env_ac_curm]; extracted 5 April 2019.

As the availability of virgin raw materials declines, recycling and recovery of materials becomes an important factor to ensure the security of supply of critical raw materials essential for the EU's economy in areas such as renewable energy, transport and information technology.

The implementation of policies focused on the circular economy, security of supply and the low-carbon economy agenda are expected to increase the circular use of materials.

At the moment, however, the EU is still far from being a circular economy.

Figure 2.8 **EU gross domestic product, domestic material consumption and resource productivity, 2000-2017 (year 2000 = 100)**



Source: Eurostat (2019), dataset for material flow accounts [env_ac_mfa], resource productivity [env_ac_rp], and GDP and main components [nama_10_gdp]; extracted 5 April 2019.

For a more nuanced analysis it is important to take a closer look at the trends before and after the economic crisis of 2007/2008 (marked by the blue bar in Figure 2.8).

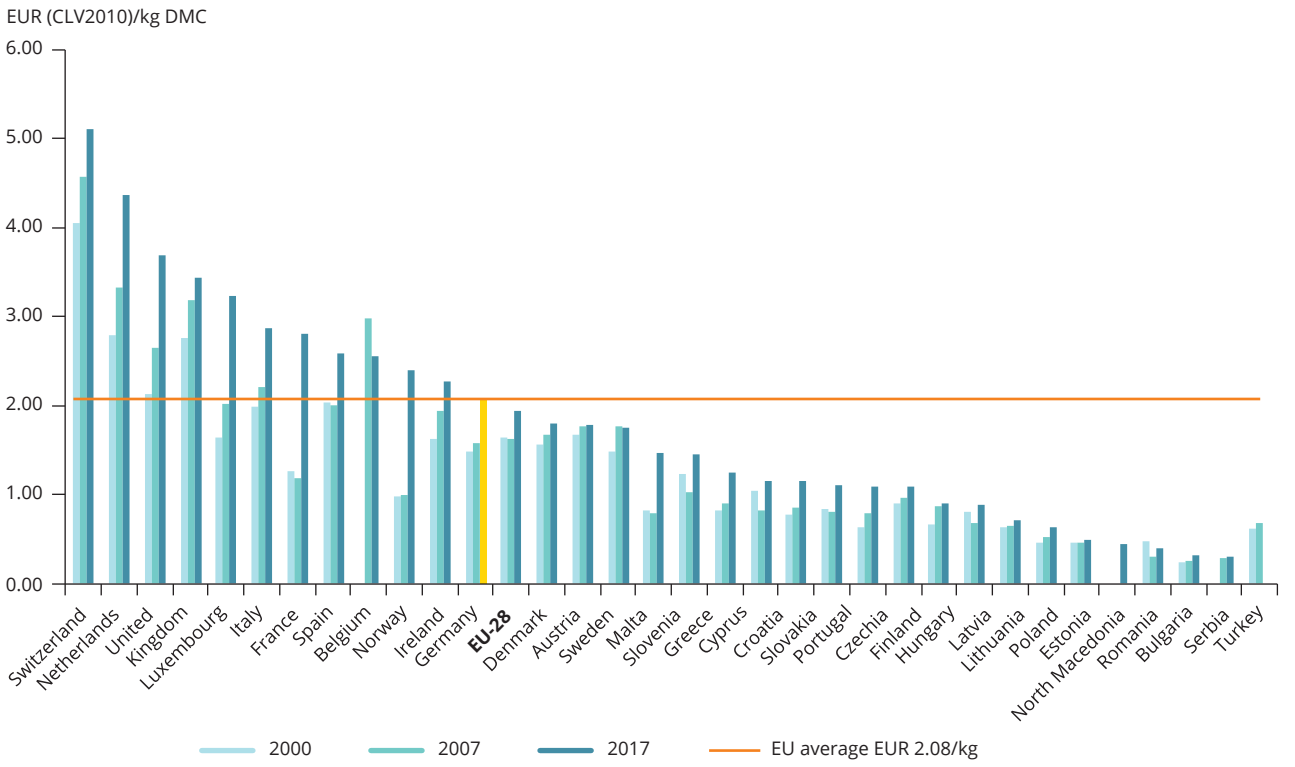
Between 2000 and 2007, total DMC for the EU increased by 10 % and GDP grew by 17 %, resulting in a 7 % growth in resource productivity. In this period, the use of resources and economic growth went hand in hand, corresponding to the long-term historical trend.

After 2008, the use of materials declined rapidly, with a 17 % decrease in total DMC between 2007 and 2017. As discussed earlier, this was mostly due to the sharp decline in the construction sector, which accounts for the majority of total material use but contributes, in relative terms, much less to the EU economy. Meanwhile, there was a sharp fall in GDP in 2008/2009, but it has gradually recovered since; by 2013, GDP had returned to the same level as that in 2007 and has continued to grow since.

The result is that resource productivity — which is the ratio of GDP to DMC — went up by about one quarter in the six years from 2007 to 2013, a period of so-called absolute decoupling, when GDP grew and resource use declined in absolute terms. While this improvement is both welcome and impressive, at this stage it would not appear justified to attribute it entirely to the success of environmental policies. Other economic or technical factors may have played a role, including the changing structure of the economies, the way in which the economic crisis affected the economies, globalisation and increasing reliance on imports, and even the nature of the indicator itself.

Since 2013, the use of material resources in the EU has been increasing again. However, the growth of DMC (4 % between 2013 and 2017) was outpaced by the increase in GDP (9 %), and, thanks to that, resource productivity continued to increase, but it has now entered the phase of so-called relative decoupling. It remains to be seen how this positive trend will develop in the long term.

Figure 2.9 Resource productivity, 2000, 2007 and 2017



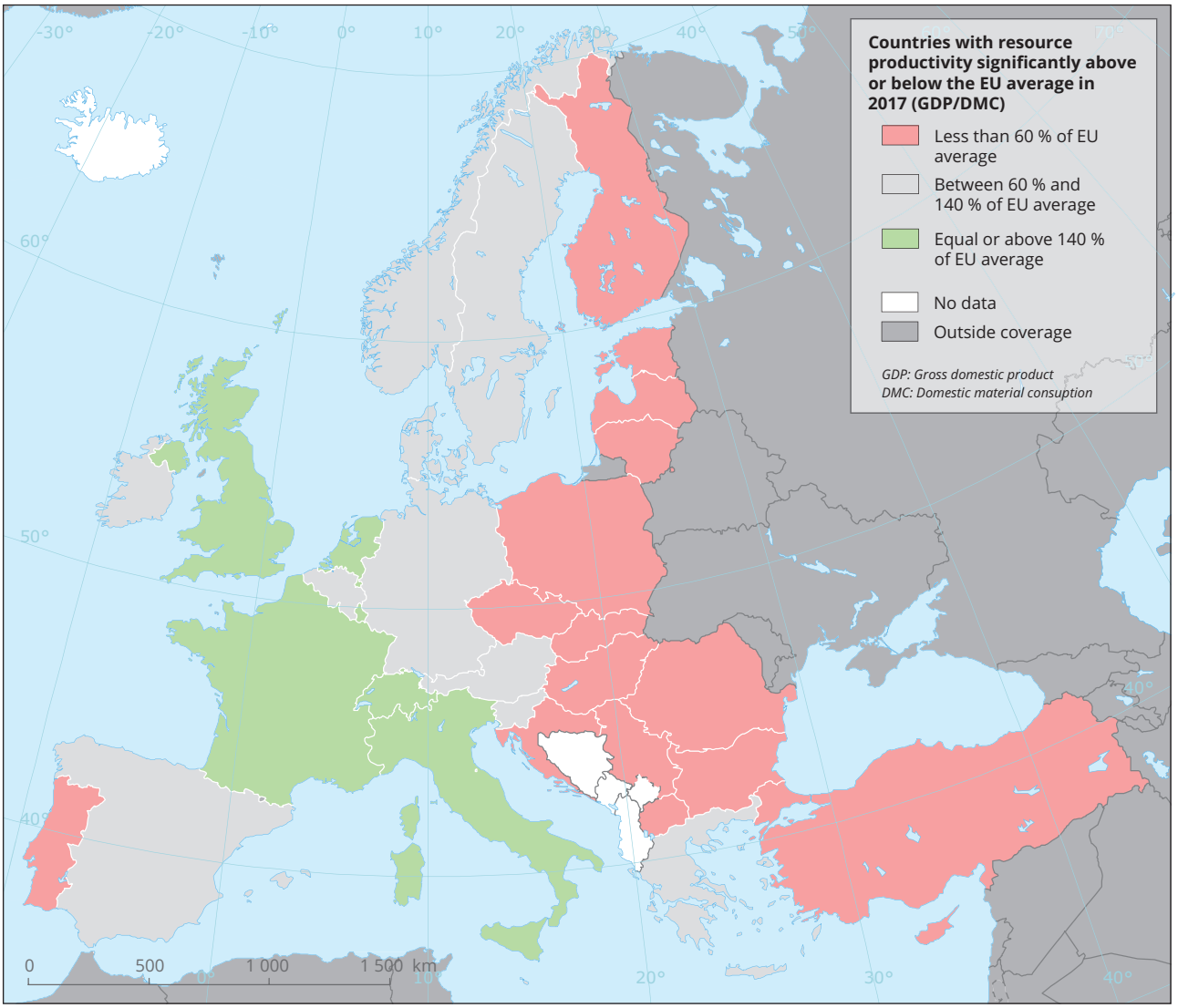
Note: Customer lifetime value, CLV.

Source: Eurostat (2019), dataset for resource productivity [env_ac_rp]; extracted 5 April 2019.

Furthermore, it should be noted that both levels of resource productivity and trends over time varied strongly from country to country (Figure 2.9, Map 2.1).

The most fundamental challenge is whether EU and national policy responses will manage to build on and strengthen the favourable trend apparent in recent years. Failing that, the EU and national economies are likely to return to the traditional pattern of economic growth accompanied by increasing resource use.

Map 2.1 Countries with resource productivity significantly above or below the EU average



Source: Eurostat (2019), dataset for resource productivity [env_ac_rp]; extracted 5 April 2019.

Part II

Policy framework

3 Main contextual factors

3.1 Drivers for material resource efficiency and the circular economy

This chapter reviews country survey responses concerning the major factors that drive their work on policies for material resource efficiency, the circular economy and the supply of raw materials.

All 32 participating countries addressed the issue, although the level of detail varied significantly, ranging from mentioning one or two generic drivers, such as 'protecting the environment' or 'supporting economic growth', to providing a detailed list of concrete drivers including illustrative examples of expected economic benefits, such as job creation. All in all, countries reported a total of 249 policy drivers.

As in the 2015 review for the 2016 *More from less* report and in the earlier 2011 review *Resource efficiency in Europe*, factors frequently reported as driving material resource efficiency policy can be roughly grouped into:

- those related to economic interests, such as increasing competitiveness, securing access to raw materials and energy, and improving production efficiency (120 mentions);
- those related to environmental concerns, such as reducing pressures on the environment, preventing environmental degradation and reducing greenhouse gas emissions (86 mentions);
- regulatory requirements, such as national or EU regulations, compliance with international targets and commitments, and transposition of the EU acquis (24 mentions);
- other drivers (19 mentions).

As in 2015, but in contrast to the situation in 2011 when environmental and economic considerations were quite evenly balanced, in 2018 economic considerations remained the most important factor — 48 % of all the drivers mentioned, reported by 31 countries. This was followed by environmental concerns — 35 % of drivers reported by 30 countries; regulatory requirements — 10 % of drivers reported by 20 countries; and various other drivers — 7 % of the total reported by 11 countries (Figure 3.1).

Table 3.1 presents a summary of the most frequently mentioned drivers and numbers of mentions. Further details are available in the individual country profiles.

Figure 3.1 Different types of drivers mentioned

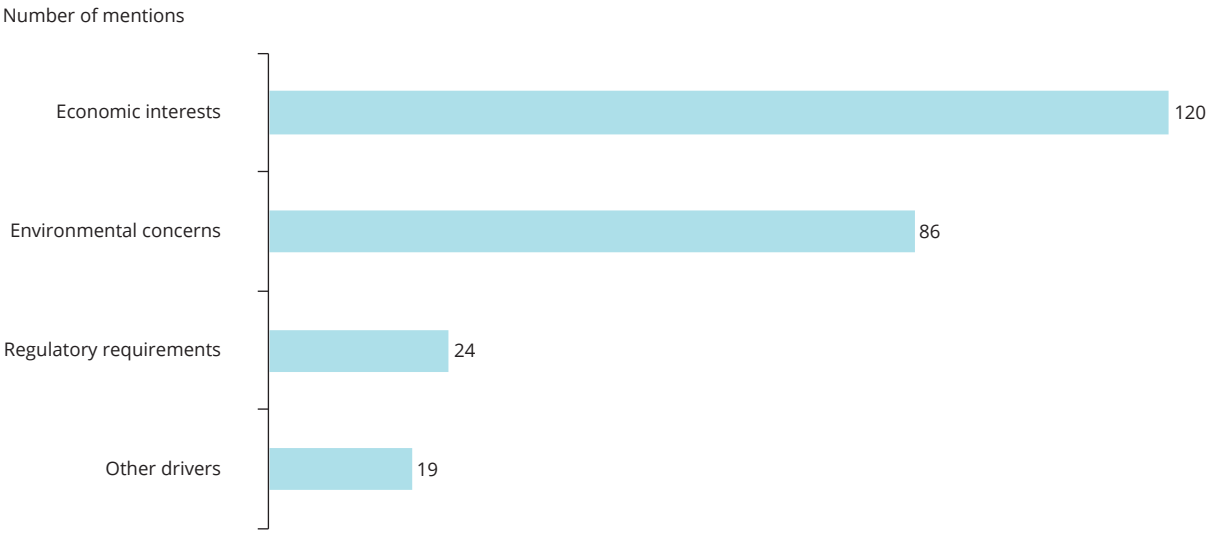


Table 3.1 Summary of the drivers reported by countries (mentioned by four or more countries)

Economic interests	**120 mentions reported by 31 countries**
Increasing competitiveness	21
Securing supply of energy and raw materials	18
Reducing dependence on imported resources	13
Providing impetus to economic growth	12
Job creation and employment	11
Increasing use of secondary raw materials and closing material loops	11
Increasing performance of the energy sector	10
Reducing exposure to volatile prices	9
Improving production efficiency	6
Creating new market opportunities/green jobs	5
Concerns about scarcity of resources	4
Environmental concerns	**86 mentions reported by 30 countries**
Improving waste management	26
Reducing pressure on the environment (including pollution and degradation of the environment)	23
Sustainable use and management of resources	18
Reducing greenhouse gas emissions	13
Reducing use of resources	6
Regulatory requirements	**24 mentions reported by 18 countries**
Compliance with EU legislation/targets	14
Compliance with national legislation/targets	10
Other drivers	**19 mentions reported by 11 countries**
Sustainable consumption and production and helping consumers make better choices	8
Reducing social impacts/addressing social concerns	5
Miscellaneous	7

3.2 Economic interests

Several countries (Belgium, Czechia, Denmark, France, Germany, Hungary, Latvia, the Netherlands, North Macedonia, Poland, Slovenia and the United Kingdom) reported the circular economy as a powerful impetus for economic development. Economic drivers featured particularly prominently in Germany, Hungary, Poland and the United Kingdom.

The need to increase competitiveness was the most recurrent driver, either with the goal of maintaining a prominent position among competitors or with the ambition of catching up with the performance of other countries (Box 3.1).

Another notable policy driver reported by countries was securing the supply of raw materials and energy and reducing dependence on imported resources. Turkey reported the need to reduce its high reliance on imports of intermediate goods as its main concern (Box 3.2).

A few countries mentioned concerns about scarcity of resources (metals and non-energy minerals), but only two respondents (Czechia and Wales (United Kingdom)) specifically reported concerns about critical raw materials for specific product types.

In contrast to the 2015 review, more countries mentioned the need to reduce exposure to volatile prices (nine countries, compared with four in 2015). It is not clear whether this increase should be attributed to genuinely growing concerns or to the fact that the topic of raw material supply was explicitly included in the scope of this survey.

Box 3.1 Policy drivers — Slovenia

Slovenia reported the following drivers:

- Supply security of raw materials. Slovenia lacks some critical raw materials for economic development and is dependent on imports. Furthermore, Slovenia is rather vulnerable to the volatility of global markets.
- Increased competitiveness. Resource productivity in Slovenia is below the EU average.
- Use of waste as resource. Efforts needed to improve waste collection and waste management to turn materials towards new production cycles.

For further information, see country profile.

Box 3.2 Drivers for resource efficiency — Turkey

A number of factors drive resource efficiency in Turkey:

- Import dependency in intermediate products. The share of intermediate products in total imports increased from 13.6 % (10.1 % for non-energy materials) in 2000 to 22.4 % (15.6 % for non-energy materials) in 2011.
- Domestic savings and avoiding waste. Improving efficiency in the use of available resources has been identified as having major potential to decrease the pressure on natural resources. The aim is to improve waste management through waste prevention, better separation at source and improved collection, transport, recycling and disposal systems.
- Pressure on the environment and natural resources. Economic growth, population growth, rapid industrial and technological development, and changes in production and consumption patterns put pressure on the environment.
- EU regulatory requirements and targets. Meeting the targets and goals is a strong driver.

For further information, see country profile.

Box 3.3 Drivers for resource efficiency — Belgium (Federal)

At the federal level, Belgium identified a comprehensive set of policy drivers of resource efficiency, including the following:

- Dependence on raw materials from other counties and price instability as raw material scarcity increases. The circular economy provides opportunities for Belgium to maintain and use materials for longer and thus to be less dependent on third countries.
- Better waste management. Belgium has long been active in the fields of separate collection and recycling of waste.
- Scarcity of the critical raw materials. Several Belgian companies are very active in sourcing, refining, recycling and distribution.
- Through innovation and research, new business opportunities and employment can be created. A 2015 study, commissioned by the Federal Minister for the Environment, estimated that the circular economy would create from EUR 293 million to EUR 1.2 billion of added value and 3 700-11 600 direct jobs by 2030 in four sectors — the chemical and food industries and the machinery and equipment and automotive sectors.
- Next to these economic incentives, there is strong environmental and climate awareness among consumers, government and civil society.

For further information, see country profile.

Several countries referred to the creation of new jobs in green sectors (Belgium, Croatia, France, Italy and the United Kingdom) or to job creation in general (Belgium, Czechia, Denmark, Finland, Germany, Hungary, Latvia, the Netherlands, North Macedonia, Serbia and the United Kingdom) as one of the drivers of their resource efficiency and circular economy policies. For example, Serbia has estimated that the introduction of a circular economy in Serbia could provide 30 000 new jobs and increase the competitiveness of the domestic economy, especially in the recycling sector.

Furthermore, the potential for resource efficiency to provide a new impetus to economic growth was identified by some countries, including Poland (development through local activities), Spain (domestic demand and investment in equipment) and Switzerland (availability of technological know-how).

Economic and environmental drivers were often linked, driving the development and implementation of circular economy policies in parallel (Box 3.3).

3.3 Environmental concerns

Waste management was the dominating driver among the reported environmental concerns. Twenty-six of the reporting countries highlighted a need for improved waste management. Only a few countries, however, specified the waste type, while 11 countries highlighted the need to increase the use of secondary raw materials and to close material loops, which is the economic core of the circular economy.

A noteworthy change between 2015 and 2018 is the fact that waste management significantly increased in importance (26 mentions, compared with 12 in 2015). Likely reasons for this are the concrete targets for recycling and reuse set in EU legislation and the role that 'using waste as a resource' plays in both resource efficiency and the circular economy.

The second most frequently mentioned driver (23 mentions) related to the goal of alleviating pressure on the environment and reducing environmental pollution and degradation.

Thirteen countries specifically referred to the need to reduce greenhouse gas emissions as a driver of resource efficiency. Compared with 2015 (nine mentions), more countries see the resource efficiency and low-carbon agendas as related. In addition, six countries were aiming to actually reduce the use of resources.

In most countries, economic drivers outnumbered those related to environmental concerns. Only Sweden reported that environmental concerns were clearly the predominant driver.

Interestingly, only a few countries — Germany, Italy and the Netherlands — mentioned the availability of national funding programmes for environmental innovation to promote clean technology, material- and energy-efficient products and production processes as a driver.

All in all, it appears that countries increasingly perceive better waste management and the efficient use of materials as an approach that simultaneously safeguards environmental and economic interests. According to the responses, scarcity of resources, security of supply and exposure to high resource costs are problems that can be tackled in part by rationalising the use of material resources, which will in turn protect the environment.

3.4 Regulatory requirements

Compared with the first two categories, compliance with regulatory requirements (accounting for 10 % of all reported drivers) seems to play a rather limited role in stimulating the development of resource efficiency and circular economy policies. Within this category, compliance with the requirements set by the EU was reported as a driver more frequently (14 mentions) than complying with national objectives or targets (10 mentions).

As stated above, only 14 countries identified compliance with EU requirements as a driver for national policies on resource efficiency regulatory requirements — EU recycling targets were mentioned most often. Finland, Ireland and Scotland (United Kingdom) mentioned the importance of the EU circular economy package for national activities — which is not unexpected given that all three have adopted dedicated circular economy strategies or roadmaps. Austria highlighted that some of its targets go beyond the minimum required by the EU.

Compliance with the EU environmental acquis was mentioned by three countries — North Macedonia, Serbia and Turkey. North Macedonia also reported the preparation of a national strategy for sustainable development, which would pave the way for economically, socially and environmentally balanced development. One of the top priorities reported by Serbia was the implementation of policies related to

a circular economy, material resource efficiency and raw material supply. In Turkey, the EU harmonisation process, especially for reaching recycling targets, contributes to national efforts.

Regulatory requirements, such as binding recycling targets, may also create new needs for innovation. The drivers reported for public innovation funding and policies, however, were mainly related to environmental concerns rather than new regulatory requirements.

3.5 Other drivers

Finally, 11 countries reported a total of 19 additional drivers. In contrast to the three categories discussed above, this was a very disparate group, with individual drivers typically mentioned by just one or two countries.

Albania, Bulgaria, Latvia, North Macedonia, Poland, Sweden, Switzerland and Turkey mentioned sustainable consumption and production and the need to help consumers make better choices. Three countries — Bulgaria, North Macedonia and Turkey — referred especially to Sustainable Development Goal 12 on sustainable consumption and production.

The need to reduce social impacts was mentioned by Germany, and the need to address social concerns was reported by Czechia, France and Flanders (Belgium) by addressing the link between jobs and social coherence and by Scotland (United Kingdom) by tackling the circular economy opportunities for social enterprises.

It was interesting to note that only three countries — Belgium, Czechia and Hungary — reported concerns about human health as a policy driver for resource efficiency. This low number is somewhat surprising, as the circular economy package action plan particularly stresses preserving a high level of protection of human health and the environment. It also emphasises the importance of health aspects in connection with the future EU strategy for a non-toxic environment.

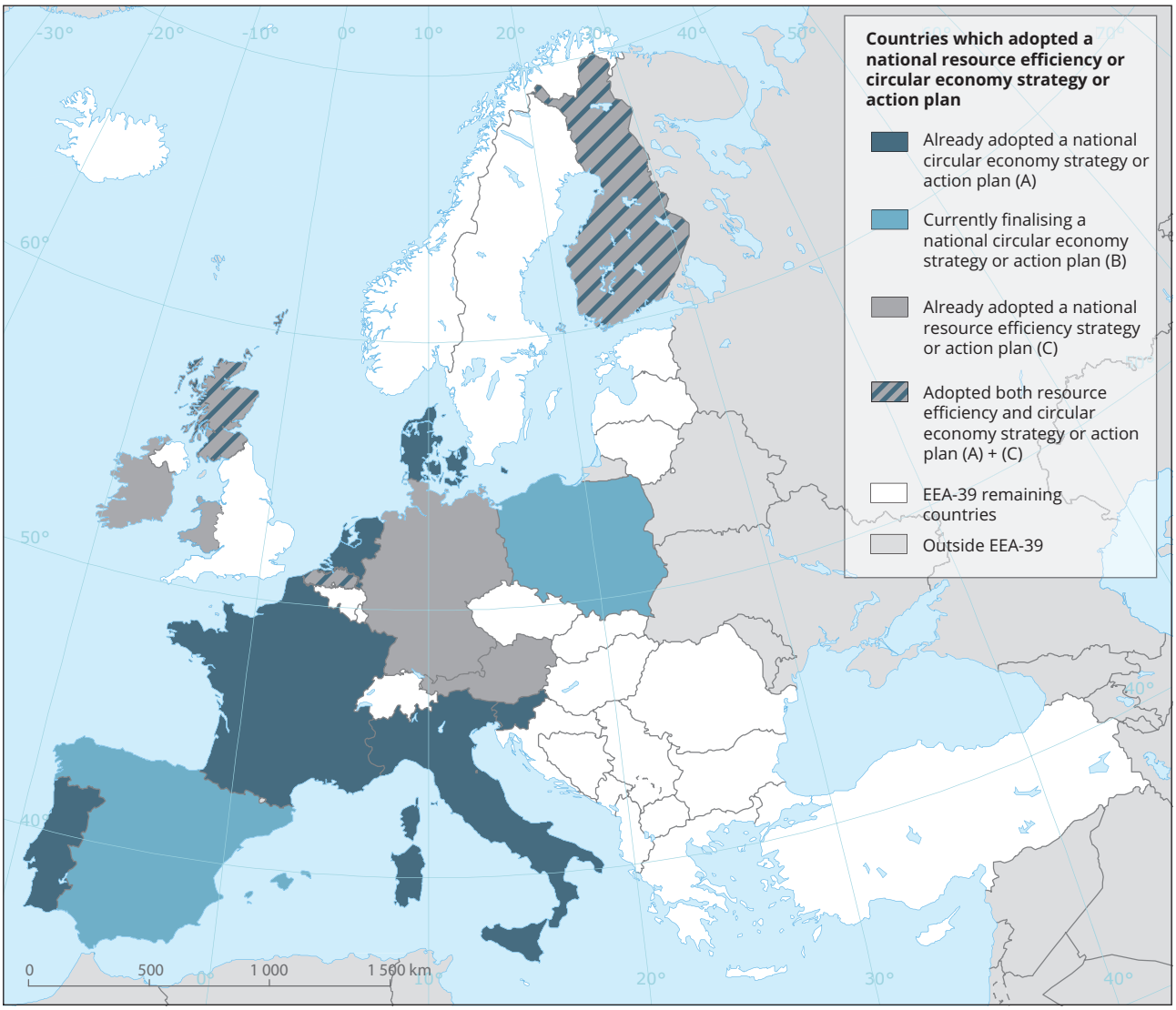
4 Dedicated national strategies or roadmaps for material resource efficiency and for a circular economy

This chapter provides an overview of country responses to two questions:

- Has your country adopted a dedicated national material resource efficiency strategy, an action plan or a roadmap? If so, what are its key objectives and main initiatives?
- Has your country adopted a dedicated national circular economy strategy, an action plan or a roadmap? If so, what are its key objectives and main initiatives?

Full details on initiatives reported by the countries are available in the individual country profiles.

Map 4.1 **Overview of countries that have adopted a national resource efficiency or circular economy strategy or action plan**



In contrast to the 2016 *More from less* report, countries were asked to report not only on the development of dedicated strategies, actions plans or roadmaps for material resource efficiency but also on dedicated strategies, roadmaps or action plans for a circular economy.

Map 4.1 presents an overview of developments reported by the countries.

Please note that the map shows only those countries that have adopted a policy document on resource efficiency or a circular economy or that are in the final stages of a formal policy development process. The map does not include those countries that reported an intention to adopt a policy only at some undefined point in the future.

4.1 Material resource efficiency strategies, action plans and roadmaps

Relatively little has changed since 2016 in the number of countries that have either resource efficiency policies or new dedicated policy initiatives.

Out of 32 countries that participated in this review, the majority continued to cover various aspects of resource efficiency in other policy areas, rather than having dedicated policy documents on resource efficiency. Four — Austria, Finland, Germany and Ireland — reported having a dedicated national strategy, while, at a subnational level, three devolved administrations provided information on such strategies: Flanders (Belgium), Scotland (United Kingdom) and Wales (United Kingdom).

The German resource efficiency programme was adopted in 2012 (ProgRess I) and updated in 2016 (ProgRess II; Box 4.1). The programme focuses on abiotic and biotic resources, while the use of fossil fuels and biotic resources for energy generation are addressed in strategies related to Germany's energy transition.

The 2013 Finnish strategy for sustainable growth through material efficiency sought to combine economic growth with a more economical use of resources. An update, published in 2018, emphasises a more circular approach — the results of a review in 2017 helped revise work on national material

Box 4.1 Germany's updated ProgRess

ProgRess II aims, when appropriate, to address energy and material flows together to exploit synergies between them and to recognise and resolve goal conflicts at an early stage.

ProgRess II continues to focus on market incentives, information, consultation, education, research and innovation and on strengthening voluntary measures and initiatives to increase resource efficiency along the entire value chain. In addition, it makes use of overarching instruments. Ten action areas are considered in this context:

1. securing the sustainable supply of raw materials;
2. increasing resource efficiency in production;
3. making production and consumption more resource efficient;
4. developing a resource-efficient circular economy;
5. ensuring sustainable building and urban development;
6. adopting resource-efficient information and communication technology;
7. applying cross-cutting instruments;
8. exploiting synergies with other policy areas and resolving goal conflicts;
9. supporting resource efficiency policy at local and regional levels;
10. strengthening resource policy at international and EU levels.

ProgRess II also includes a new target for resource efficiency (for more detail, see Chapter 9).

efficiency and identify measures that best respond to the EU circular economy package and the United Nations 2030 agenda Sustainable Development Goals. It is worth noting that, in addition to this update, Finland already had a separate circular economy roadmap, which was updated to circular economy roadmap 2.0 in March 2019.

Three regions/devolved administrations have adopted strategies or roadmaps for resource efficiency. Flanders' 2011 materials programme was followed up by new activities for the period 2012-2015, developed as first steps in the transition to a circular economy.

Scotland's material resource efficiency strategy is based on its waste prevention programme, Zero Waste — Safeguarding Scotland's Resources, adopted in 2013. The programme's aim was to make today's production and consumption model more resource efficient while also laying the foundations for a more circular model of resource use. In 2016, *Making Things Last: a circular economy strategy for Scotland* was published, building on the progress that has been made under the zero waste and resource efficiency strategies and integrating their key elements into the one strategy.

Interestingly, Ireland (Box 4.2) and Wales (United Kingdom), took a route similar to that of Scotland. They developed their national waste management plans or waste prevention programmes (required by EU waste legislation) into policy documents with a broader scope, explicitly covering resource efficiency.

Table 4.1 presents an overview of key objectives in dedicated strategies and programmes for material resource efficiency.

Box 4.2 Towards a resource-efficient Ireland

Ireland's national waste prevention programme, Towards a Resource Efficient Ireland, will run from 2014 to 2020. It looks beyond waste prevention to also address the broader concept of resource efficiency.

The overarching objective is to implement EU and national policies on resource efficiency to break the link between economic growth and environmental impact. More specifically, the strategy aims, among other things, to:

- reduce wasteful consumption of materials, water and energy resources by changing behaviour in businesses, households and the public sector;
- enhance competitiveness and reduce business costs by delivering programmes that stimulate resource efficiency and the circular economy;
- support sustainable growth and employment in the green economy — including reuse enterprises.

For further information, see country profile.

Table 4.1 Overview of key objectives in dedicated strategies and roadmaps for resource efficiency

Country	Key objectives
Austria	Increasing resource efficiency; reducing resource use and related environmental impacts; increasing competitiveness; securing the supply of natural resources; creating green jobs.
Belgium (Flanders)	Closing material cycles; lowering consumption of materials.
Finland	Economic growth; economical use of resources; efficient management of by-products; reducing waste; better recycling.
Germany	Decoupling economic growth from resource use, taking into account global responsibility for resource consumption; minimising associated environmental pressures.
Ireland	Reducing wasteful consumption of materials, energy and water; enhancing competitiveness and reducing business costs; supporting sustainable growth and employment in a green economy.
Scotland (United Kingdom)	Preventing waste; increasing resource efficiency; shifting towards a more circular economy.
Wales (United Kingdom)	Increasing waste prevention; more sustainable ways of consuming and producing; more green jobs within the waste and resource management industries; resilience against rising costs and the security of supply of global material resources; increasing profit through more efficient resource management.

As might be expected, increasing resource efficiency was a key objective in all seven reported strategies. Other frequently mentioned objectives included lowering the consumption of materials, more economical use of resources and minimising associated environmental pressures. Three countries explicitly mentioned creating new jobs through activities on resource efficiency.

One somewhat surprising fact was that only two countries referred to improving the security of the supply of materials as a key objective, although this topic was more frequently mentioned in circular economy strategies and is also covered by dedicated raw material strategies discussed in Chapter 5.

Countries reported a wide variety of actions and measures to support the achievement of key objectives, including the following: providing resource efficiency consulting services for small and medium-sized enterprises and other businesses; setting up resource efficiency networks; stimulating innovation and business opportunities; adopting material-efficient production processes and product design, including resource aspects in standardisation processes; and increasing focus on resource-efficient products and services in public procurement.

4.2 Dedicated strategies, action plans and roadmaps for the circular economy

In total, 21 of the 32 participating countries reported having initiated work on national policy documents related to the circular economy. This is quite a remarkable state of affairs just 3 years since the publication of the EU action plan for the circular economy in December 2015.

Nine countries reported having adopted a dedicated circular economy strategy, action plan or roadmap at various administrative levels. In eight of these — Belgium, Denmark, Finland (Box 4.3), France, Italy, the Netherlands, Portugal and Slovenia — policy documents were adopted at the national level. An additional two countries — Poland and Spain — are at the stage of adopting a circular economy roadmap or strategy. Another 11 countries reported having the intention of launching a circular economy strategy, roadmap or action plan.

4.2.1 The circular economy at subnational level

In two countries, the reported policy initiatives took place at the subnational/regional level: Belgium (Flanders and Brussels Region) (Box 4.4) and the United Kingdom (Scotland and London). Policies in Flanders/Brussels and Scotland are not surprising given the governance structure of their countries; however, it is worth noting the circular economy action plans adopted at city level in London and Peterborough. In England (United Kingdom), more so than in any other UK region, there has been a trend towards cities developing local actions to promote the circular economy.

Spain also reported work on circular economy policies in several of the country's autonomous communities, including Andalusia, Castile La Mancha, Castile Leon, Catalonia, Extremadura, Galicia, Madrid, Murcia and the Basque Country.

Box 4.3 Recently adopted circular economy action plans in Finland

After the Finnish roadmap to a circular economy (2016) and the circular economy action plan (2017), a second version was adopted — circular economy roadmap 2.0 in March 2019.

Finnish society is deeply involved in turning the economy into a more circular one, with over 30 new actions committed to and most crucial stakeholders involved. With the updated version, instead of focus areas, the actions are discussed through target groups: state administration, municipalities and cities, companies and citizens. Most of the actions are cross-sectoral with several target groups as owners.

For further information, see country profile.

Box 4.4 Brussels Region programme for a circular economy — Be Circular

In 2016, the Brussels Region developed its own transition programme towards a circular economy. This 4-year programme, called Be Circular, aims to offer a holistic vision of circularity, together with practical interpretation through an initial series of levers at its disposal. It involves various ministerial departments and a wide diversity of private, public and community-based regional and municipal stakeholders to meet a range of cross-functional challenges and carry out increasingly sector-based actions.

Be Circular pushes forward three main objectives:

1. transforming environmental objectives into economic opportunities;
2. anchoring economic activities within Brussels' boundaries to maximise resource circularity while boosting entrepreneurship;
3. creating new employment opportunities.

The programme itself consists of an action plan of 111 measures covering transversal, governance, territorial and sectoral topics for delivering circular patterns at regional level. It focuses on five key economic sectors: retail, logistics, waste and resources, food, and construction and the built environment.

For further information, see country profile.

4.2.2 Scope of the circular economy and how to achieve systemic change

The scope and comprehensiveness of national circular economy policy documents varies widely. As can be expected, in the early adopting countries, such as Finland and the Netherlands (Box 4.5), the policy framework is quite extensive, and several mutually reinforcing initiatives are in place to support the circular economy. Some issues identified include the complexity and rebound effect of systemic changes; economic challenges, because circular economy business may be unprofitable in the short term; imperfect markets; and inadequate legislation and/or implementation or insufficient knowledge and skills.

Some circular economy strategies explicitly include voluntary sectoral agreements or sectoral transition agendas, for example in France and the Netherlands (Box 4.5).

4.2.3 Circular economy policy objectives

Key objectives within national circular economy policies included reducing the use of primary and non-renewable materials; increasing the share of recycled and reused materials; introducing new business models for reuse, refurbishment and remanufacturing; improving communication and education for a circular economy; and developing effective indicators to monitor the transition.

It is worth noting that reducing greenhouse gas emissions was frequently mentioned as an important objective, much more often than resource efficiency-oriented policies. This is perhaps because of a combination of the growing importance of the low-carbon agenda and the high greenhouse gas reduction potential of recycling, in particular of food waste and biomass. France even embedded its circular economy roadmap within the framework of its Energy Transition Law for green growth.

Last but not least, transition to a circular economy was also often seen as an important opportunity to strengthen the economic competitiveness of a country or create new jobs (Box 4.6).

Very few measurable targets have been included in the reported circular economy strategies and action plans. One exception is the Dutch government programme for a circular economy by 2050, which includes a quantitative target for reducing the use of primary raw materials (minerals, fossil-based minerals and metals) by 50 % by 2030. Another example is the French roadmap to the circular economy, with its target to reduce the material intensity of French consumption — domestic material consumption (DMC)/gross domestic

Box 4.5 A circular economy in the Netherlands by 2050 — national agreement and transition agendas

In September 2016, the Dutch government launched a government programme for a circular economy by 2050. Jointly developed by the Ministries of Infrastructure and the Environment, Economic Affairs, Interior and Kingdom Relations, and Foreign Affairs, it will provide a framework for all government policy efforts on the circular economy, resource efficiency and raw materials.

Five priority sectors have been identified:

1. biomass and food;
2. plastics;
3. manufacturing industry;
4. construction;
5. consumer goods.

For each of these sectors, in 2017 and 2018, transition agendas were developed with the help of relevant stakeholders from each.

These transition agendas are an elaboration of the national agreement on the circular economy (*Grondstoffenakkoord*), which was signed on 24 January 2017 by the government and its nine drafting partners from business, trade unions, local/regional governments and non-governmental organisations (NGOs).

By early 2018, almost 400 organisations had signed this (voluntary) agreement. The signatories share the ambition of realising a circular economy in which the efficient and intelligent use of raw materials and products will help to reinforce the earning capacity of the Dutch economy, as well as helping to bring about the sustainable use of natural capital and achieve climate and other environmental goals.

For further information, see https://www.government.nl/topics/circular-economy/documents/discussion-documents/2017/01/24/national-agreement-on-the-circular-economy.

product (GDP) — by 30 % by 2030 compared with 2010.

Examples of concrete action envisaged in national circular economy plans varied widely. They included increased recycling and recovery; reuse, repair and remanufacturing; shifting to a sharing economy; increased use of eco-design; extended producer responsibility; incentives to create markets for secondary materials; education and vocational training initiatives; support for research and innovation; industrial symbiosis; and financing mechanisms, including public procurement.

4.2.4 Circular economy priority areas

Most countries sought to identify priority areas for circular economy policy intervention in a more concrete way than tended to be the case for resource efficiency policies. Table 4.2 provides an overview.

One noteworthy development was that some countries set out to estimate benefits from implementing the circular economy, in terms of not only financial/GDP benefits but also reducing greenhouse gas emissions or creating jobs (Box 4.6).

Table 4.2 Overview of priority areas identified in circular economy strategies and roadmaps

Country	Priority areas
Belgium (Federal)	Focus on products including increasing recovery of components and materials from products; making products more robust; avoiding use of hazardous chemicals; promoting use of renewables; and recovery of secondary materials.
Belgium (Flanders)	Three strategic themes: (1) circular procurement; (2) circular cities; (3) circular businesses.
Denmark	Six areas of intervention: (1) strengthen enterprises as a driving force for circular transition; (2) support circular economy through data and digitisation; (3) promote circular economy through design; (4) change consumption patterns through circular economy; (5) create a proper functioning market for waste and recycled raw materials; (6) get more value out of buildings and biomass.
Finland	Mainly cross-sectoral circular economy actions are defined for each stakeholder group: state administration, municipalities and cities, companies and citizens.
France	Fifty actions envisaged in four topic areas: (1) production; (2) consumption; (3) management of waste; and (4) wide stakeholder involvement.
Italy	Product design; new business and consumption models; industrial symbiosis; bioeconomy; fiscal and economic instruments; green public procurement; efficient use of resources; monitoring and indicators.
Netherlands	Five priority sectors: (1) biomass and food; (2) plastics; (3) manufacturing industry; (4) construction; (5) consumer goods.
Portugal	Four key sectors: (1) tourism; (2) construction; (3) textiles/footwear; and (4) agri-food and retail.
Slovenia	Four priority fields: (1) food system; (2) forest-based value chains; (3) manufacturing industry; and (4) mobility.
Scotland (United Kingdom)	Four priority areas: (1) food and drink and bioeconomy; (2) energy infrastructure; (3) construction and buildings; and (4) remanufacturing.

Box 4.6 Is it worth it?

As part of the policy development process, several countries have undertaken to estimate the benefits to the national economy from implementing the circular economy. Examples include:

- Belgium (Flanders) — savings in material costs of 2-3.5 % of the Flemish GDP and the creation of 27 000 additional jobs.
- Denmark — the transition towards a circular economy will result in up to DKK 45 billion increase in GDP and a reduction in CO_2 emissions of between 3 % and 7 %.
- Finland — an additional EUR 1.7 billion in GDP, 5 000 new jobs by 2030, a 2.6 % reduction in consumption-related greenhouse gas emissions and a 0.6 % reduction in raw material consumption.
- France — creation of 300 000 new jobs, avoidance of 8 million tonnes of greenhouse gas emissions though plastic recycling and reduction in the amount of non-hazardous waste sent to landfill by half.
- Netherlands — EUR 7.3 billion savings on the cost of raw materials, 54 000 new jobs created, avoidance of 17 million tonnes of greenhouse gas emissions and reduction in the use of raw materials by 100 million tonnes.

Although such estimates are by their nature imprecise, having concrete figures at hand has proved to be a powerful impetus for circular economy policy development.

5 Overview of dedicated national or sectoral strategies for raw materials

This chapter provides an overview of responses to the question about dedicated national or sectoral strategies for raw materials.

This is the first time that the question about raw materials strategies has been included in EEA/Eionet (European Environment Information and Observation Network) survey. The reason for this is the growing importance of this topic on the EU policy agenda. During the last decade, the European Commission undertook a number of policy initiatives related to raw materials, with special emphasis on the security of raw material supply and the identification of critical raw materials (CRMs). The 2015 circular economy package (COM(2015) 614 final) and its 2018 update (COM(2018) 28 final) further reinforced the strategic importance of using secondary resources as a substitute for virgin materials.

Within this context, this chapter aims to examine how and to what extent European countries and regions are developing national/regional or sectoral strategies for raw materials.

5.1 Countries that reported dedicated national or sectoral strategies for raw materials

In total, 22 countries and regions (about two thirds of all those participating) reported having adopted at least one dedicated national or sectoral strategy for raw materials. Most of those reported having two or more strategies in place (Figure 5.1), often with separate strategies for minerals and metals and for biomass.

Overall, countries reported 45 national/regional strategies or plans (Table 5.1) aiming to foster the development of the mining sector, other raw material extractive activities and forestry, founded on a solid supply from the sustainable exploitation of domestic geological and biological resources and making the most of waste.

Seven countries — Estonia, Finland, France, Italy, the Netherlands, Slovenia and Turkey — reported having three or even four separate raw material strategies. Reasons for this proliferation include the

Figure 5.1 Reported raw material strategies per country/region

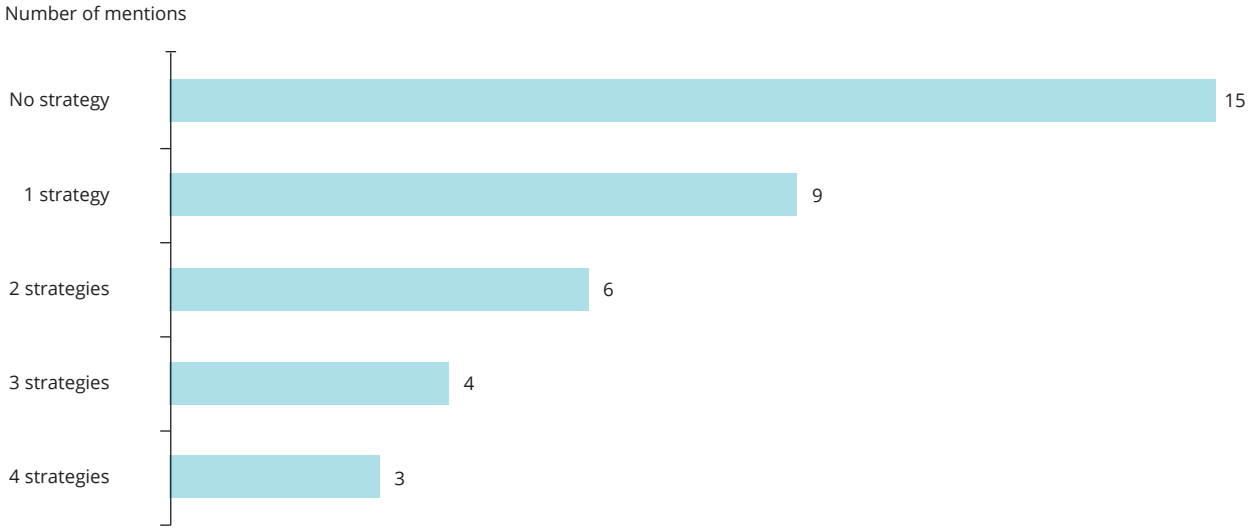


Table 5.1 Reported raw material plans and strategies

Country	National plan or strategy
Austria	• Mineral resources plan (2012) • Raw materials strategy (2012)
Belgium (Flanders)	• Parliament Act on surface mineral resources (2003)
Bulgaria	• National strategy for development of the mining industry (2015) • National strategic plan for the management of construction waste (under development)
Croatia	• Mineral raw materials management strategy of the Republic of Croatia (2008)
Czechia	• Raw material policy of the Czech Republic on mineral materials and their resources (2017)
Estonia	• General principles of Earth's crust policy until 2050 (2017) (A) • Forestry development plan to 2020 (2011) (B) • National development plan for the use of construction minerals 2011-2020 (2011) ([a]) (C) • National development plan for the use of oil shale 2016-2030 (2016) (D)
Finland	• Finland's mineral strategy (2010) and its follow-up (A) • 2013 action plan for Finland's research strategy for mining (B) • National forest strategy 2025 (2015) (C) • The Finnish bioeconomy strategy (2014) (D)
France	• National strategy for the mobilisation of biomass (2017) (D) • National strategy on the sustainable management of land and marine aggregates, quarry materials and substances (2012) (A) • Plan for natural resources (2018) (C) • Comité pour les Métaux Stratégiques (COMES), technical paper on recycling priorities (2019) (B)
Germany	• National raw materials strategy (2010)
Hungary	• National forest strategy (2016-2030) • Raw material action plan (In preparation)
Italy	• Sectoral strategy for raw materials (2010) (A) • National bioeconomy strategy (2017) (B) • Legislative decree on forests and forestry supply chains (2018) (C)
Latvia	• Environmental policy guidelines 2014-2020 (2014) • Development guidelines for forestry and related sectors for 2015-2020
Montenegro	• National strategy for sustainable development by 2030 (2017)
Netherlands	• International responsible business conduct (IRBC) agreements (A) • Raw materials memorandum (2011) (B) • National policy for green growth (2013) (C)
Poland	• State raw materials policy (under development) • Programme for the hard coal mining sector and programme for the lignite mining sector (2018)
Portugal	• National strategy for geological and mineral resources 2020
Slovakia	• Raw material policy (2004)
Slovenia	• Roadmap towards the circular economy in Slovenia (2018) (A) • National mining strategy — mineral resources management (draft for public hearing, 2017) (B) • Slovenian development strategy 2030 (2017) (C)
Sweden	• Sweden's mineral strategy (2013) • Strategy for environmentally sustainable management of mining waste (2017)

Table 5.1 Reported raw material plans and strategies (cont.)

Country	National plan or strategy
Turkey	• The iron, steel and non-iron metals strategy and action plan (2018-2021) (undergoing approval process) (A) • Draft ceramics strategy and action plan (2018-2021) (undergoing approval process) (B) • Input supply strategy and action plan (2017-2019) (C)
United Kingdom (England)	• Resource security action plan (2012)
United Kingdom (Wales)	• Natural resources policy (2017)

Notes: Letters A, B, C and D refer to specific strategies of the reporting countries and are used in Table 5.2.

([a]) This plan has ended earlier than initially envisaged, since, reportedly, its goals were achieved.

Table 5.2 Focus on materials in countries with multiple raw material strategies

Main materials focus	Estonia	Finland	France	Italy	Netherlands	Slovenia	Turkey
Minerals		A	A	A	AB	A	
Metals			B				A
Secondary materials			ABC	B	BC		
Mining	A	B		A		B	
Biomass	B	C	CD	BC	ABC		
Bioeconomy		D		BC	BC		
Construction	C		C	B			B
Energy	D		CD				
General						C	C
Social				C	A		

Note: Letters A, B, C and D refer to specific strategies of the reporting countries/regions, as listed in Table 5.1.

existence of different issuing entities; the evolution of economic, environmental and/or societal priorities over time; a different focus on main materials; and the involvement of different stakeholders and value chains.

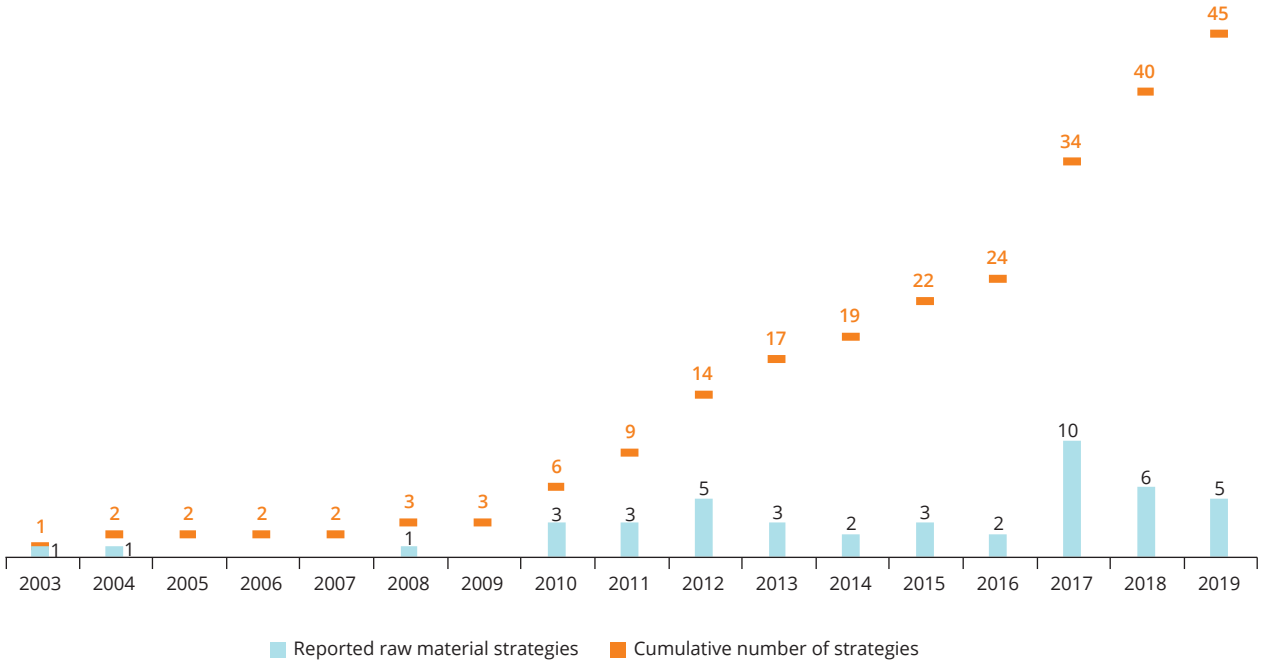
Most of the reported national/regional raw material strategies were implemented after 2010 (Figure 5.2). The development of these strategies between 2010 and 2016 might have been triggered by turbulence in international market trading in rare Earth elements and other critical materials, leading to price volatility. The new wave of strategies that followed after 2016 was probably due to a combination of the spreading concept of circular economy, European critical materials lists and efforts to re-industrialise EU economies.

Interestingly, 11 responding countries from among the old EU-15 Member States accounted for more than half of the reported strategies and three quarters of the strategies focusing on biomass, although other countries have seen an increase in policy development in the last few years.

5.2 Regional and local involvement

Countries in which regional authorities are responsible for raw material strategies report different approaches to dealing with such responsibilities. For example, in Belgium and Denmark, there are no dedicated national raw material strategies. In Denmark, each of the five regions of the country develops its own planning and management strategies for the extraction of raw materials in its geographical area. In Belgium, only Flanders reported having specific raw material strategies in place. In the United Kingdom, national resource strategies and a dedicated action plan are in

Figure 5.2 Cumulative and yearly number of reported raw material strategies



Note: 2019 was assumed as the launch year for strategies reported as 'under development'.

place, although Wales (United Kingdom) provided the details of its own natural resources policy.

Other reported initiatives dealing with regional and local issues include those listed below:

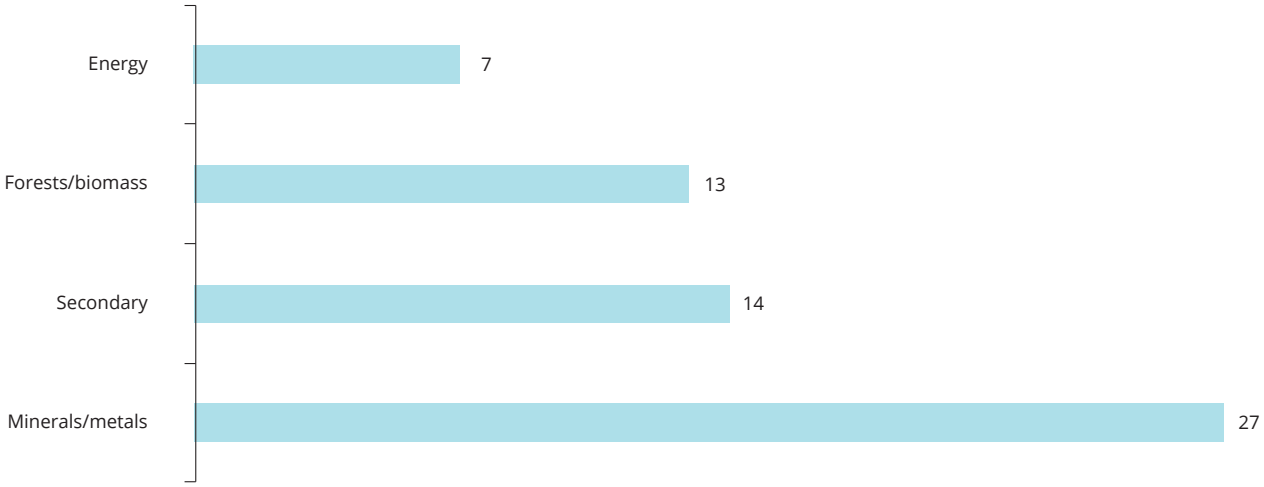
- In Austria, municipalities provided details of their specific needs during the process of preparing the mineral resources plan. These are meant to be used as a basis for planning future national mining activities.
- In Italy, the Laboratorio Materie Prime initiative sets out to bring more consistency to the national raw materials strategy by overcoming the current fragmentation in many non-coherent regional raw material-related norms. It also supports the development of a circular economy, through both governmental and regional action towards increased recovery of raw materials. The newly adopted legislative decree on forests and forestry supply chains explicitly refers to the development of local supply chains supported by forestry-related activities as well as the need to offer economic opportunities that help to avoid the depopulation of remote areas of the country.
- The Polish Ministry of the Environment, in the process of developing a state raw materials policy, has started a public consultation process that includes a 12-month series of regional conferences in the largest Polish cities to present and discuss the draft document locally.
- The Portuguese strategy for geological and mineral resources aims to promote a mining sector that explicitly promotes regional development, guarantees returns and employment for local people and ensures the development of communities.

5.3 Objectives and scope of dedicated national and sectoral strategies for raw materials

5.3.1 Types of raw materials in focus

Looking at the 45 reported national and sectoral strategies, a distinction can be made between those that focus on minerals and/or metals, secondary raw materials, wood and bio-based materials, and fuels. Almost 70 % of the reported strategies focused on a single category of raw material, whereas 14 strategies in nine countries — Austria, Czechia, France, Germany, Hungary, Italy, the Netherlands, Poland and Wales (United Kingdom) — concentrated on two or more categories at once.

Figure 5.3 Number of strategies reported per raw material category priority



Most frequently reported was a focus on minerals, ores and metals. In many cases — 17 out of 27 strategies — it was the sole focus of a given raw material strategy (Figure 5.3).

A number of countries reported strategies with an important energy-related focus. Czechia and Hungary referred to imports of energy carriers; Poland and Estonia referred to extraction of domestic energy carriers, such as coal, lignite and shale oil; France referred to bioenergy; and Wales (United Kingdom) referred to minerals for renewable energy generation.

Five countries — Estonia, Finland, Hungary, Italy and Latvia — included strategies that explicitly envisaged promoting domestic forestry for timber and wood production, and three countries — Finland, Italy and the Netherlands — have implemented dedicated strategies for developing a bioeconomy that envisages a gradual substitution of non-renewable materials with bio-based ones in a sustainable and economically sound way.

Roughly one third of the strategies explicitly focused on waste as a potential source of raw materials and highlighted the importance of recycling pre- and post-consumer waste. Interestingly, none of these strategies was found to be driven by waste legislation.

5.3.2 Strategic purpose and drivers of raw material strategies

Figure 5.4 shows different categories of strategic purpose and drivers and their relative importance.

Economic growth and environmental sustainability were the two most mentioned drivers of raw material strategies.

Economic growth

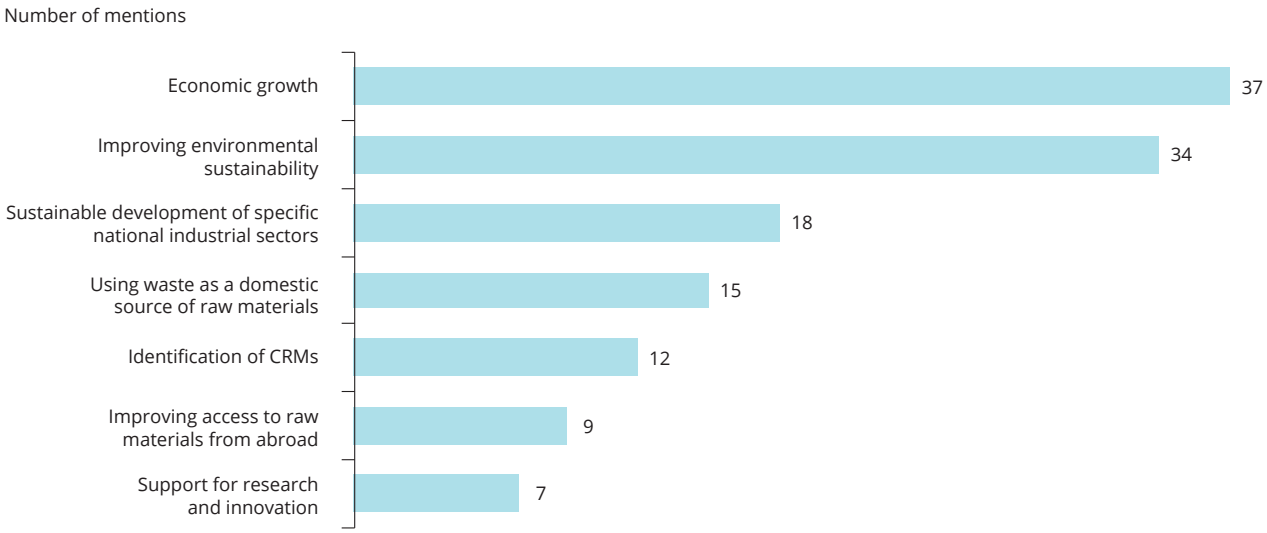
Most countries put economic considerations at the top of the list of declared strategic purposes. These included improving the competitiveness of national industries, creating value-adding opportunities and increasing national/regional raw material self-sufficiency. With a few exceptions, notably Finland and Portugal, raw material policies rarely seem to target the competitiveness of the mining sector itself; rather, they aim to contribute to the economy by making domestic industries less dependent on imports (e.g. Poland and Slovakia).

Other strategies specifically highlighted the goal of creating opportunities for raw materials-related industrial symbiosis — Bulgaria, Italy and Sweden — or included action for achieving international leadership and expertise in sustainable extraction — Finland.

Improving environmental sustainability

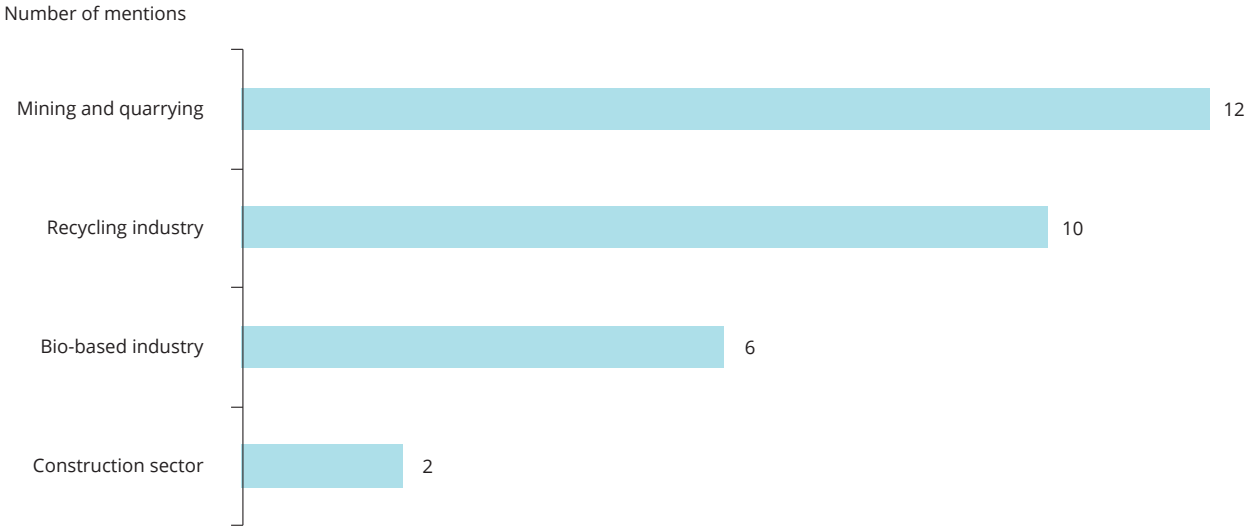
Reducing environmental burdens associated with mining and extracting minerals and metals from domestic sources, or with harvesting and planting forests for producing timber and wood, appears to be a key driver in almost all of the reported raw material strategies.

Figure 5.4 Drivers and strategic purposes of raw material strategies



Note: CRM, critical raw material.

Figure 5.5 National industrial sectors explicitly targeted in strategies



Sustainable development of specific national and regional industrial sectors

National and regional raw material strategies are often expected to improve the sustainability of specific, national industries (Figure 5.5) — a country's mining and quarrying sector being the most obvious and recurrent one. The majority of countries with such strategies in place have defined objectives that explicitly aim to improve the sustainability of their national mining and quarrying industries.

The bio-based industrial sector is focused on countries — Estonia, Finland, Hungary, Italy, Latvia, and the Netherlands — that emphasise biotic raw materials and the development of a bioeconomy. This is often related to the forestry, building and construction, cosmetics and pharmaceutical sectors.

Dedicated strategies involving construction materials and waste were identified. In Bulgaria, a construction waste management system, which should facilitate cost-effective recycling, is under development.

Recycling industries are expected to benefit from strategies that promote the use of waste as a domestic source of materials.

Using waste as a domestic source of raw materials

A few countries reported having implemented raw material strategies that are exclusively dedicated to the recovery of materials from a particular waste stream, such as construction waste in Bulgaria, metals in France and mining waste in Sweden. The majority of countries, however, referred to the recovery of secondary construction materials and metals from mining, industrial and post-consumer waste flows as part of their mineral raw material strategy — Austria, Bulgaria, Czechia, Germany, Hungary, Latvia, Poland and Sweden. Using organic waste as a source of materials was mostly considered in countries that implemented a bioeconomy strategy — Finland, Italy and the Netherlands.

Identification of critical raw materials

Twelve countries/regions made reference to an adopted or proposed list of materials deemed critical for their economies.

Some countries, such as Czechia and Hungary, reported having applied the approach and results of the EU criticality assessment (Box 5.1) to their own context.

In some countries, including Czechia, the EU list of CRMs was used to identify CRMs at the national level but with emphasis on the needs of industries. Three countries indicated that they had mapped the occurrence and mining potential of deposits of EU-listed CRMs in their territories — Czechia, Slovenia and Sweden.

Most of the 12 countries that reported having adopted a list of CRMs developed surveys for or dedicated research initiatives to assess the criticality of materials for their economy or industries — Austria, France, Ireland, the Netherlands, Poland, Scotland (United Kingdom), Sweden and Wales (United Kingdom).

Two innovative initiatives that may increase the awareness of materials criticality for individual companies were highlighted by the Netherlands and Switzerland:

- **Netherlands:** Grondstoffenscanner, a self-assessment tool for evaluating the criticality of resources for businesses.
- **Switzerland:** Reffnet.ch, a resource checking tool that enables small and medium-sized enterprises to determine their specific exposure to the growing scarcity of rare metals and develop corresponding innovation and response strategies.

Improving access to raw materials from abroad

Specific strategies were developed to facilitate access to raw materials from outside Europe.

Box 5.1 List of critical raw materials for the EU

Raw materials form the basis of Europe's economy. They are crucial for creating jobs and ensuring competitiveness. Some raw materials are of more concern than others in terms of a secure and sustainable supply. The European Commission regularly updates a list of critical raw materials for the EU, as well as fine-tuning the underlying criticality assessment methodology. Successive EU critical raw material lists were published in 2011, 2014 and 2017.

Critical raw materials are both of significant economic importance to the EU and at high risk of supply disruption. The risk of supply not being adequate to meet EU industrial demand can arise from several sources, including concentration of primary supply in countries exhibiting poor governance, distorted international markets and high dependency on imports. Recycling and substitution can contribute to reducing the risk. Economic importance is calculated based on the significance of a given material in EU end-use applications and the performance of available substitutes in these.

China is the major supplier of critical raw materials — rare Earth elements, magnesium, antimony, natural graphite, etc. — accounting for 70 % of their global supply and 62 % of their supply to the EU. Brazil (niobium), the United States (beryllium and helium), Russia (palladium) and South Africa (iridium, platinum, rhodium and ruthenium) are also important producers of critical raw materials.

The latest update of the EU critical raw materials list was published in 2017, based on an assessment of 78 raw materials, of which 27 were judged critical for the EU because of considerable risks of supply shortage and their high economic importance. The risks associated with the geographical concentration of production of these materials are often compounded by low substitution and recycling rates.

For further information, see http://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en.

Germany, for instance, has established bilateral raw material partnerships and credit guarantees to create opportunities for diversifying its supply of raw materials. These partnerships aim to support cooperation among companies from both Germany and the exporting countries in the fields of development, extraction, processing and use of mineral raw materials, with the aim of developing a secure and sustainable supply and use of raw materials and of encouraging technology and innovation transfer. Currently, Germany has bilateral raw material partnerships with Kazakhstan, Mongolia and Peru.

The Netherlands is the only country that reported having implemented initiatives that aim to reduce potentially adverse impacts on human rights and/or negative environmental impacts in international raw material supply chains. In this particular case, for some raw materials, specific international responsible business conduct agreements have been developed, which include the practical application of the Organisation for Economic Co-operation and Development (OECD) due diligence guidance.

Support for research and innovation

Strategies in several countries — Bulgaria, Estonia, Finland, France, Germany, Latvia and Switzerland — mentioned research and innovation as a driver of raw material policies.

5.4 Compilation of data on projected demand for raw materials

Some countries explicitly reported that their national statistical services annually compile national economy-wide material flow accounts and submit them to Eurostat, in compliance with EU Regulation No 691/2011 on European environmental economic accounts. These accounts present data on domestic extraction, imports and exports of 45 material categories, covering biomass and metallic and non-metallic minerals. In general, national geological surveys provide publicly available data on domestic extraction.

Only Flanders (Belgium) reported having developed projections of future demand, particularly for domestically available mineral resources. Other countries may have such policies, but they were not reported.

5.5 National raw material platforms and fora

Several countries, all EU-15 Member States, reported various national raw material platforms, institutions or agencies. Their aim is to facilitate the exchange of expertise and insights among different sectors involved in raw material strategies, often integrating research institutes, policymakers and companies.

- In France, the **Comité pour les Métaux Stratégiques (COMES)** serves as a forum for exchanges between manufacturers, administrations and research laboratories. Its objective is to direct research, particularly on the circular economy; bring stakeholders together; and share information on strategic metals — markets, innovations, etc. — and help industry anticipate risks related to their procurement.

- The **German Mineral Resources Agency (DERA)** is a national competence centre for natural resources and the central information and advisory platform for mineral and energy resources for German industry. It advises government and industry on matters concerning secure and sustainably managed raw material supply, and it runs the competition for the German Raw Materials Efficiency Award.

- In Italy, the **Laboratorio Materie Prime** is a network of major mining organisations involving Assomineraria, Aitec, Marmomacchine, Anim and Anepla; the scientific world through the University of Milan; and public administration bodies including the Ministry of Economic Development (MISE), the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the National Institute of Statistics (Istat) and the Institute for Environmental Protection and Research (ISPRA).

- The Finnish **Network for Sustainable Mining** is another example of a voluntary instrument that brings together stakeholders affected by and involved in mining. The focus of activities is on voluntary action and self-regulation.

- The Flemish Department of Environment and Spatial Planning (OMG), the Public Waste Agency of Flanders (OVAM) and the Flemish Institute for Technological Research (VITO) established a **partnership for monitoring and collecting data** on current demand and on imports and exports of virgin and secondary materials.

Box 5.2 More information on raw material strategies

The analysis presented in this report is based exclusively on the information provided in the country profiles. In some cases, this information may not be fully complete, or totally up to date, especially for a topic that is not a traditional part of the environmental agenda.

Therefore, the authors encourage interested readers to consult additional sources on the national and European raw material sectors, starting with the EU knowledge platform on non-energy, non-agricultural raw materials, the so-called Raw Materials Information System (RMIS), developed and hosted by the Joint Research Centre (JRC) (http://rmis.jrc.ec.europa.eu).

In addition, the links below point the reader to a number of EU-funded projects, typically under the Horizon 2020 scheme:

- Prospecting secondary raw materials in the urban mine and mining wastes (ProSUM): http://www.prosumproject.eu
- Mineral policy guide (MinGuide): https://www.min-guide.eu
- Global material flows and demand-supply forecasting for mineral strategies (MinFuture): https://minfuture.eu
- Towards a world forum on raw materials (FORAM): http://www.foramproject.net
- Mineral intelligence capacity analysis (MICA): http://www.mica-project.e
- Expert network on critical raw materials (Scrreen): http://scrreen.eu
- Vision and roadmap for European raw materials in 2050 (VERAM): http://veram2050.eu
- Mineral resources in sustainable land-use planning (MinLand): http://minland.eu
- Mineral deposits of public importance (MiNatura2020): https://minatura2020.eu
- International Raw Materials Observatory (Intraw): https://intraw.eu
- Mining and metallurgy regions of EU (MIREU): https://www.mireu.eu
- Optimising data collection for primary and secondary raw materials (ORAMA): https://orama-h2020.eu
- Smart data collection and integration platform to enhance availability and accessibility of data and information in the EU territory on secondary raw materials (SmartGround): http://www.smart-ground.eu
- Strategic dialogue on sustainable raw materials for Europe (STRADE): http://stradeproject.eu
- Sustainable wood for Europe (Rosewood): https://rosewood-network.eu

6 Policies that include elements of material resource efficiency and the circular economy

This chapter provides an overview of those policies reported by countries that cover, in part, resource efficiency and the circular economy, among other topics.

Countries without dedicated strategies or action plans may still cover resource efficiency, the circular economy or raw material supply within other policies. For example, both countries with and without dedicated strategies reported that circular economy, resource efficiency and raw material objectives have been incorporated into sustainable development strategies or environmental framework programmes in recent years.

Most reported policies cluster around a few main topics: waste management and waste prevention, innovation and research and development (R&D), and economic development and industrial programmes. The specific sectors that were frequently reported include forestry, food and agriculture, and industry.

In addition to a wide variety of related policies, several countries noted that the institutional panorama is also complex, with several ministries or agencies involved in the work. The topic of institutional arrangements is covered in more detail in Chapter 7.

6.1 Policies and strategies that contain elements of material resource efficiency and the circular economy within other topics

All 32 participating countries and regions reported covering material resource efficiency or the circular economy to varying degrees within other policies. In total, about 300 examples were provided. In some cases, countries also reported the objectives shared with other policy areas, including those related to waste, resource use, economic competitiveness and reducing environmental pressure.

The majority of countries reported between 5 and 10 examples of policies that include elements of resource efficiency/circular economy concerns, but this ranged from a low of two to a high of more than 20. Therefore, rather than reporting the number of mentions of a policy in a specific area, this chapter reports on the number of countries that mentioned it — the rationale being that one country reporting the same policy area five times has less weight than five countries reporting it once.

Furthermore, it is worth noting that the situation is developing dynamically — about one quarter of the reported policies have been adopted, implemented or revised since 2016 (Figure 6.1).

By far the most frequently mentioned policies were waste-related policies (31 countries). This is consistent with the results of the 2011 and 2016 EEA surveys and is hardly surprising, given the many links between resource efficiency and the circular economy on the one hand and waste management and waste prevention on the other. As an example, Finland explicitly integrated circular economy objectives into its national waste plan from 2017 (Box 6.1).

It is interesting to note that 17 countries reported adopting or revising/updating their waste management or waste prevention policies in 2016 or more recently. This may well be because the 2015 EU circular economy action plan was accompanied by four legislative waste proposals, which illustrates the tight policy connection at EU level.

Specific waste streams that were reported frequently include food, industrial, construction and demolition, and biodegradable wastes.

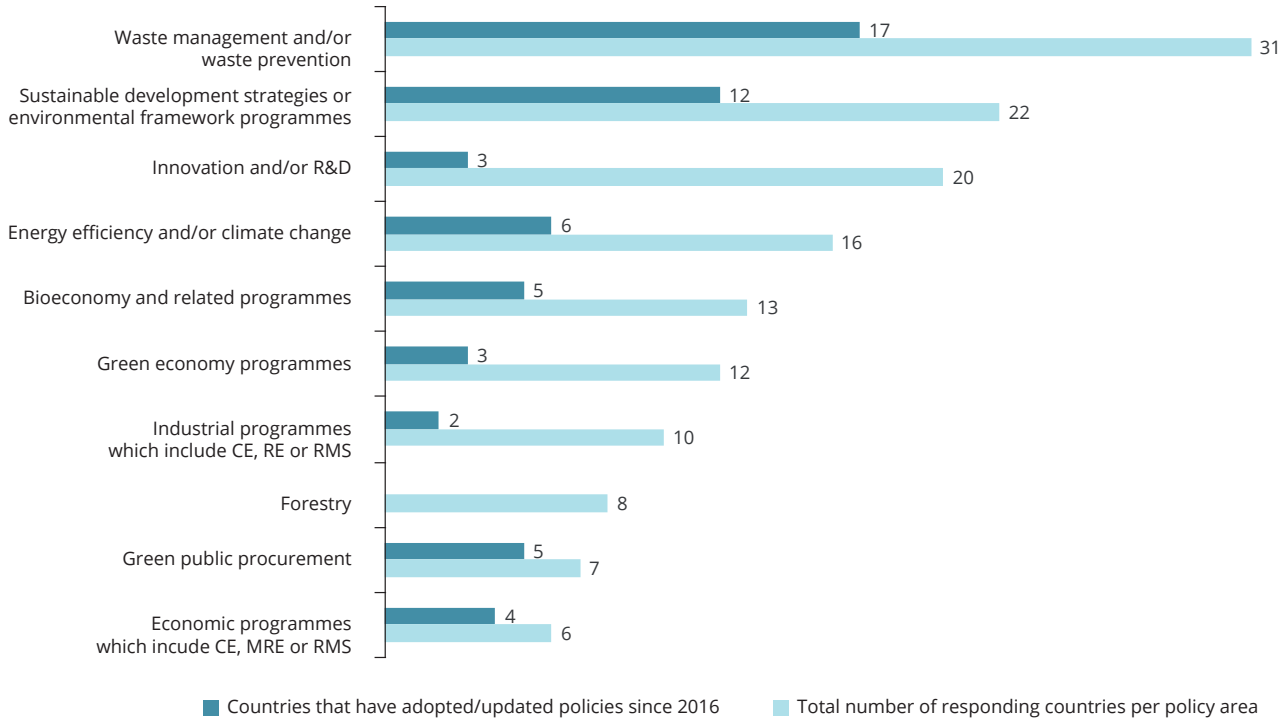
Within a related context, turning waste into a resource has, for many years, been recognised as a way of reducing the need for primary materials through more recycling, recovery and reuse. For example, Czechia launched a secondary raw materials policy in 2014 (Box 6.2).

New or updated sustainable development strategies and environmental framework programmes increasingly incorporate aspects of material resource efficiency or the circular economy. Several countries recently adopted new sustainable development strategies — Belgium (Wallonia), Finland, France,

Germany, Italy, Montenegro, Poland, Slovenia and Switzerland — or updated their environmental framework programmes — Germany, Portugal and Slovakia.

Out of the total of 22 countries/regions including resource efficiency/circular economy objectives and goals in their sustainable development strategies or environmental framework programmes, 12 adopted such strategic documents in 2016 or more recently. On an even more strategic level, Bulgaria declared its ambition to to develop a strategy and roadmap for the circular economy in the governmental programme for 2017-2021 (Box 6.3).

Figure 6.1 Overview of frequently reported policies that include resource efficiency/the circular economy within other topics



Note: CE, circular economy; RE, resource efficiency; RMS, raw material supply.

Box 6.1 From recycling to a circular economy — Finland's national waste plan to 2023

The national waste management plan and waste prevention programme, designed to support the circular economy, was adopted at the end of 2017 and will remain in effect until the end of 2023.

The plan sets out the objectives for waste management and waste prevention and the measures to achieve them. Detailed targets are set and measures are presented for four key areas: construction and demolition waste, biodegradable waste, municipal waste, and waste electrical and electronic equipment.

The national waste management plan also describes long-term aspirations (to 2030) for waste management. Landfilling of all recyclable waste will be banned from 2025 onwards. Today, a landfill ban exists for biodegradable waste (biowaste), plastic and rubber. The aim is to increase the supply of secondary raw materials; product, processing and service innovation; and circular economy business.

For further information, see http://www.ym.fi/en-US/The_environment/Waste/The_National_Waste_Plan.

Box 6.2 The 2014 secondary raw materials policy of Czechia

The policy, with a time horizon of 20 years, sets strategic goals for the extraction, processing and use of secondary raw materials from domestic and foreign sources, including imported products. Ten priority commodities and/or sources of secondary raw materials were identified and the key objectives of the policy are to:

- enhance Czechia's self-sufficiency in raw material resources by substituting secondary raw materials for primary materials;
- support innovation, ensuring extraction of secondary raw materials to a quality suitable for further use in industry;
- support the use of secondary raw materials as a tool for reducing the energy and material demands of industrial production while eliminating negative impacts on the environment and human health;
- ensure the availability of a skilled secondary raw materials workforce to support Czech competitiveness;
- update the range of statistical surveys to develop material accounts to enable the assessment of the volume of secondary raw materials used in Czechia.

Given the dynamic growth of the market in secondary raw materials, the Czech secondary raw materials policy will be updated as needed, and an assessment of the measures laid down carried out every 4 years.

For further information, see http://www.mpo.cz/dokument153352.html (in Czech).

Box 6.3 Bulgaria government programme envisages a circular economy roadmap

As part of the governmental programme, a national circular economy strategy is to be developed, including a roadmap. The development of a concept for the circular economy is embedded in the context of waste management and related areas. Preparation of a roadmap and initial assessment of the circular economy concept include an economic and social analysis of phased implementation and the costs associated with transition. The strategy and action plan for the circular economy in Bulgaria will cover the period 2021-2030

For further information, see country profile.

Box 6.4 Montenegro's national strategy for sustainable development until 2030

Montenegro's sustainable development strategy defines a framework and activities for the introduction of concepts that complement a green economy as well as the implementation of more sustainable consumption and production patterns, with the objective of improving the use of resources. Its key objectives include:

- improving waste management by applying circular economy-based approaches;
- enabling sustainable growth and the development of Montenegro until 2030;
- defining key measures and activities to achieve circular economy principles in the area of waste management; the measures envisaged under improving resource efficiency in key economic sectors include:
    - improving resource efficiency by introducing market-oriented measures, that is, by introducing economic instruments — environmental taxes, fees and charges for users, trade certificates, green finances, green procurement, subsidies and permits — in key economic sectors;
    - improving resource efficiency by introducing regulatory instruments — norms and standards, obligations and responsibilities for environmental protection, environmental controls and implementation of standards.

For further information, see http://www.nssd2030.gov.me.

An example of embedding resource efficiency/the circular economy in a general sustainable development or environmental strategy is Montenegro's national strategy for sustainable development, which proactively adopts the application of circular economy-based approaches as a key objective (Box 6.4). Poland also embedded elements of resource efficiency, the circular economy and raw material security into its 2017 strategy for responsible development.

Programmes or policies that focus on innovation or R&D while stimulating resource efficiency and environmental benefits have already been in operation for many years. This might explain why only three countries, out of a total of 20, reported having adopted new policies in 2016 or more recently on innovation or R&D that include elements of resource efficiency/the circular economy.

A total of 16 countries mentioned that their policy initiatives on climate change/low carbon and energy efficiency also include elements of resource efficiency, the circular economy or raw material supply (see Chapter 13 on synergies). Six — Albania, Belgium (Wallonia), Estonia, France, Latvia and Scotland (United Kingdom) — launched these policies in recent years, confirming the general trend that countries increasingly seek synergies between these policy areas (Box 6.5). France even embedded its circular economy programme within the 2016 Energy Transition for Green Growth Act.

However, it is worth keeping in mind that the topics of climate change, energy use and energy efficiency were outside the scope of this report, unless there was an explicit and direct link to resource efficiency or the circular economy. The fact that, despite this limited scope, 16 countries still reported climate change/energy efficiency policies is likely to be a sign of expected synergies between these policy areas.

Thirteen countries launched a bioeconomy/biomass or agriculture strategy with links to material resource efficiency, the circular economy or supply of raw materials. Five countries — Denmark, France, Latvia, Norway and the Netherlands — launched such strategies either in 2016 or more recently (Box 6.6). This perhaps reflects the 2018 review of the EU bioeconomy strategy and an increased focus on the synergies between the bio- and circular economies on the EU policy agenda.

Twelve countries reported green economy/green growth/green jobs policies, some of which were adopted several years ago in response to the economic crisis of 2008. Since 2013, several countries and regions have come up with smart specialisation strategies, inspired by EU policies. Recently, three countries have introduced new green growth or green economy policies — Norway (Box 6.7), Switzerland and the United Kingdom (in England and Wales).

6.2 Sectors and consumption categories

Industrial development or re-industrialisation programmes were highlighted by Croatia, Czechia, England (United Kingdom), Italy, Latvia, Lithuania,

Box 6.5 Scotland's climate change plan, 2018-2032

Adopted in 2018, the plan recognises that, over the longer term, some of the emission reductions will be delivered through a circular economy approach, meaning more productive businesses, new markets and reduced reliance on scarce resources. The aim of the plan is to reduce energy demand and overall greenhouse gas emissions by improving resource efficiency.

Source: Scottish Government, Climate change plan: third report on proposals and policies 2018-2032 (RPP3).

Box 6.6 Bioeconomy strategy — Latvia (2017)

The Latvian bioeconomy strategy 2030, adopted in 2017, addresses circularity in the use of bioresources (from forest, agriculture and aquaculture resources). It sets five main directions, one of which is efficient and sustainable resource management. Specific measures related to resources, and integrated with climate and energy policies, are focused on the use of biomass for energy production, based on the cascading principle, and reducing greenhouse gas emissions in bioeconomy sectors.

For further information, see http://tap.mk.gov.lv/lv/mk/tap/?pid=40433525&mode=mk&date=2017-12-19 (in Latvian).

Box 6.7 Norway's strategy for green competitiveness (2017)

In October 2017, Norway's strategy for green competitiveness was launched. It contains basic principles that will form the basis of future policies as well as a description of its core aspects, including the circular economy as a possible contribution to green competitiveness. Norwegian businesses and industries have also put forward roadmap proposals for enhancing green competitiveness within their industries or branches, which will be subject to further dialogue between the public and private sectors.

For further information, see country profile.

Box 6.8 The United Kingdom's industrial strategy (2017)

The industrial strategy, published on 27 November 2017, sets out a long-term plan to boost the productivity and earning power of people throughout the United Kingdom.

It sets out four 'grand challenges' to put the United Kingdom at the forefront of 'industries of the future':

1. growing an artificial intelligence and data-driven economy;
2. clean growth;
3. the future of mobility;
4. the ageing society.

The industrial strategy recognises the fundamental role that the efficient use of resources has to play in moving towards a cleaner, stronger economy and sets out ambitions for zero avoidable waste and a doubling of resource productivity by 2050, including through a 25-year environment plan and a new strategy for resources and waste.

For further information, see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf

North Macedonia, Scotland (United Kingdom), Serbia, Slovakia and Turkey. Links to resource efficiency or the circular economy were at times geared towards achieving substantial structural changes in the economy and sometimes linked to innovation strategies. England, for example, reported a new industrial strategy aimed at zero avoidable waste and a doubling of resource productivity by 2050 (Box 6.8), while Italy highlighted an industrial symbiosis scheme for ecologically equipped productive areas, in addition to its Industria 4.0 programme. The majority of programmes in this group were set up some years back, with only the Industry 4.0 initiative from Czechia and the programme in England having been adopted since 2016.

One notable feature was that several south-eastern European countries reported that their industrial programmes include aspects of resource efficiency and the circular economy, while much of their policy effort still focuses on the topics of waste management and energy.

The sharing economy is a consumption model that may help achieve higher levels of sustainable consumption. The EU circular economy action plan states that 'innovative forms of consumption can also support the development of the circular economy, e.g. sharing products or infrastructure (collaborative economy), consuming services rather than products'. Denmark launched a strategy for the sharing economy in 2017 (Box 6.9).

The food sector and food waste are key policy areas with links to material resource efficiency and the circular economy. They were most often mentioned within the context of waste management and waste prevention, but in several cases they were also mentioned in relation to the 2030 Sustainable Development Goals (SDGs), as halving food waste is one of the SDGs.

Several respondents — England (United Kingdom), Flanders (Belgium), Ireland, Italy, the Netherlands,

Box 6.9 Denmark's strategy on the sharing economy (2017)

The national strategy on the sharing economy was launched in October 2017, with the aim of giving the sharing economy room to grow in Denmark.

The strategy contains 22 initiatives on promoting a sharing economy. The central premise is to make it easier to be both a citizen and a sharing economy business. The government intends to lower taxes on income generated from renting out accommodation or cars when the rental is done through a platform that ensures the reporting of revenues to the tax authorities.

A new website, https://deleoekonomien.dk (in Danish), will make it easy for citizens and businesses to find answers to their questions about the sharing economy. The government wants to create a dialogue with social partners to discuss how the labour market can best prepare for the future challenges that the sharing economy might bring.

For further information, see https://www.regeringen.dk/media/4151/strategi-for-vaekst-gennem-deleoekonomi.pdf (in Danish).

Box 6.10 The More Food, Less Waste strategy in Spain

In 2013, Spain adopted its national strategy More Food, Less Waste, which aims to improve efficiency and reduce losses along the food chain. The initiative aims to reduce food loss and wastage and to obtain the maximum value from discarded food.

The underlying philosophy of the strategy is that prevention and reduction of food waste should not be done through a strongly interventionist and restrictive policy. Therefore, much of the More Food, Less Waste strategy will be implemented through recommendations, voluntary agreements and self-regulation. However, in some areas, these measures may be accompanied by regulatory initiatives to improve supply chain efficiency.

For further information, see http://www.mapama.gob.es/es/alimentacion/temas/estrategia-mas-alimento-menos-desperdicio (in Spanish); https://www.mapa.gob.es/es/alimentacion/temas/estrategia-mas-alimento-menos-desperdicio/Libro%20de%20la%20estrategia_ENG_baja_tcm30-78821.pdf (in English).

Norway, Portugal and Spain — provided information on dedicated instruments and approaches to combat food waste. An interesting overview of key concepts and the current situation with regard to food waste is provided in the Spanish strategy More Food, Less Waste (Box 6.10).

Two more examples of voluntary sectoral agreements were reported by England (United Kingdom) and Norway, showing how to share responsibilities between consumers and producers.

One survey question that received few responses was on policy initiatives that seek to make imports of materials and products more sustainable. Judging by country responses, this is still an emerging issue. It is often mentioned during policy discussions that possible outsourcing of resource-intensive production to foreign (often developing) countries should be made transparent. Several countries reported that they do not currently have any specific policy initiatives under way that seek to make imports of materials and products more sustainable.

Based on the responses provided, it would appear that the countries where the issue is high on the public agenda include Denmark, France, Germany, the Netherlands and Switzerland. A few countries, including Denmark, the Netherlands, Switzerland and the United Kingdom, reported pilot projects to increase the sustainability of some imported commodities, such as palm oil, peat, cotton, fish, soy, coffee and cocoa. Furthermore, several countries are developing footprint indicators, making international value chains more transparant.

6.3 Comparing recent policy developments in countries with and without dedicated policies for resource efficiency or a circular economy

One interesting comparison to make is whether those countries with dedicated resource efficiency or circular economy policies also include elements of resource

Table 6.1 Examples of recently adopted policies that include resource efficiency/circular economy elements in those countries that have recent dedicated resource efficiency or circular economy strategies or action plans

Country	Policy area	Policy document
Belgium (Flanders)	Waste/ industrial	Implementation plan on household waste and comparable industrial waste (2016-2022)
Denmark	Sustainable consumption and production	The action plan on plastics (2018)
	Economy	Strategy on the sharing economy (October 2017)
Finland	Public procurement	Decision-in-principle on the basis for evaluating catering service procurement in the public sector (2016)
	Waste	From recycling to a circular economy — national waste plan to 2023 (2017)
France	Agriculture	Agricultural and food policy (2017-2025)
	Bioeconomy	The bioeconomy strategy (2017)
Germany	Environmental programme	Integrated environmental programme 2030, Shaping Ecological Transformation (2016)
	Sustainable consumption and production	The national programme for sustainable consumption (2016)
	Sustainable development	Sustainable development strategy (2016)
Ireland	Corporate social responsibility	National plan on corporate social responsibility (2017)
	Sustainable development and SDGs	Sustainable Development Goals national implementation plan (2018-2020)
Italy	Public procurement	Legislative Decree No 50/2016 (Mandatory green public procurement) (2016), Legislative Decree No 56/2017 (2017)
	Sustainable development	The national strategy for sustainable development (2017), Law No 221/2015 Environment provisions to promote green economy measures and contain excessive use of natural resources (2015)
Netherlands	Waste	Third national waste management plan (2017)
	Innovation	Top sector innovation support and smart industry initiative (2016)
	Biomass	Strategic vision for the use of biomass on the road to 2030 (2016)
	Agriculture	A vision for circular agriculture (2018)
Portugal	Food waste	National strategy to combat food waste (2017)
	Tourism	National strategy for tourism 2027 (2017)
	Public procurement	National strategy for green public procurement 2020
	Education	National environmental education strategy for 2017-2020
	Environmental financing	Environment Financial Fund (2016)
Slovenia	Sustainable development	Vision for Slovenia in 2050 and the 2030 Slovenian development strategy (2017)
United Kingdom (Scotland)	Climate action	Climate change plan (2018-2032)

efficiency/the circular economy in other policy areas compared with those countries that do not have such dedicated policies.

As shown in Table 6.1, countries with dedicated policies for resource efficiency or the circular economy continue to integrate resource efficiency/the circular economy/raw material supply topics into other recently launched policies, in particular waste management, climate change and environmental framework programmes and sustainable development strategies.

Table 6.2 provides examples of policies that include resource efficiency/the circular economy reported by those countries that do not have dedicated resource efficiency or circular economy strategies or action plans.

Tables 6.1 and 6.2 show that resource efficiency and the circular economy are cross-cutting issues, included in various other policies, even when dedicated policies or action plans for resource efficiency/the circular economy are already in place. There is a wide variety of such policies auxiliary to resource efficiency/circular economy initiatives, with waste policies and framework strategies for sustainable development and environmental protection mentioned most frequently.

One particular area receiving attention in recent years is the link with the climate change and low-carbon policy agenda. This topic is discussed in more depth in Chapter 13.

Table 6.2 Examples of recently adopted policies that include resource efficiency/the circular economy in countries without dedicated resource efficiency or circular economy strategies or action plans

Country	Policy area	Policy document
Albania	Energy efficiency	Energy efficiency plan (2016)
Belgium (Wallonia)	Climate and energy	Air-climate-energy plan (2016)
	Economic development	Marshall Plan 4.0 (the Walloon Government regional development plan (2015-2019)
	Research and innovation	Regional policy statement (2018)
	Sustainable development	Second Walloon sustainable development strategy (2nd WSDS) (2016)
	Waste/ resources	Walloon waste-resources plan (2018)
Lithuania	Waste prevention and management	The national waste prevention programme (adopted in 2013) The national plan for waste management for 2014-2020 (adopted in 2014) and its implementation plan
North Macedonia	Energy efficiency	The strategy for increasing energy efficiency in North Macedonia (2010-2020), renewed in 2017
Switzerland	Green economy	Further development of the green economy (2016-2019)
	Sustainable development	Sustainable development strategy (2016-2019)

7 Institutional set-up and stakeholder engagement

One key issue for developing material resource efficiency and circular economy policies is the allocation of tasks and responsibilities at different governance levels, between governmental bodies and among a variety of stakeholders.

This chapter provides an overview of responses to two questions:

- What is the institutional set-up in your country for material resource efficiency, the circular economy and raw material supply?
- How is stakeholder engagement organised and facilitated?

All 32 participating countries or regions responded to the question on the institutional set-up, reporting a wide variety of arrangements to develop and implement policies for a resource-efficient circular economy, mostly at the central government level, but in some cases also at a regional level.

7.1 Institutional set-up

The information provided was examined from the following angles: nominated leading institution, number of institutions involved, functions, topics, additional regional structures, coordination mechanisms and specialised institutions.

Both material resource efficiency and the circular economy are cross-cutting challenges that touch on many domains and policy levels. Deeply rooted in national governance structures, reported approaches range from fairly centralised, such as in Austria and France, to quite decentralised, as in Belgium, Germany, Italy and the United Kingdom. Most of the latter group were countries with federal structures or those where devolved administrations have a high degree of autonomy.

All of the 32 participants reported having institutional structures for the development or advancement of national material resource efficiency or circular economy policies.

7.1.1 One or more institutions

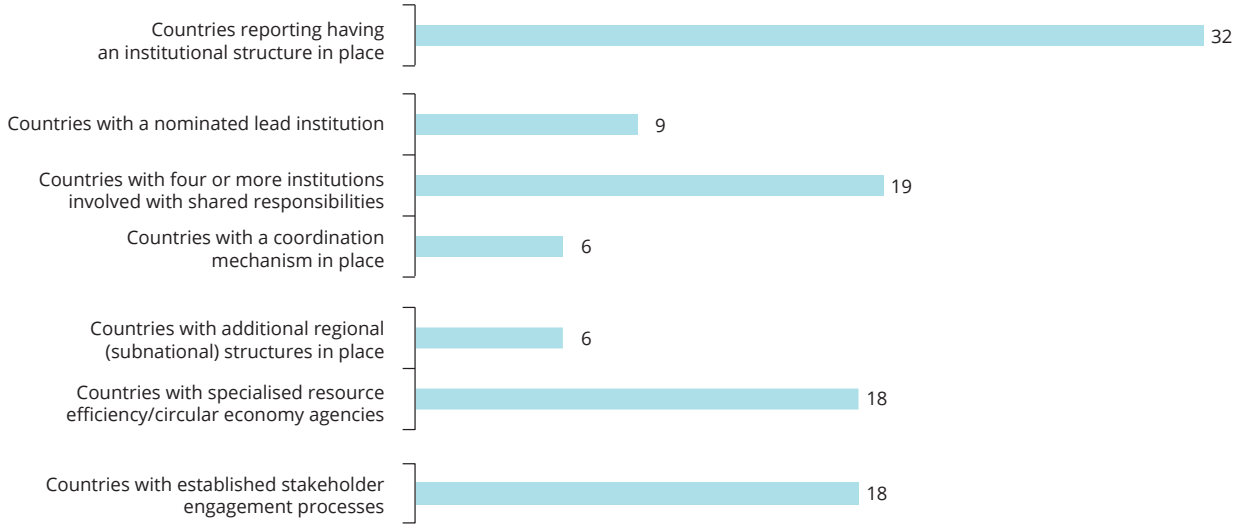
Most countries reported having nominated one or more institutions to take responsibility for the resource efficiency/circular economy agenda. In reality, the arrangements ranged from one nominated institution being in charge to six different institutions being involved. On average, respondents reported having three institutions involved in this policy area.

Figure 7.1 provides an overview of how respondents organise their institutional structures to support material resource efficiency and the circular economy.

In nine cases — Austria, Czechia, Flanders (Belgium), Germany, Latvia, Lithuania, the Netherlands, Norway and Switzerland — one institution was reported to have been nominated to lead the work. This was often the environment ministry, but there were also other leads, including the Cross-Sectoral Coordination Centre in Latvia and the Federal Office for the Environment in Switzerland. These leading institutions usually coordinate activities and are responsible for the implementation and evaluation of policies, but they often also have an overarching responsibility for strategies and their complex development processes.

In most cases (19 respondents), the tasks were dispersed across different ministries, with a number of institutions and ministries involved. Responsibilities and competences were typically delegated for individual tasks — for example, policy development, coordination and monitoring. The most common arrangement was the ministry responsible for the environment and the ministry responsible for the economy/economic development jointly leading on the policy portfolio. However, in some cases, this could well be several ministries. For example, in the Netherlands, six ministries are jointly responsible for carrying out the government programme for a circular economy by 2050: the ministries responsible for infrastructure and water management; economic affairs and climate; agriculture; nature and food quality; interior and kingdom relations; and foreign affairs. In Finland, material and resource efficiency policies are mainly addressed by the ministries responsible for the environment; employment and the economy; transport

Figure 7.1 Overview of reported institutional set-ups for resource efficiency and the circular economy, by type



Box 7.1 Developing resource efficiency policies in Finland

There is a long tradition in Finland of involving different stakeholders and institutions in the drafting of laws and strategies.

The material resource efficiency policies are mainly addressed by the ministries responsible for the environment; employment and the economy; transport and communications; agriculture and forestry; and finance.

In addition, there is a group of governmental organisations, such as Sitra — the Finnish Innovation Fund, a public fund reporting directly to the Finnish Parliament — that implement material efficiency policy, among other topics.

In addition, a number of other funding organisations, such as Business Finland and governmental agencies that administer, for example, the European Regional Development Fund, promote material resource efficiency policies.

Motiva Ltd, a state-owned company, promotes material and energy efficiency on a national level. Motiva provides expert services to promote efficient use of energy and materials in Finland. The services are used by public administration, businesses, communities and consumers.

For further information, see country profile.

and communications; agriculture and forestry; and finance (Box 7.1).

Ensuring policy coherence is a recognised challenge in policy development, and therefore it is somewhat surprising that only six countries reported having a mechanism in place, such as a working group or committee, to coordinate the activities of various institutions. These countries were Belgium (Federal, Flanders and Wallonia), Montenegro, Poland, Portugal, Slovenia and Sweden.

Most often, the policy areas overlapping with resource efficiency/the circular economy were waste prevention and management and secondary raw materials. In the past, there used to be a not always clear-cut division of responsibilities for waste management and raw material policy between institutions — typically the ministries responsible for the environment and the economy. However, at present, there are increasingly frequent examples of integration in this field — countries that are pioneering in this process include Belgium, Denmark, Finland, France and the Netherlands.

7.1.2 Additional regional structures

Six countries reported having additional regional structures in place for developing material resource

efficiency and circular economy policies. Countries that report a substantial role for regional or local government in the field of material resource efficiency and the circular economy include Belgium, Bulgaria, Germany, Ireland, Sweden and the United Kingdom. In the cases of Bulgaria and Ireland, this was mainly related to the administrative division of responsibilities for waste management and waste prevention. In other cases, such as Belgium, Germany and the United Kingdom, it reflected the federal system of governance. Sweden was an interesting showcase of coordination and delegation to subnational structures through various channels to meet its longstanding environmental objectives.

7.1.3 Growing role for public-private partnerships

One noteworthy example of a public-private partnership model for coordinating the work of very different stakeholders is Circular Flanders (Belgium) (Box 7.2). Some other noteworthy mechanisms include a Partnership for the Green Economy in Slovenia, which organises meetings and conferences in various regions for different stakeholders, coordinated by the government, and a governmental working group for circular economy and a government plenipotentiary for state raw materials policy in Poland, both established in 2016.

Several countries pointed out that, with a large number of institutions involved, some challenges occur with respect to coordination of activities and clarification of roles and responsibilities. One succinct reflection on this was provided by Turkey (Box 7.3).

7.1.4 From ministries and administrations to specialised agencies

With 18 responses from 15 countries, the number of countries that reported having a specialised agency for resource efficiency or the circular economy has hardly changed since the 2016 *More from less* report. However, these institutions are very different, encompassing environment agencies, reference centres, circular economy centres or institutes, executive bodies and ministerial advisory boards.

Last but not least, several countries — Albania, Finland, Hungary, Latvia, Montenegro and Turkey — noted the role of statistical offices in setting up systems to produce data and monitoring mechanisms for resource efficiency or the circular economy. In Croatia and Serbia, this task was delegated to environmental protection agencies.

7.1.5 EU countries and EU candidate countries

There were some noteworthy trends in the institutional arrangements in EU candidate countries — for example in Albania, Montenegro, Serbia and Turkey. The political emphasis, reflected in the institutional arrangements, in many of these countries tended to be on establishing the necessary structures for the rational use of raw materials, for waste management or for sustainable development, as a key step before planning for the development of policies for resource efficiency or the circular economy.

Within the EU, densely populated industrialised countries such as Belgium, Germany and the Netherlands, as well as Scandinavian countries, seem to place the greatest emphasis on the efficient use of raw materials and the circular use of materials, and they are clearly in the lead with respect to institutional arrangements for the circular economy.

7.2 Stakeholder engagement

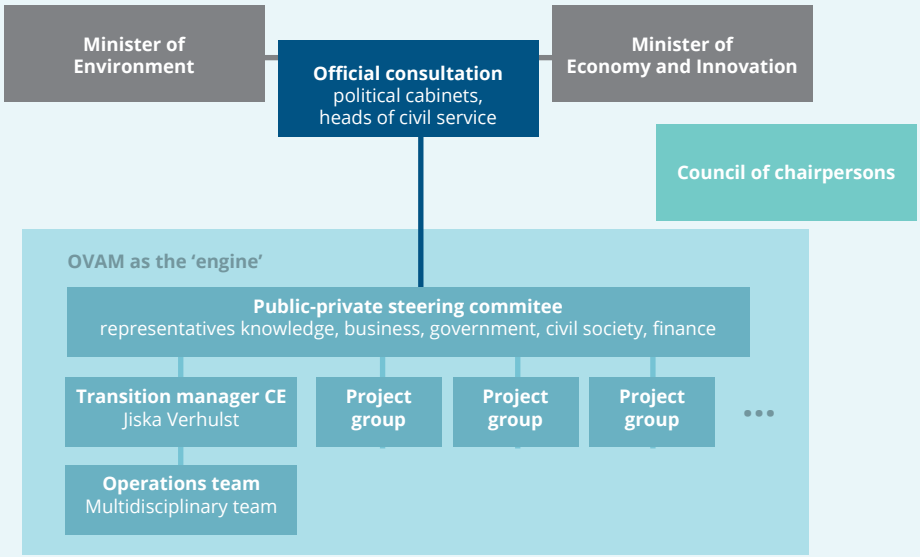
This section provides an overview of responses concerning mechanisms that countries/regions use to engage stakeholders in developing policies on resource efficiency and the circular economy.

Some countries followed generic procedures for stakeholder consultation on environmental policymaking in line with the provisions for public participation in environmental decision-making embedded in the 1998 Aarhus Convention. In others, specific procedures have been developed for the resource efficiency/circular economy agenda, which can roughly be grouped into networks, working groups, advisory boards, task forces and committees.

The various reported mechanisms focused on a wide range of topics, from material resource efficiency (e.g. mechanisms in Denmark, Estonia, Finland and Germany) to the circular economy (e.g. mechanisms in Belgium, Denmark, Estonia, the Netherlands, Northern Ireland (United Kingdom), Spain and Wales (United Kingdom)). Some were narrower in scope, focusing on, for example, industrial symbiosis (e.g. mechanisms in Italy), indicators or barriers (e.g. mechanisms in Belgium (Federal) and Denmark).

Box 7.2 Governance model of Circular Flanders — Flanders (Belgium)

Figure 7.2 Governance model of Circular Flanders



Note: CE, circular economy.

Source: Circular Flanders (2018).

Two ministers are responsible for the transition to a circular economy. The council of chairpersons (leading civil servants from different ministerial departments) oversees the follow-up of the government-wide approach to transition management. The public-private steering committee is responsible for the strategic management of the circular economy transition priority. All partners from business, research, civil society, local authorities and government institutions provide support and contribute to the achievement of the shared goals. The transition manager manages the operational team of Circular Flanders on a day-to-day basis. The operations team carries out the agreed strategy and the yearly work programme. A range of stakeholders will pool human and financial resources in the unit, which will be headed by a public-private steering group. It will provide a single effective hub for the circular economy in Flanders.

OVAM (the Public Waste Agency of Flanders) provides human resources and accounting services, infrastructure, housing, etc.

Project groups are expert groups installed for a specific time and with a specific goal.

The transition space is a broad network of all partners and stakeholders that are involved in the circular economy in a broad sense.

For further information, see country profile.

Box 7.3 Need for better coordination of action — a voice from Turkey

In Turkey, a range of ministries function as the main stakeholders as a result of the cross-cutting nature of resource efficiency topics. They include the Ministries of Development; Industry and Technology; Energy and Natural Resources; Environment and Urbanisation; and Forestry and Water Affairs.

However, it was noted in Turkey's country profile that 'no specific ministry has been appointed as the coordinating body and coordination between the main actors is relatively poor. Uncertainties, inadequacies and overlaps in the duties, power and responsibilities of the different ministries need to be resolved.'

For further information, see country profile.

Some noteworthy examples included a broad consultation process for ProgRess II in Germany (Box 7.4); the task force, including companies, for resource efficiency in Denmark; and mechanisms that achieved a broad consensus through the process itself.

Another example of broad stakeholder engagement, for example through public consultation and sectoral partnerships, was provided by Denmark (Box 7.5).

7.2.1 The shifting role of authorities

One interesting new development, albeit in only a few countries/regions, is the slowly shifting role of the government away from regulator and enforcer of regulations to facilitator and promoter of the processes. In practice, this typically involves wide-reaching stakeholder engagement in policy development, a negotiated consensus with the business community and other key stakeholders, and often a reliance on voluntary agreements. Countries/regions that demonstrate such an approach include Belgium (Flanders), Denmark, Finland and the Netherlands.

7.2.2 International dimension

Keeping global trade and international supply chains in mind, it is worth noting that very few countries/regions reported work on cross-country initiatives for resource efficiency or the circular economy. At present, it seems that resource efficiency and the circular economy tend to be considered only at the national scale. The few exceptions are Denmark, which referred to partnerships of stakeholders in value chains, including food; Sweden, which mentioned a dialogue on textiles including value chain stakeholders (Box 7.6); and Denmark and the United Kingdom, which mentioned the North Sea Resources Roundabout. On the global scene, it is worth noting that Germany has been vigorously promoting the issue of resource efficiency internationally, also in the context of the Sustainable Development Goals and the climate agenda.

7.2.3 Reaching stakeholders

Finally, there are some noteworthy examples of general outreach initiatives aiming to promote the benefits of resource efficiency or the circular economy to stakeholders (Box 7.7).

Box 7.4 Stakeholder engagement through various mechanisms — Germany

The German resource efficiency programme (ProgRess) is to be reviewed and updated every 4 years. A wide range of mechanisms are used to include stakeholders' views:

- National resource efficiency platform (NaRess): network members include industry associations, special interest associations, chambers of commerce, research institutions and federal and state bodies.
- Citizens' workshops: a public consultation through a public participation concept (*Bürgerdialog*), with a participative structure including organised talks and online fora to include citizens' opinions.
- Education system: network of stakeholders (*BilRess-Netzwerk*) within and outside the education system to anchor the topic in education areas, including schools, professional training, higher education and technical qualifications.
- LAGRE: a cross-federal state working group on resource efficiency.
- The Round Table on Resource Efficiency in Construction: members from the construction industry promote resource-efficient construction through scientific studies and a shared information platform. The current focus is on developing and establishing an assessment methodology for resource efficiency in construction.

For further information, see country profile.

Box 7.5 Stakeholder inclusion through public consultation and sectoral partnerships — Denmark

Denmark mentioned a variety of mechanisms and processes during the development of policies related to the circular economy:

- An Advisory Board on Circular Economy was established by the government.
- A public internet portal was set up, through which anyone could deliver their input and recommendations to the Board.
- Discussions took place in a participatory workshop.
- A large number of stakeholders were included in the development of a vision, targets and recommendations for a circular economy.
- More than 140 inputs were received from different stakeholders.
- The preliminary recommendations were discussed by 240 stakeholders.

Partnerships between stakeholders in value chains are being set up to increase resource efficiency, including partnerships on preventing food waste, recycling and preventing construction waste.

For further information, see country profile.

Box 7.6 Sweden's dialogue on textiles (2016-2019)

Through dialogue and co-creation, the Environmental Protection Agency and the Swedish Chemicals Agency involve relevant stakeholders in the textile value chain. The dialogue takes place in cooperation with authorities, researchers, the textile industry and voluntary organisations, as well as other textile stakeholders. The initiative originates from the government assignment on textile management 2016.

At each dialogue meeting, a specific theme will be highlighted. The purpose of the dialogue is to contribute to reducing environmental and health impacts throughout the textile value chain to create resource-efficient and non-toxic cycles.

For further information, see http://www.naturvardsverket.se/Miljoarbete-i-samhallet/Miljoarbete-i-Sverige/Uppdelat-efter-omrade/Konsumtion-och-produktion/Hallbara-textilier/ (in Swedish) and country profile.

Box 7.7 Examples of outreach and promotion initiatives on resource efficiency/the circular economy

Belgium (Federal) — a knowledge centre for sustainable economy was set up by the federal government to inform businesses and citizens and help them become more actively involved in economic strategies that contribute to the sustainable development of the goods and services market.

Estonia — the Ministry of the Environment organises an annual partner day, which, since 2017, has addressed the circular economy. Responding to a request to meet more frequently, more partner days took place in 2017 and 2018 to find solutions to meeting the municipal waste recycling target of 50 % by 2020 and developing a strategic document for the circular economy.

Lithuania — the Ministry of Economy is developing a concept and organising a contest to promote products manufactured from recycled materials: Product of the Year from Recycled Materials. The main objective is to promote the use of recycled materials in technological processes. This initiative aims to promote cooperation between waste managers and industrial companies.

Poland — one successful example of awareness-raising efforts on the circular economy was a special supplement to *Rzeczpospolita*, a business-oriented daily newspaper, which was fully dedicated to the circular economy. It included relevant insights from policymakers, non-governmental organisations (NGOs), consultancy companies and entrepreneurs.

For further information, see country profiles.

8 Approaches to resource efficiency and circular economy policy evaluation

This chapter presents an overview of countries' responses about their approach to the evaluation of policies for resource efficiency and the circular economy.

The answers can be divided into three categories:

- A few examples of *ex ante* and *ex post* evaluations of **policies specifically on resource efficiency and the circular economy** (Finland, Flanders (Belgium), Germany and the Netherlands). All but one (the Netherlands) referred to evaluations of policies on resource efficiency, which is perhaps natural given that most circular economy policies are fairly new.
- ***Ex ante* evaluations of new policies**. Most countries reported that, prior to introducing new policies, some kind of *ex ante* policy evaluation is or should be carried out, including regulatory impact assessments or cost-benefit analyses.
- ***Ex post* assessments** were reported for environmental policies in general, most frequently carried out for waste management. Other reported *ex post* assessments evaluated grants or infrastructure investment programmes.

A few countries also reported on their sectoral assessments, which look at sectoral and environmental policy integration.

Finally, some countries mentioned that they do not have examples of evaluating the effectiveness of policies for resource efficiency or the circular economy. Instead, they monitor progress towards a policy objective, using indicators (Montenegro), or monitor frameworks or state of environment reports (Croatia and Serbia).

8.1 Evaluations of policies specifically on resource efficiency and the circular economy

Three countries provided details of their evaluations of dedicated resource efficiency strategies, all of which took place early in the 2010s.

Finland (Box 8.1) used the evaluation to reflect on how resource efficiency activities can support the national circular economy roadmap.

Flanders (Belgium) carried out material programme evaluations through stakeholder consultations, which contributed to the development of the new Circular Flanders initiative. France intends to review its resources plan every 5 years, while, in the early stages of developing its ProgRess resource efficiency strategy, the German government committed to reviewing and revising its strategy every 4 years.

Box 8.1 Evaluating the national material efficiency programme in Finland

The Finnish Prime Minister's Office commissioned a research project to evaluate the effectiveness of the 2013 national material efficiency programme, which proposed eight measures with 40 different projects to promote material efficiency.

The implementation of the 2013 programme was reviewed in 2017, evaluating how material efficiency should in future be promoted as part of a circular economy. The results clarified the priorities for national material efficiency work and the measures that best respond to the EU circular economy package and the United Nations 2030 agenda Sustainable Development Goals.

It also became apparent that there was a need to renew the programme to bring its measures up to date. The review concluded that, while the actual quality of the projects was good, only half had had a significant impact on resource efficiency.

For further information, see http://tietokayttoon.fi/documents/10616/3866814/64_Kansallisen+materiaalitehokkuusohjelman+arviointi.pdf/9416e1e8-3afa-417c-ba47-468fb55a0707?version=1.0 (in Finnish).

Box 8.2 Monitoring and evaluating circular economy policies in the Netherlands

The key objectives of the Dutch government programme for a circular economy are a transition to a fully circular economy in the Netherlands by 2050 and a 50 % reduction in the use of virgin raw materials by 2030.

In an *ex ante* evaluation of the programme for a circular economy, the Netherlands Organisation for Applied Scientific Research (TNO) analysed the extent to which the 2030 ambition of a 50 % reduction in the use of primary raw materials was supported by sub-goals on reduction targets for fossil, metallic and other mineral materials formulated within the programme. The *ex ante* evaluation resulted in an overview of the effects on use of raw materials, CO_2 emissions, and water and land use. The reduction in greenhouse gas emissions and water and land use for producing these materials is expected to decrease proportionally. One identified sector of concern was the manufacturing industry, as it has yet to operationalise targets and it uses materials with relatively large environmental impacts.

For further information, see https://www.government.nl/topics/circular-economy/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050.

In 2018, the TNO also analysed the transition agendas developed as a follow-up to the national agreement on the circular economy. This focused not only on the effects of the agendas on CO_2 emissions but also on broader economic, ecological and social aspects, such as water and land use and employment.

For further information, see https://www.rijksoverheid.nl/documenten/rapporten/2017/07/06/tno-rapport-ex-ante-evaluatie-van-het-rijksbrede-programma-circulaire-economie (in Dutch).

The monitoring system that is being developed for the circular economy will examine the measures and actions included in the programme. This might be supplemented from 2018 onwards by monitoring of the measures in the transition agendas. The monitoring system will also look into the dynamics of the transition to a circular economy, thereby focusing on the transition phases of each of the five priorities. Effect monitoring will look into the impacts of a more circular economy on material flows — direct/indirect material consumption, secondary material use and resource efficiency — together with impacts on CO_2 emissions, land and water use across the entire economy and the five identified priorities.

This monitoring system will be the foundation for an annual evaluation of the programme, thereby providing input to adjust and steer the measures within it and the transition agendas. An annual progress report will discuss both the performance of the measures and the progress of the transition.

For resource efficiency, some countries build a requirement into existing policies to regularly evaluate their impact and effectiveness.

The circular economy is a fairly new policy field and thus it has undergone less evaluation. The only example of *ex ante* evaluation was provided by the Netherlands (Box 8.2).

Portugal plans to carry out evaluations of the implementation of its circular economy action plan every 3-5 years, starting in 2020. The plan includes proposed governance and monitoring models of how to carry out such evaluations.

8.2 *Ex ante* evaluations for new policies

Most countries reported that, prior to introducing new policies, some kind of *ex ante* policy evaluation is or should be carried out, including regulatory impact assessments, mentioned by Bulgaria, Serbia, Switzerland and Turkey, and cost-benefit analyses, mentioned by Italy, Norway, Sweden and Wales (United Kingdom). These may include a calculation of economic and environmental effects on society and of economic effects and administrative burdens on business. For strategic framework policy documents, a strategic impact assessment is required during policy development in some countries, and it typically includes public consultation.

Some *ex ante* assessments may look at technical and economic aspects of proposed policy instruments in depth, as shown by the example from Flanders (Belgium) (Box 8.3). France reported developing a macro-economic modelling tool to help estimate the benefits of a circular economy.

8.3 *Ex post* assessments

Most examples of policy evaluation/assessments were related to waste, and in particular waste management plans and waste prevention programmes — Austria (Box 8.4), Croatia, Czechia, Latvia, Lithuania, Slovakia and the

Box 8.3 *Ex ante* impact assessment of a beverage packaging deposit scheme in Flanders

An extensive *ex ante* impact assessment of the introduction of a deposit system for single-use beverage packaging in Flanders (Belgium) was carried out in 2015.

The assessment concluded that the introduction of a deposit system for single-use beverage packaging had a number of clear benefits but also some drawbacks. The benefits were a reduction in littering by 10-15 % by weight or 20-40 % by volume of total littering; a reduced cost for cleaning, paid for by local government, varying from EUR 1.8 million to EUR 15.2 million per year; and an increase in the recycling rate of single-use packaging, especially that of polyethylene terephthalate (PET) bottles.

The drawbacks of the deposit system were the high cost, three times more than the cost of the current collection system; the structural deficit in the system if the return rate rises above 90 %; and the risk of additional cross-border purchases from neighbouring countries. A specific legal analysis concluded that introducing a deposit system in Flanders would be possible, but it would be very complex, and preference should be given to a Belgian system, covering the country's three regions: Brussels, Flanders and Wallonia.

For further information, see http://www.ovam.be/afval-materialen/huishoudelijk-afval-en-lokale-besturen/statiegeld (in Dutch).

Box 8.4 Evaluation of the waste prevention programme in Austria

The Austrian waste prevention programme is revised every 6 years. The preparation of revisions builds on a stakeholder consultation process, which assesses the expected effectiveness of specific measures through expert evaluation.

During the last revision process, stakeholders and experts were invited to a workshop, with discussions centred on the current waste prevention measures, the challenges faced by the Austrian waste and resource economy in upcoming years, and the general focus of the 2017 waste prevention programme.

In addition, an evaluation of the recently completed waste prevention measures was presented. This had been carried out through expert interviews and internet searches, and was meant to analyse the extent to which the implemented measures met the objectives of the 2011 waste prevention programme. The overall vision of the 2011 waste prevention programme was also examined to see whether its objectives were still current, necessary and efficient.

Based on these assessments, measures for the 2017 waste prevention programme were selected in two further stakeholder workshops, and were then formulated and structured for implementation.

Overall, the development of the 2017 waste prevention programme was based on a methodology recommended by the European Commission in its guidelines on waste prevention programmes.

United Kingdom. Periodic assessments and updates of waste management plans, typically every 3-6 years, are generally required by national regulations, stemming from the EU Waste Framework Directive.

The requirement for periodic assessment and evaluation was also evident in Czechia, while Wallonia (Belgium) uses a survey-based waste prevention barometer.

8.4 Guidelines for policy evaluation

Some countries, such as Switzerland (Box 8.5), compile extensive national guidelines on how to carry out policy evaluations. In the United Kingdom, information on the approach taken to evaluation across the government is available in the *Green book* guidance ([4]).

([4]) https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

Box 8.5 Policy evaluation guidelines in Switzerland

For an *ex ante* evaluation of new regulations or substantial revisions of existing legislations, the State Secretariat for Economic Affairs in Switzerland recommends a so-called regulatory impact analysis, an evaluation of the impacts of the regulation. The goal is to analyse the economic, ecological and social impacts of policies according to a given checklist.

For further information, see http://www.seco.admin.ch/air (in French).

A sustainability assessment is commonly used as an *ex ante* assessment tool.

For further information, see https://www.are.admin.ch/are/en/home/sustainable-development/data/assessing-sustainability/assessing-sustainability-within-the-federal-government.html.

Both of these tools evaluate the economic, social and environmental consequences of initiatives or regulations, although they differ in terms of focus. Impact analyses concentrate mainly on economic consequences, but they also look into the impact on individuals who are affected, not just the economy or society as a whole. Sustainability assessments aim to incorporate environmental, social and economic aspects into laws, action plans and public projects at both national and local levels. Responsibility for carrying out an impact analysis or sustainability assessment falls within the remit of federal offices, which can adapt the tools to suit the proposal being assessed.

The Federal Office for the Environment has developed its own instrument for *ex ante* evaluation. This economic assessment (*Volkswirtschaftliche Beurteilung*, VOBU) is based on and considered equivalent to the regulatory impact analysis, but it is specifically designed to assess the economic — as well as the social and environmental — impacts of environmental policies. It includes a step-wise procedure for the assessment of the relevance of possible impacts on the economy and the environment and for the actual assessment of the impacts — and it is mandatory for new environmental policies and substantial revisions to existing legislation.

With regard to *ex post* assessment tools, a general guide has been developed — the *Guide de l'évaluation de l'efficacité à la Confédération*.

For further information, see https://www.bj.admin.ch/bj/fr/home/staat/evaluation/materialien.html and https://www.bj.admin.ch/bj/fr/home/staat/evaluation/netzwerk.html (in French and German).

Several countries reported that their policy evaluations take criteria and practices compiled by international institutions, including the European Commission, the Organisation for Economic Co-operation and Development (OECD) and the EEA, into account (Austria, France, Slovakia and Wales (United Kingdom)). Such procedures typically look at the effectiveness, efficiency, coherence, relevance, impact, sustainability and value added of policies (Box 8.6).

8.5 Sectoral assessments

While not directly related to policies on resource efficiency and the circular economy, several countries reported carrying out various sectoral evaluation programmes. This seems to go back to the Cardiff process of integrating sectoral and environmental policies.

Such assessments typically cover those sectors that a country's government sees as the most important. Examples include energy, industry and transport (Croatia); mining, food, wood, pulp and paper, and production of other non-metallic minerals (Estonia); waste management (Latvia); manufacturing industry (Netherlands); energy, industry, agriculture and tourism (Serbia) (Box 8.7); and industrial production, energy, transport, agriculture, forestry and tourism (Slovakia) (Box 8.8).

Box 8.6 International guidelines on policy evaluation

European Commission's Better regulation: guidelines and toolbox:

https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en

OECD Development Assistance Committee guidelines for project and programme evaluations:

http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

EEA overview of environment and climate policy evaluation:

https://www.eea.europa.eu/publications/environment-and-climate-policy-evaluation

Box 8.7 Monitoring environmental pressures from selected sectors in Serbia

The Serbian Environmental Protection Agency prepares the annual report on economic activities of importance to the environment in Serbia, which covers the following areas: industry, energy, agriculture, forestry, tourism and urban settlements. It provides a basic picture of both the pressures of economic activities and the measures taken to reduce environmental impacts, offering an indirect insight into the realisation of policy goals and measures defined in different sectors' strategic and planning documents.

For further information, see http://www.sepa.gov.rs/download/posebni/Privredne_aktivnosti_2017.pdf (in Serbian).

Box 8.8 Sectoral indicator reports in Slovakia

One specific series of reports on the environment in Slovakia consists of the so-called sectoral reports — reports on the state of implementation of environmental measures in selected sectors of economic activity.

Their origin is in the conclusions of the 1998 Cardiff European Council, which laid down a set of measures for connecting sectoral and environmental policies. These sector reports are the mechanism for monitoring these processes.

The first sectoral reports were drawn up by the Slovak Environment Agency in 2005 and they have since been produced every 2 years. The six evaluated sectors — industrial production, energy, transport, agriculture, forestry and tourism — are considered the most important in terms of their impact on the environment and resource use. Evaluations are made on the basis of indicators, looking at the following key questions:

- Does the implementation of environmental principles and targets in each sector reflect strategic documents at the Slovak and EU levels?
- What is the condition and direction of the sector in relation to the environment?
- What are the interactions between the sector and the environment?
- What is the societal response to mitigating or compensating for the negative consequences of the sector on the environment?

The latest sectoral report, drawn up in 2017, *Are the sectors of the economy of the Slovak Republic becoming greener?*, brings together the most important information and findings of the individual sectoral reports.

For further information, see: http://enviroportal.sk/spravy/detail/8002.

Box 8.9 Knowledge Centre for Sustainable Economy in Belgium

In Belgium, the Knowledge Centre for Sustainable Economy keeps track of policymaking for matters that have an impact on the circular economy at regional, federal and European levels.

As a federal institution, the centre does not have the mandate to evaluate the impact or effectiveness of regional policies, but it carries out analyses based on published figures and reports.

Secondly, the centre monitors new federal policies and tries to develop measures or find data that can evaluate the impact of these policies. At the moment, an evaluation of the 21 measures is under way to see what impact they had and to propose follow-up and extra measures that will enhance the transition to a circular economy. This work is done in collaboration with the Federal Agency for the Environment.

8.6 Institutional arrangements for policy evaluation

Very little information was provided on who actually carries out policy evaluations and how the results are disseminated. The predominant model seems to be that the government commissions a policy evaluation, but it is typically carried out by an external organisation.

Those few countries that commented on dissemination mentioned that documents are made available through the internet. Sweden noted that the results of most evaluations are publicly available, as are reports from the Environmental Protection Agency or other government agencies. Most of these reports also include an English summary.

Only Belgium provided examples of tasks of specific institutions in policy evaluation. For example, Circular Flanders, the policy research centre on the circular economy in Flanders, conducts research to support ongoing policy processes. One of the centre's focal points will be the economic effects associated with the introduction of a circular economy and the way in which these are affected by policy measures. The resulting policy advice will focus on topics such as:

- market acceptance;
- learning effects;
- the effectiveness of funding and revenue models;
- the expected impact on vulnerable groups within the labour market;
- agreements between the government and other stakeholders in Flanders.

Depending on the topics and cases that will be studied, the research may include both *ex ante* and *ex post* evaluations.

At the federal level, Belgium monitors policy development at the regional and international levels (Box 8.9).

PART III

Monitoring and targets

9 Targets for resource efficiency and the circular economy

This chapter provides an overview of countries' responses to the question: What targets (measurable goals with a specific timeline) have been adopted in your country for a resource-efficient circular economy?

Targets are concrete and measurable policy objectives that are accompanied by an indicator and generally have a deadline/timeline to meet.

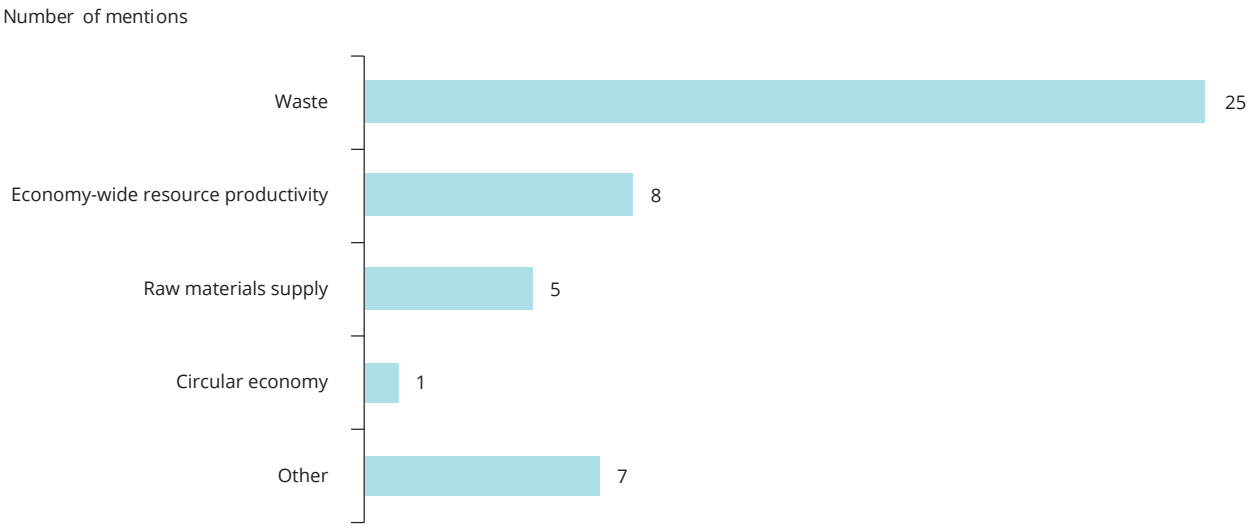
Twenty-six countries reported having adopted targets related to resource efficiency, the circular economy or raw material supply. An extensive overview is available in Annex 3, while responses in full are presented in individual country profiles. Figure 9.1 provides an overview of the targets that countries reported.

It should be noted that there are some important differences between this survey and that carried out for the 2016 *More from less* report. It was agreed with Eionet (European Environment Information and Observation Network) that the topic of energy use and energy efficiency was outside the scope of this report, unless there was a direct link to resource efficiency/the circular economy. Countries were encouraged to report their national targets related to waste that go beyond the minimum targets required by EU regulations. Finally, the scope of this report was extended to include targets on the circular economy, on closing material loops and on raw material strategies.

Overall, waste continues to be the area for which most countries have targets related to resource efficiency or the circular economy. The number of countries with an economy-wide resource productivity target (eight) has not changed much since the 2016 *More from less* report. The policy domains of the circular economy (fairly new) and raw materials supply (covered for the first time) do not yet have many specific targets.

Another important caveat to keep in mind is that some traditional waste targets, such as recycling targets, have been reported here under waste. Recycling or use of secondary materials, however, are key approaches for the circular economy, and thus a recycling target could also be considered a circular economy target. In

Figure 9.1 Overview of reported targets, by type



fact, some waste indicators are key for monitoring the implementation of circular economy policy, as shown in the current EU monitoring framework for the circular economy.

9.1 Economy-wide resource productivity targets

Eight countries reported having a national target for resource productivity, as shown in Table 9.1. With the exception of Germany, this is usually expressed as gross domestic product (GDP) over domestic material consumption (DMC), an indicator developed and published annually by Eurostat. Note that the EU does not have a resource productivity target, either for the EU as a whole or for individual countries.

The main changes from the 2016 report include:

- Austria is no longer following up on the achievement of its resource productivity target.
- Germany has introduced a new type of resource productivity target that also takes imported resources into account.
- Poland's targets for economy-wide resource productivity are no longer in force. Work is under way to develop new targets within the framework of the roadmap for transformation towards a circular economy, currently in preparation.
- Montenegro reported having adopted targets at the national level as well as at the sector level. Montenegro did not participate in the 2016 *More from less* report.
- Slovenia added a non-binding long-term goal for 2030 of EUR 3.5 purchasing power parity per kg.
- Although it has not been formally adopted at the time of writing (and therefore is not shown in Table 9.1), the United Kingdom is expected to adopt a long-term target on doubling resource productivity by 2050 in the near future.
- Similarly, Spain has prepared a proposal for a target of a 30 % increase in material productivity from 2015 to 2030.

Interestingly, there is no obvious correlation between having a dedicated policy on resource efficiency or the circular economy and adopting dedicated targets for resource productivity. Of the eight countries listed in Table 9.1, only Germany has a dedicated resource efficiency strategy, but France, Portugal and Slovenia have adopted national circular economy roadmaps. Meanwhile, as shown in Chapter 4, nine countries have adopted dedicated circular economy policies and six have resource efficiency policies. Thus, it would seem that even those countries that have a dedicated policy framework for resource efficiency/the circular economy do not always see that it is necessary to have a measurable target for resource productivity.

Table 9.1 Overview of national resource productivity targets

Country	National target	Period or year
Estonia	10 % increase to EUR 0.46/kg (GDP/DMC)	2023
France	30 % increase in GDP/DMC	2010-2030
Germany	Double abiotic material productivity	1994-2020
	Trend in total raw material productivity to continue increasing at 1.5 % per year	2010-2030
Hungary	Reduce material intensity (DMC/GDP) to 80 %	2007-2020
Latvia	Resource productivity of EUR 600/tonne	2020
	Resource productivity of EUR 710/tonne	2030
Montenegro	60 % increase in resource productivity	2013-2020
	103.8 % increase in resource productivity	2013-2030
Portugal	Resource productivity of EUR 1.17/kg	2020
	Resource productivity of EUR 1.72/kg	2030
Slovenia	Resource productivity of EUR 1.5/kg	2023
	EUR 3.5 purchasing power parity (PPP)/kg	2030

9.2 Waste-related targets

Waste-related targets were reported by 25 countries. An overview of all non-EU-imposed waste targets is given in Annex 3. Figure 9.2 shows the waste-related targets as reported by the countries, classified according to the type.

Targets related to food waste and landfill bans are shown in separate categories, as they seem to be mentioned more frequently than in the 2016 *More from less* report.

Most waste targets shown in the examples — landfill bans, waste reduction, waste collection, waste recovery, waste recycling and caps on energy recovery — are often linked and are in fact applicable in the wider context of a transition to a circular economy.

The examples in Annex 3 may inspire countries to introduce targets, complementary to EU obligations. At the time the survey for this report was carried out, the EU was still working on a revision of the waste legislation ([5]). Therefore, it was not possible to include a check on the complementarity of national targets with EU targets in this analysis.

It is worth noting how some countries diversify waste targets depending on their local situations, for example for the region (Italy), administrative unit (Ireland) or type of municipality (Belgium (Flanders)).

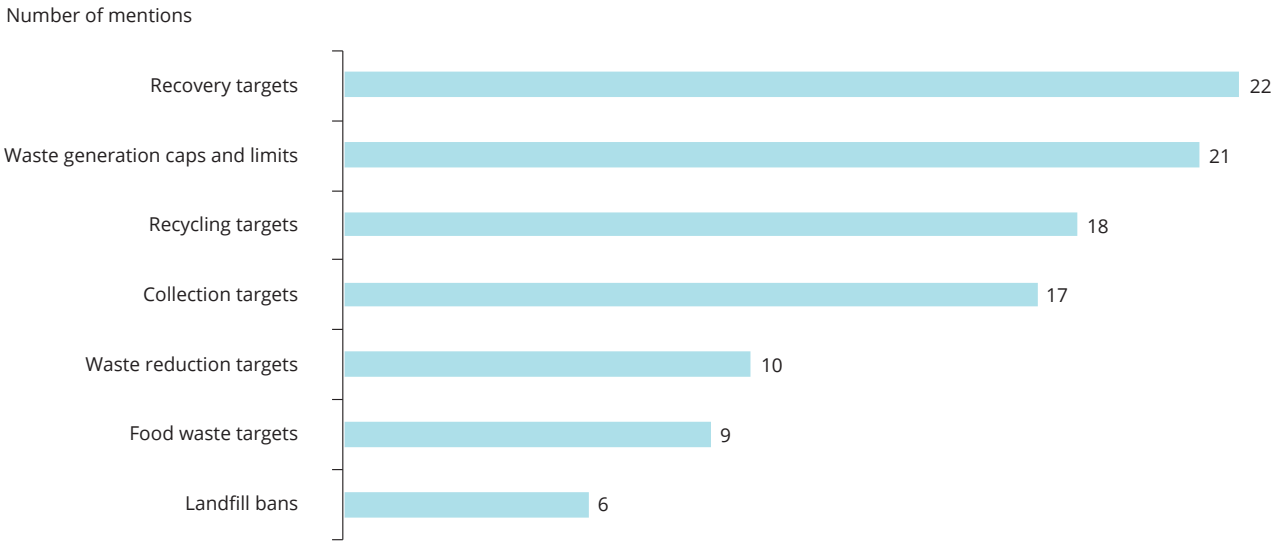
9.2.1 Food waste prevention targets

In the 2016 *More from less* report, only Flanders (Belgium), France and Sweden reported on food waste targets. In the 2015 EU circular economy package, a proposal was included to have a target that consists of halving food waste by 2030. This in itself was a reflection of the 2030 Sustainable Development Goal 12, to 'halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030', adopted by the United Nations in September 2015.

It is clear from the responses to this survey that an increasing number of countries are reporting or are preparing to report on food waste targets.

- **Austria**: *Lebensmittel sind kostbar!* (Food is Precious!) — the target of this voluntary agreement between the Federal Ministry for Sustainability and Tourism (BMNT) and a number of food producers and retailers is to halve trade and consumer food waste by 2030 (voluntary agreement).
- **Belgium** (Flanders): optimal reuse of food processing residues from production, distribution and catering — 15 % more reuse by 2020 and 25 % by 2030. Optimal reuse means a shift from material applications to food/feed applications, or from residual waste to material/food/feed applications. These targets are combined with the mandatory

Figure 9.2 Reported waste-related targets, by type



([5]) https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=OJ:L:2018:150:TOC

separate collection of kitchen waste and former vegetable and animal foodstuffs by 2021. At least the following percentages of separately collected biowaste have to be recycled:

  - vegetable/fruit/garden waste: 95 %;
  - green waste: 95 %;
  - other organic-biological waste: 90 %.

- **Belgium** (Wallonia): reduce food loss and wastage by 30 % by 2025 compared with 2015.
- **Finland**: halve food waste and food loss by 2030.
- **France**: reduce food waste by 50 % between 2013 and 2025.
- **Slovenia**: reduce marine litter and food waste by 30 % by 2025.
- **England** (United Kingdom): working in partnership with food businesses, from farm to fork, through the Courtauld Commitment, deliver a 20 % per person reduction in food waste by 2025.
- **Scotland** (United Kingdom): reduce all food waste arising in Scotland by 33 % by 2025 and work with industry to reduce on-farm losses of edible produce.
- **Wales** (United Kingdom): in August 2017, the Welsh government announced a proposed new target to halve the amount of food being wasted in Wales by 2025. The proposed target will be consulted on as part of the update of Wales's waste strategy.

9.2.2 Recycling targets contributing to climate targets

Several countries (including the Netherlands — Box 9.1) pointed out that recycling targets also avoid primary production, and therefore they also reduce greenhouse gas emissions.

9.2.3 Waste targets and the circular economy

Setting targets for the broad concept of the circular economy is a challenge, in part because of difficulties in measuring circularity, but several countries mentioned traditional waste targets in this context.

- **France**: the roadmap for the circular economy aims to progress towards 100 % recycling of plastics by 2025.
- **Germany**: ProgRess II includes a series of circular economy targets, including a 50 % increase in the quantity of separately collected organic waste and high-quality recycling/recovery of such waste by 2020 relative to 2010.
- **Netherlands**: the government programme for a circular economy by 2050 contains some measurable targets for consumer goods — by 2020, the annual volume of household residual waste will be a maximum of 100 kg/person; by 2025 the maximum will be 30 kg/person/year.
- **Scotland** (United Kingdom): a key target applicable in Scotland is 60 % recycling/composting and preparing for reuse of waste from households by 2020.

Northern Ireland (United Kingdom) and Wales (United Kingdom) reported that they were close to adopting waste targets in the context of the circular economy.

- **Northern Ireland** (United Kingdom): it is anticipated that an updated waste management strategy will take account of the latest targets and revisions in the recently agreed circular economy package.
- **Wales** (United Kingdom): in October 2017, the Cabinet Secretary for Environment and Rural Affairs stated the Welsh government's commitment to consulting on a recycling target of 80 % for municipal waste for 2030.

One of the ambitions of this survey was to elicit information on waste targets that go further than the minimum required by EU regulations or that apply to aspects not covered by EU regulations. Overall, it proved difficult to judge which of the reported targets met this condition. In Annex 3, the targets, listed per country (for EU Member States), are at least different from descriptions of EU-imposed targets. Different targets do not mean, by definition, a higher level of ambition. Slovakia explicitly stated that it had introduced targets not available in EU directives (Box 9.2). Switzerland provided an example of a sanction to be applied when a particular recycling target is not achieved (Box 9.3).

9.3 Raw material supply targets

Only a few targets related to raw material supply were reported. This is somewhat surprising, given widespread concerns about reliance on imports or

Box 9.1 Plastic fantastic — reducing greenhouse gas emissions

One of the key goals for 2030 of the Dutch transition agenda on plastics is to reduce the amount of plastics that are incinerated. It is estimated that, thanks to the envisaged reduced incineration of plastics, CO_2 emissions in the Netherlands will be reduced by 970 000 tonnes in the period 2016-2030.

France, in its 2018 roadmap for the circular economy, set the objective of avoiding emissions of 8 million tonnes of CO_2 annually from the recycling of plastic.

For further information, see country profiles.

Box 9.2 Going the extra mile — Slovakia

Slovakia reported having several waste-related targets aimed at waste streams for which there are no targets in EU directives:

- **Biodegradable industrial wastes:** the objective for biodegradable industrial wastes is to reach 75 % material recovery by 2020, with 10 % energy recovery and a maximum of 5 % sent to landfill.
- **Ferrous and non-ferrous metals:** the objective for wastes from ferrous and non-ferrous metals is 90 % material recovery by 2020, with zero energy recovery and a gradual decrease in landfilling to a maximum of 1 %.
- **Waste tyres:** the objective for waste tyres is 80 % material recovery by 2020, with 15 % energy recovery and a gradual decrease in landfilling to a maximum of 1 %.
- **Waste oils:** the objective for waste oils is 60 % material recovery by 2020, with 15 % energy recovery and zero landfilling.

For further information, see country profile.

Box 9.3 And what if you don't? Switzerland's recycling target

Switzerland provided an example of the sanctions to be applied if a target is not achieved. If the recycled share of polyethylene terephthalate (PET) plastics, aluminium and glass drops below 75 %, a deposit-based solution will be implemented.

For further information, see country profile.

security of supply, mentioned in the section on driving forces in Chapter 3.

As shown in Box 9.4, the Belgian targets refer to using best local supply for raw materials. The Dutch target is formulated in terms of use of raw materials, but this has a one-to-one relationship with raw material supply. The Portuguese target refers to the circumstances in which raw materials are produced.

In the country responses, five countries — Estonia, Hungary, Montenegro, North Macedonia and Serbia — reported on targets for biofuels or renewable forms of energy in general. Although energy was beyond the scope of this survey, explicit targets on biofuels are listed in Annex 3 under raw material supply targets, because the supply of bio-based materials themselves is bounded by the Earth's capacity to supply them. It is quite likely that other countries may have similar targets but did not report them because energy was outside the scope of this report.

Box 9.4 Examples of targets related to raw material supply

Flanders (Belgium)

- By 2020: harvest 135 000 tonnes of low-grade wood from the Flemish forests (branches, treetops, other low-grade wood) compared with 2013 harvest levels of 90 000 tonnes.
- By 2020: harvest 114 000 tonnes of woody biomass from the maintenance of roadsides and small landscape elements — hedgerows, roadside trees and wood on road shoulders.

Netherlands

- An (interim) objective of a 50 % reduction in the use of primary raw materials (minerals, fossil materials and metals) by 2030 compared with 2014.

Portugal

- Increase the volume of timber and other certified forest products traded on the market by 50 % between 2010 and 2020.

For further information, see country profiles.

9.4 Circular economy targets

As indicated earlier, traditional waste targets can be relevant in the context of the circular economy, for example those that increase recycling levels, reduce residual waste, limit the percentage of waste incineration or introduce landfill bans. All of these targets contribute to increasingly closing the material loops in society.

Several countries reported targets on waste generated, or on recycling, as part of a circular economy. Indeed, recycling can play a role in indicating how well material loops are closed, and recycling targets can also be classified under a circular economy.

However, in this report, these targets have been included under waste targets, as they were traditionally developed in that area. The only target classified under circular economy is the reuse target defined by Flanders (Belgium), as a reuse target was never set in the EU policy context.

9.5 Other targets

Seven countries reported having targets relevant to resource efficiency and the circular economy that focus on other aspects, such as consumption (office paper), green public procurement, land management (protected areas) and footprints (ecological footprint). More information on the other reported targets can be found in Annex 3.

9.6 Setting new targets — how and why, or why not?

A few countries/regions reported that they are exploring the feasibility of adopting targets for the circular economy.

Albania and Wallonia (Belgium) provided some insights into the factors that determine the possibility of setting a quantitative target in general. Albania reported on the topic of sectoral energy targets and, although energy is beyond the scope of this survey, those reflections have a generic character and are therefore also applicable to other policy areas. Wallonia shared its reflections on the factors for and against setting targets, including why the Walloon waste resources plan does not have numerical targets in certain areas (Box 9.5).

Last but not least, Flanders (Belgium) provided an argument for not raising the quantitative target for recycling construction and demolition waste, but focusing more on the quality of recycling (Box 9.6).

Box 9.5 Wallonia (Belgium) — factors for setting targets

When setting targets, the following are taken into account:

coherence with the objectives already defined at the European level and/or Wallonia's desire to be more ambitious and exceed these objectives;

thoroughness and the level of data mastery — if, for certain waste flows, there is still uncertainty deemed too significant regarding the waste supply or the rates of recycling or energy recovery, the choice is made not to define precise objectives, as the first measure to be implemented is improving the quality of data;

levels of performance achieved and prospects for improvement — when a waste flow has already been almost fully optimised and recovered, it is unrealistic to set more ambitious objectives in relation to the current situation;

level of expertise of public authorities regarding the expected effects of certain measures — a priori, it is difficult to predict whether measures relating to research and development will be successful, or to assess with certainty the impact of information, awareness-raising or inspection campaigns.

For further information, see country profile.

Box 9.6 Flanders (Belgium) — considerations when setting targets

In those policy domains in which recycling rates are already very high, for example in the building and construction sector, where targets are higher than 96 %, no new targets have been introduced. Instead, there is a focus on the quality of recycling rather than the quantity. Tracimat, for example, is a traceability system designed to separate contaminated construction and demolition waste streams, such as asbestos, from non-contaminated waste streams.

For further information, see http://www.tracimat.be (in Dutch).

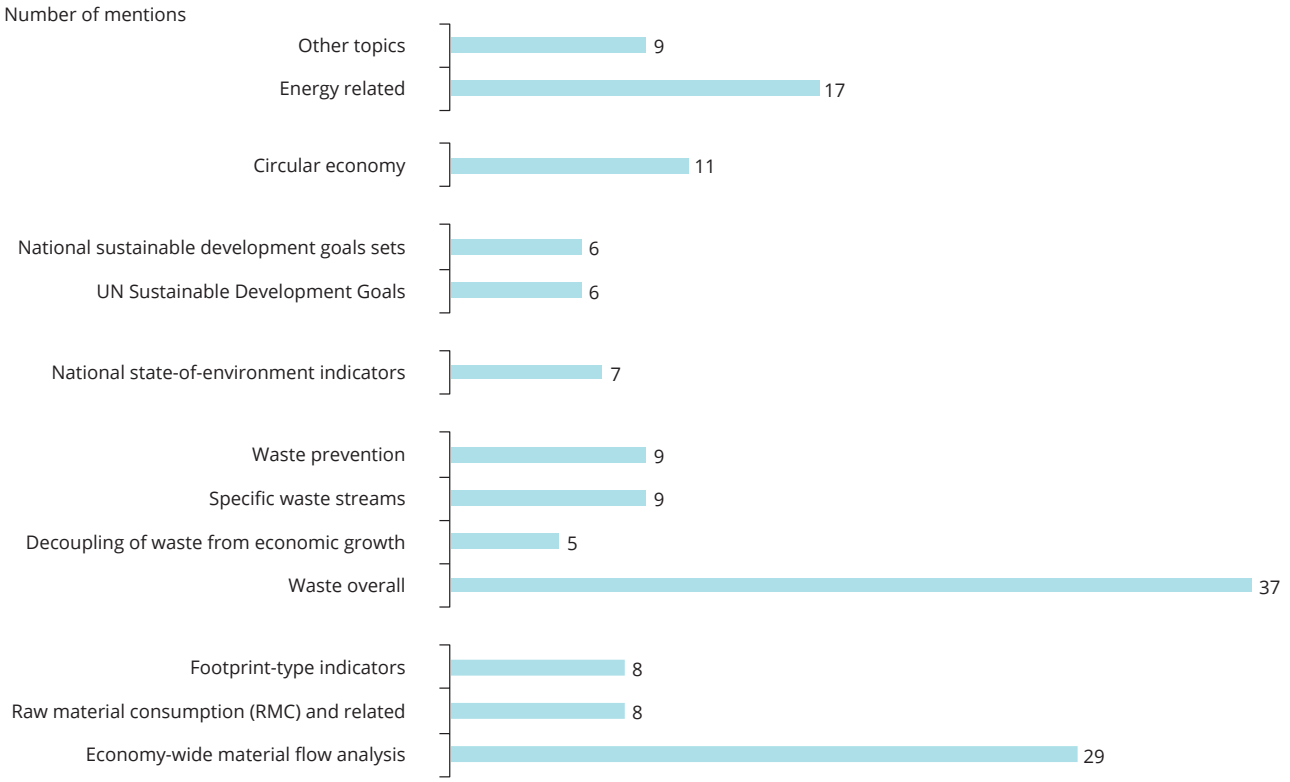
10 Indicators to monitor progress towards a resource-efficient circular economy

This chapter provides an overview of responses to the question about the indicators that countries/regions use to monitor progress towards a resource-efficient circular economy, as well as an overview of the different ways in which the results of monitoring efforts are made available to the public.

The responses received were in general extensive and provided detailed information on very diverse indicators, ranging from common metrics on waste generation to complex indicator sets on specific sustainable development priorities. Figure 10.1 presents an overview of the indicators reported.

One very common group of indicators used for monitoring is Eurostat's economy-wide material flow account (MFA)-based indicators. Reporting on MFA indicators is mandatory for EU Member States, but the indicators are also reported by several non-EU countries. Eight countries reported the use of raw material consumption (RMC) and RMC-based footprint indicators, such as resource productivity (gross domestic product (GDP)/RMC). Turkey reported that it is planning to compile RMC and material footprint data in the near future. Germany reported on the development of novel material productivity indicators. Eight respondents have proposed or integrated into their indicator sets (ecological) footprint-based indicators for monitoring national, local — for example at city level — or company performance. A few countries included a reference to the EU Resource Efficiency Scoreboard, without further elaborating on their actual use of it.

Figure 10.1 Overview of reported indicators, by type



All countries use indicators on waste for evaluating and monitoring the targets established in their national waste management and prevention plans and programmes. Five respondents indicated having indicators in place to measure decoupling of waste generation from (sectoral) economic growth; nine reported using indicators for specific waste streams, such as food waste and construction and demolition waste; and nine explicitly mentioned indicators for monitoring progress on waste prevention.

Seven respondents provided examples of sets of quantitative indicators related to the monitoring of the state of the national environment.

Six countries reported applying the United Nations (UN) Sustainable Development Goal (SDG) indicators. Five other respondents have developed national sustainable development goals and strategies with corresponding indicator sets, more or less aligned with the UN SDG indicator sets. Sweden uses both UN and nationally developed indicators.

Eleven respondents offered insights into their circular economy monitoring frameworks, with the corresponding indicator sets being at different stages of development. In this group, only France reported already having a specific circular economy indicator set.

Seventeen respondents reported the use of energy-related indicators, which, in principle, are beyond the scope of this report, and nine mentioned indicators on other more diverse topics.

None of the country reports mentioned the existence or use of qualitative approaches (i.e. not relying on indicators) to monitor progress towards a resource-efficient circular economy.

10.1 Material use, resource productivity and footprint-type indicators

10.1.1 Economy-wide material flow account-based indicators

All EU Member States are required, as per Regulation (EU) No 691/2011 on European environmental economic accounts, to compile economy-wide MFAs within a common framework and submit these to Eurostat.

Although only mandatory for EU Member States, some non-EU countries also compile economy-wide MFAs — Albania, Bosnia and Herzegovina, North Macedonia, Norway, Serbia, Switzerland and Turkey. Most of the reporting countries indicated that economy-wide MFAs, both per person and in absolute quantities, are provided by their statistical bodies (voluntarily or mandatory) and allow the calculation of resource productivity at national level.

Germany reported an interesting approach to indicators and, for that matter, to setting targets by adopting a variation of existing MFA indicators and developing completely new indicators (Box 10.1).

Box 10.1 Developing indicators in Germany to suit national needs

Germany has adopted a variation of conventional material flow indicators by introducing abiotic raw material productivity as gross domestic product (GDP)/domestic material input $(DMI)_{abiotic}$ and total raw material productivity as (GDP + monetary value of imports)/raw material input (RMI). Total raw material productivity is considered an extension of abiotic raw material productivity, as it includes both biotic and abiotic materials. In addition, and perhaps more importantly, imported goods are included in terms of not only their actual weight but also the weight of all of the raw materials used during their production (material footprint). This guarantees that increases in productivity will not be falsely reported because of shifting resource-intensive processes abroad. To ensure the conceptual consistency of the indicator, the monetary value of imported goods is added to GDP.

Germany has, furthermore, developed a couple of novel indicators on the effects of the use of secondary resources as opposed to virgin raw materials. Direct effects of recovery (DERec) and direct and indirect effects of recovery (DIERec) make it possible to present the direct and indirect effects of substituting primary raw materials with secondary materials. DERec is a virtual indicator reflecting the extent to which primary raw materials and semi-finished and finished goods — assuming similar production patterns and technologies — would have to be imported or produced domestically if no secondary raw materials were to be used in production. DIERec also reflects the extent to which primary raw materials would have to be produced not only domestically but also globally.

For further information, see country profile.

10.2.3 Raw material consumption indicators

Resource productivity is traditionally calculated as GDP per unit of DMC. However, the limitation of the use of DMC is that resource productivity is not adjusted for the raw materials associated with goods and materials traded across borders.

Most reporting countries explicitly recognise this important shortcoming, and many have embraced an alternative method in which DMC is substituted by RMC. The latter is defined as the annual quantity of raw materials extracted from domestic territory, plus all physical imports and minus all exports, both expressed in raw material equivalents. RMC is also referred to as the material footprint.

At the time of writing, Eurostat compiles RMC accounts for the EU as a whole, while individual countries compile national accounts on a voluntary basis:

- **Austria** included RMC in its official annual statistics in 2018.
- The material productivity of the **Flanders (Belgium)** economy is expressed in terms of both RMC and DMC. Both are used in an indicator, calculated bottom-up from around 60 individual material flows, aggregated into biomass, metal ores, non-metallic minerals and fossil energy carriers.
- Since 2018, RMC has been included among the various environmental indicators used for **Wallonia (Belgium).**
- The Danish action plan on the SDGs (2017) includes monitoring 37 objectives. One of the indicators was on resource efficiency (DMC/GDP, but this will be changed to RMC/GDP).
- **Finnish** material use and efficiency trends for 2008-2030 have been calculated in a pre-study for the national material efficiency programme by the Finnish Environment Institute and the Thule Institute. The trend in resource productivity (material productivity) was estimated using DMC and RMC, although it is noted that, as with DMC, RMC fails to take water use and unused extraction of natural resources into account.
- **France** has recently assessed its RMC.
- In **Switzerland**, the Federal Office for the Environment (FOEN) and the Federal Statistical Office publish indicators related to resource efficiency, including the material footprint (RMC) and consumption-related material productivity (GDP/RMC).
- Waste prevention metrics and ratios of economic performance to resource, including GDP/RMC, are monitored in **England (United Kingdom).**

To support countries in their calculation of national resource productivity using RMC, Eurostat has recently developed and shared a model to estimate it. Within this model, the EU's RMC represents the total amount of extracted raw materials, both within the EU and abroad, needed to produce the goods and services consumed by EU residents ([6]).

10.1.3 National-, local- and company-level footprint indicators

Several countries reported not only considering the domestic perspective (pressures or impacts occurring within a country's territory) but also taking a global or consumption perspective into account, by including pressures or impacts associated with imported products or resources. This is typically done by employing various footprint-type indicators.

- In **Belgium (Flanders)**, studies are being conducted on footprint methodology for the circular economy. Carbon footprint indicators are considered useful for establishing the link between circular economy strategies and climate policies. Recycling and reuse contribute to lowering the carbon emissions of a country in only a limited way, but they have a greater impact on the carbon footprint and therefore carbon footprint indicators can be useful for policy purposes. They can be used to translate climate targets into circular economy targets and to help integrate circular economy strategies into climate policies.
- Apart from the RMC-based material footprint, **Switzerland's green economy indicator set** includes energy, biodiversity, water, greenhouse gas and ecological footprints as well as the total environmental impact of Swiss consumption. The latter indicator uses ecopoints, based on the ecological scarcity method — also known as the UBP method. Ecopoints can also be used to calculate the environmental impact of products and processes, as applied in the Reffnet.ch projects. The share of environmental impacts generated abroad by Swiss

([6]) https://ec.europa.eu/eurostat/statisticsexplained/index.php/Material_flow_accounts_statistics_-_material_footprints

consumption — currently accounting for 75 % of the total burden — is increasing. The green economy indicator set includes efficiency indicators but also focuses on per person footprints in absolute numbers, because increased efficiency will not alone reduce environmental impacts sufficiently. The FOEN also provides a comparison with the available limits derived from planetary boundaries to communicate the need for action.

- **Finnish Sustainable Communities** — the FISU network — is committed to becoming carbon neutral and waste free, as well as curbing overconsumption by 2050 or earlier. Member cities and municipalities use four indicators on a regular basis to evaluate their steps towards resource wisdom: (1) a carbon footprint; (2) an ecological footprint; (3) material loss; and (4) the perceived well-being of city residents.

- In **Italy**, the 2017 circular economy framework and strategic document proposes that companies provide details of their carbon, water and material footprints in their sustainability reports.

Other respondents that have proposed or integrated similar (ecological) footprint-based indicators in their indicator sets are Wallonia (Belgium), Latvia, Montenegro and Scotland (United Kingdom).

10.2 Indicators related to waste management

10.2.1 Waste generation, recovery and disposal

EU Member States are subject to Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics, which lays down a framework for the production of statistics relative to the generation, recovery and disposal of waste.

All respondent countries reported having indicators on waste that enable the evaluation and monitoring of the targets established in their national waste management and prevention plans and programmes. In most cases, specific indicators were reported on absolute and/or relative volumes of waste: (1) waste generated by different sources — industrial sectors, households, construction, etc.; (2) waste subject to different treatment — landfill, incineration, recycling, recovery, reuse, etc.; (3) waste consisting of specific products — waste electrical and electronic equipment, end-of-life vehicles, tyres, batteries, packaging, construction and demolition waste, etc.; and (4) waste categorised as hazardous or non-hazardous. Most respondents reported having indicators related to mandatory EU reporting as well as some dedicated national approaches for monitoring waste management in a more resource-efficient circular economy.

Four countries — Croatia, Finland, Norway and Slovakia — reported using indicators that measure the decoupling of waste generation from economic growth. Turkey has an indicator on the waste intensity of manufacturing sectors, defined as the amount of total waste and hazardous waste generated by the main manufacturing sectors divided by the value added by their respective economic activity.

Several countries/regions indicated having developed specific indicators on food waste — Austria, Croatia, Denmark and France — and on construction and demolition waste — Austria, Croatia, Czechia, England (United Kingdom), Finland, Slovakia and Wales (United Kingdom). Bulgaria measures spare waste recycling capacity, in tonnes per year, and additional capacity for recovery of energy from waste.

To measure progress in the transition to a resource-efficient circular economy, Belgium (Federal) also considers the cost of waste management compared with total input costs, application of the Lansink waste hierarchy, and the percentage of repair activities compared with total market services as key parameters.

10.2.2 Waste prevention indicators

Indicators related to waste prevention targets were explicitly mentioned by Austria, Croatia, Denmark, England (United Kingdom), Finland, Slovakia, Spain, Sweden and Wales (United Kingdom). These included indicators relating to, among others, consumer/business behaviour, biowaste and composting, construction and demolition waste, and public procurement.

10.3 National state of the environment indicator sets

A significant number of countries (Belgium (Wallonia), Croatia, Ireland, Italy, Portugal, Serbia, Sweden) presented examples of indicator sets related to the monitoring of the state of the national environment.

10.4 National sustainable development indicators

The specific indicators explicitly referring to material resources that were adopted for monitoring the UN 2030 SDGs ([7]) are:

- 8.4.1 and 12.2.1: material footprint, material footprint per person and material footprint per unit of GDP;
- 8.4.2 and 12.2.2: DMC, DMC per person and DMC per unit of GDP.

There are several other SDG indicators that do not refer to materials or resource efficiency but were mentioned by the countries in the context of their reporting on sustainable development:

- 6.4.2: level of water stress — freshwater withdrawal as a proportion of available freshwater resources;
- 7.1.1: renewable energy share of total final energy consumption;
- 7.2.2: proportion of the population with primary reliance on clean fuels and technology;
- 7.3.1: energy intensity measured in terms of primary energy and GDP;
- 11.6.1: proportion of urban solid waste regularly collected and with adequate final discharge out of the total urban solid waste generated by cities;
- 12.5.1: national recycling rate, tonnes of material recycled.

Countries that reported working on the UN SDG indicators include Denmark, Finland, Poland, Serbia, Sweden and Turkey.

Other countries (Belgium (Wallonia), Estonia, Montenegro, Portugal, Switzerland) have developed national sustainable development goals and strategies with corresponding indicator sets. Several of these countries report having made efforts to better align the development of their national indicators with the UN SDG indicator sets.

Sweden uses a set of both globally proposed and nationally developed indicators for monitoring the implementation of the 2030 agenda.

In several countries (Albania, Ireland, Lithuania, Portugal, Serbia and Slovakia) sustainable development indicators have been adopted that measure progress towards increased sustainability, including aspects of resource efficiency and circularity.

10.5 Circular economy

Only France reported already having a dedicated circular economy indicator set (Box 10.2).

Slovakia adopted the circular economy monitoring framework established by the European Commission, along with the corresponding indicators. In eight other countries (Belgium, Czechia, Finland, Italy, the Netherlands, Poland, Portugal, Slovenia), dedicated circular economy monitoring frameworks or indicator sets are at various stages of development. These vary from exploring the feasibility of establishing circular economy indicators to designing, planning and implementing complex frameworks with indicators on different scales (national, regional, sectoral and company) in a wide range of economic and sustainability domains.

The **Netherlands** reported developing a monitoring system for the circular economy, distinguishing three levels: (1) action monitoring; (2) transition dynamics monitoring; and (3) effect monitoring:

1. **Action monitoring** considers the review of the implementation of the measures in the government programme for a circular economy, probably supplemented in 2018 with monitoring the measures in the transition agendas.
2. **Transition dynamics monitoring** first looks at the likelihood of circular strategies taking off (start-up phase), focusing on the elements of capabilities, motivation and a normative framework. To this end, slightly different indicators were established for five prioritised sectors. Then, in the so-called growth phase, companies' actual implementation of circularity strategies is measured. Some of the nine circularity strategies, structured in an R-ladder (Table 10.1), require the development of new indicators, which will be included in subsequent editions of the monitoring reports.
3. **Effect monitoring** looks into not only the effects of a more circular economy on material flows (direct/indirect material consumption, secondary material use, resource efficiency) but also the impact on CO_2

([7]) https://unstats.un.org/sdgs/indicators/indicators-list

emissions and land and water use. The effects are monitored for the entire economy as well as for the five prioritised sectors.

Italy reported establishing a set of indicators at the macro, meso and micro levels. The report Circular economy and resources efficiency: indicators for circular economy, published in May 2018, recognised the need for measuring circularity ([8]).

10.6 Other indicators reported by countries

10.6.1 Energy

Data on the use of fossil energy carriers are included in the economy-wide MFA and physical energy flow accounts reported to Eurostat by all Member States.

Although energy use and energy efficiency were beyond the scope of this survey, many countries — Albania, Belgium (Federal and Wallonia), Bulgaria, Czechia, Denmark, Finland, Ireland, Lithuania, the Netherlands, North Macedonia, Norway, Portugal, Serbia, Slovakia, Switzerland and Turkey — reported the use of indicators for monitoring energy consumption, intensity, efficiency and productivity in various economic sectors; the share of energy from renewable sources in final energy consumption; energy demand from dwellings or buildings; or the production of energy from waste.

10.6.2 Land use and other indicators

A few countries reported having developed indicators on land use or land use change (Italy, Lithuania, the Netherlands, North Macedonia, Serbia and Slovakia) and on biodiversity (Serbia and Switzerland).

Box 10.2 Monitoring the circular economy in France

In 2017, France adopted a set of 10 indicators to monitor progress towards a circular economy.

The indicators for sustainable production are:

- domestic material consumption per person;
- resource productivity;
- number of ecolabel holders;
- number of industrial symbiosis projects.

The indicators for sustainable consumption are:

- car-sharing;
- food waste;
- household spending on product repairs and maintenance.

The indicators for waste management are:

- quantities of waste sent to landfill;
- use of recycled raw materials in production processes.

Employment in the circular economy is included as a cross-cutting theme.

The indicators were selected by taking into account those already produced and the data availability for their production; results of consultations with stakeholders; and the need to cover the main fields of the circular economy, namely sustainable production, sustainable consumption and waste.

For further information, see country profile.

([8]) https://www.minambiente.it/sites/default/files/archivio_immagini/economia_circolare_ed_uso_efficiente_delle_risorse_-_indicatori_per_la_misurazione_della_circolartita_-_bozza_maggio_2018.pdf

Table 10.1 The R-ladder

Produce and use in a smart way	R0 REFUSE	Make existing products obsolete by doing without or introducing alternatives
	R1 RE-THINK	Intensify the use of products through shared use or multipurpose products
	R2 REDUCE	Produce and use more efficiently, with smaller quantities of (raw) materials
Prolong the lifespan of parts and products	R3 REUSE	Further use of the same product by another user
	R4 REPAIR	Repair and maintain for continued use by the same user
	R5 REFURBISH	Update an old product to meet today's demand
	R6 REMANUFACTURE	Take parts of an old product to make a new product with the same specification
	R7 REPURPOSE	Take parts of an old product to make another product
Make good use of materials	R8 RECYCLE	Take materials from waste for another use (higher or lower value)
	R9 RECOVER	Take materials from waste to generate energy

Source: http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-circulaire-economie-innovatie-meten-in-de-keten_2249.pdf (in Dutch)

A handful of respondents provided information on the implementation of environmental management systems and tools such as the EU Eco-Management and Audit Scheme, the International Organization for Standardization, ecolabels and green patents (Croatia, Portugal, Serbia and Slovakia).

Lithuania reported an interesting indicator: the share of the population that makes a significant contribution to the sustainable use of resources, estimated at 24 % in 2014, with an aspirational target of 30 % by 2020.

10.7 Publication and communication of indicator-based monitoring results

All countries reported periodically publishing national state of the environment reports and/or providing online statistics and monitoring results on the their progress towards a more resource-efficient, circular and sustainable economy. This is typically done through the websites of the responsible public bodies. Representative examples include:

- Every 2 years, the Belgium (Wallonia) Operational Directorate-General for Agriculture, Natural Resources and the Environment publishes a State of the *Walloon environment report*, including a critical, evaluative and prospective monitoring of various components of the environment and the pressures exerted by human activities, as well as a review of efforts to establish sustainable development. Since 2018, the various indicators on the state of the Walloon environment have been kept up to date on the Directorate-General's website, providing different types of indicators, including environmental, socio-economic and health indicators as well as resource efficiency indicators.
- In Italy, the new set of indicators for the National System for Environmental Protection, adopted in 2017, including data related to waste and material flows, is published in the *Environmental data yearbook*, available on the website of the Institute for Environmental Protection and Research (ISPRA).
- In 2017, *Green economy indicators for Poland* was published, with indicators assessing the state of the green economy in Poland in four core areas: (1) natural asset base; (2) environmental and resource productivity; (3) environmental quality of life; and (4) economic opportunities and policy responses.
- In Austria, results on resource efficiency targets are presented in the *Resource efficiency report.*
- *The Use of natural resources — report for Germany 2016* focuses on renewable and non-renewable raw materials, and its themes range from raw material extraction and trade to the use of raw materials in the German economic system and material consumption. Other resources, such as water, land or flow resources, are included in a separate report. To provide a comprehensive picture, the report is not limited to a national perspective but includes an in-depth account of international aspects, covering issues such as security of supply and indirect raw material use.
- The Office of Statistics of Liechtenstein publishes an annual report on indicators of sustainable development, including built-up areas, the ecological quality of forests, drinking water consumption, ecological compensation areas in agricultural zones, concentration of nitrite in ground water, a range of air pollutants and waste recycling rates.

- In Sweden, progress on the environmental quality objectives should be reported to the government annually and evaluated and reported in depth every few years. The Environmental Objectives Portal currently presents some 100 national indicators tracking progress towards the environmental quality objectives and the milestone targets.

- Zero Waste Scotland (United Kingdom) provides an annual report on the carbon impacts of Scotland's waste.

The (mandatory) periodic reporting and publishing of the results of national waste management and prevention plans and policies, as well as the nationally calculated economy-wide MFA data provided to Eurostat, are outside the scope of the present analysis.

Finally, at the EU level, three indicator sets have been published in recent years (EU Resource Efficiency Scoreboard, EU Raw Materials Scoreboard and monitoring framework for the circular economy). Five countries (Bulgaria, Italy, Latvia, Poland and Slovakia) committed to using the EU Resource Efficiency Scoreboard as a reference when developing national indicators.

11 Resource efficiency, the circular economy and the 2030 Sustainable Development Goals

In September 2015, the United Nations General Assembly adopted the 2030 agenda for sustainable development, which includes Sustainable Development Goals (SDGs) in 17 areas and 169 specific targets. This chapter presents country responses to the request to report national examples of concrete initiatives in which resource efficiency and the circular economy are used as a way of achieving the SDGs. The main thrust of the question was to elicit concrete examples of initiatives already under way, rather than a generic statement of how important SDGs are.

In total, 28 of the 32 participating countries provided answers. The level of detail in the responses varied considerably, as did their relevance to the actual question. The answers can be grouped into three categories:

- examples of how countries build resource efficiency/the circular economy into their national strategies for the implementation of the 2030 agenda and in particular the SDGs;
- examples of strategies in preparation to implement SDGs;
- general acknowledgement that SDGs are seen as an important framework.

Box 11.1 Finland — reviewing the national material efficiency programme to contribute to Sustainable Development Goals

Finland is committed to implementing the 2030 agenda as a whole while focusing on some specific issues that are critical for the country. To become carbon neutral and resource wise by 2030, Finland is investing in the bioeconomy, the circular economy and clean solutions, producing and exporting climate-friendly products, services and innovation, and building low-emission sectors and business models.

The 2013 strategy, The Finland We Want by 2050 — Society's commitment to sustainable development, is one of the tools that Finland adapted to reach the Sustainable Development Goal (SDG) targets. The commitment includes eight objectives that aim to make the vision of a sustainable Finland by 2050 a reality. One of the objectives is a resource-wise economy. Specific commitments are aimed at improving resource efficiency as well as creating business models that boost the productivity of natural resources.

In addition, Finland has a national action plan on how to reach SDG targets with specific focus areas. One of the areas is a carbon-neutral and resource-wise Finland. Key relevant actions include:

- follow the circular economy roadmap alongside implementing organisations;
- accelerate public procurement in central and local government;
- support sustainable innovation;
- promote carbon neutrality and the wise use of resources globally.

Last but not least, the implementation of Finland's national material efficiency programme — Sustainable Growth through Material Efficiency — was reviewed in 2017 to evaluate how material efficiency should be linked to the circular economy in the future. The results clarified priorities for national material efficiency work and measures that best respond to the EU circular economy package and the SDGs.

For further information, see country profile.

11.1 Countries actively building resource efficiency and the circular economy into their strategies to implement the Sustainable Development Goals

As could perhaps be expected, initiatives to combine resource efficiency and the circular economy are most advanced in those countries that have adopted dedicated strategies, action plans or roadmaps.

Some countries have reviewed existing key policy documents to consider how these policies can best support the implementation of the 2030 agenda (Box 11.1).

A few countries have undertaken new initiatives to frame resource efficiency and the circular economy in their SDG implementation strategies (Box 11.2) or to explore new ways of including a variety of stakeholders. In the Netherlands, more than 100 organisations have signed up to the national SDG Charter, committing to forming partnerships to contribute to the SDGs.

11.2 Examples of reported resource efficiency/circular economy activities relevant to national strategies to implement the Sustainable Development Goals

A large group of countries reported a variety of initiatives in which they see links between the SDGs and resource efficiency and the circular economy. Common examples related to SDG 12, Responsible consumption and production, followed by SDG 2, Zero hunger, and SDG 6, Clean water and sanitation. A few answers addressed SDG 8, Decent work and economic growth, and SDG 13, Climate action, directly, although they were indirectly linked through SDG 12. Denmark has developed an action plan on the SDGs including resource efficiency and the circular economy as a tool for achieving the SDGs ([9]).

Typically, countries reported initiatives related to waste reduction and management, green public procurement and strategies to protect the environment and use natural resources sustainably.

Circular economy practices are considered important elements for the transition to systems of sustainable consumption and production (SDG 12). In the responses, the focus was on describing the links between the circular economy and environmental sustainability, with aspects of social and economic sustainability discussed much less (Table 11.1). Scotland (United Kingdom) and Estonia mentioned some examples of the latter.

In general, countries provided more examples of initiatives on sustainable production than on sustainable consumption. Sustainable consumption was mentioned in connection with SDGs in the responses from Austria, Belgium (Flanders and Wallonia), Croatia, England (United Kingdom), Italy, Northern Ireland (United Kingdom), Serbia, Sweden

Box 11.2 Combining the Sustainable Development Goals with resource efficiency/the circular economy in Flanders (Belgium)

The Flanders government is working on a vision statement, Vizier 2030, that will translate the 17 Sustainable Development Goals (SDGs) into its policy objectives.

The government's ambition for an open and international Flanders translates into seven transition priorities, with the 2030 agenda and the SDGs as common features. Specifically, for the 2030 agenda, the government aims to achieve 49 objectives by 2030.

Resource efficiency/circular economy objective 32 has particular relevance: 'by 2030 we will close as many cycles as possible in pursuit of a circular economy. The carbon and material footprints of Flemish consumption will be reduced in relation to the quality of life. Food losses in Flanders will be reduced by 30 %.'

After the approval of these objectives by the Flanders government, detailed policies will be further integrated into the Flanders' 2030 objectives. Further steps towards the Flanders 2030 agenda will be the implementation of the 2030 objectives and the development of a monitoring and reporting system.

For further information, see https://do.vlaanderen.be/sites/default/files/atoms/files/Visienota_Vizier2030.pdf (in Dutch).

([9]) https://www.regeringen.dk/publikationer-og-aftaletekster/handlingsplan-for-fns-verdensmaal

and Wales (United Kingdom). Most of the examples given of initiatives on sustainable consumption are related to food.

Sustainable public procurement policies were mentioned in several answers, including those from Croatia, Finland, Latvia, Serbia, Sweden, Wales (United Kingdom) and Wallonia (Belgium). In Sweden, the National Agency for Public Procurement was established in 2015 to develop and manage criteria for environmental considerations in public procurement.

Circular economy practices linked to several production sectors were mentioned, including manufacturing, forestry and agriculture. Only a few responses, from Belgium (Wallonia), Croatia, the Netherlands and Sweden, mentioned examples from the service sector.

Initiatives on food and water were given as examples by many countries. One possible reason for this is the fact that these two streams are directly mentioned in SDGs 2, 6 and 14. The EU circular economy package 2015 also calls for action to reduce food waste (Table 11.2).

Water-related initiatives were reported by some countries, including Belgium (Wallonia), Croatia and Lithuania. These include management plans for rivers, the protection of surface waters, ensuring wastewater treatment and marine and coastal management.

11.2 Development of national strategies to achieve the Sustainable Development Goals

Many countries reported that they have developed or are developing strategies or roadmaps linked to achieving the SDGs. Often SDGs are being implemented as an overarching set of principles that need to be integrated into various policies. Norway, for example, underlines good general governance as key to achieving the SDGs.

Several countries, including Bosnia and Herzegovina, Latvia, Turkey and Wales (United Kingdom), reported mapping their existing policy targets against the SDGs. As the circular economy is seen as a cross-cutting issue connecting various SDGs, it was reported that highlighting one single action for the circular economy was difficult.

Cooperation mechanisms play an important role in implementing SDG strategies and targets. In Finland, voluntary commitments are collected, through which the government and the administration, in collaboration with stakeholders, pledge to promote sustainable development. To maximise the impact, there is a need for efficient coordination, peer support and clustering of similar commitments. Switzerland organised an online consultation in 2017 in which non-governmental stakeholders were asked about their views on SDG targets. In Scotland (United Kingdom), a Sustainable Development Goals Network was initiated in 2017 by the Scottish Council for Voluntary Organisations.

Table 11.1 Examples of resource efficiency and circular economy initiatives related to sustainable production and consumption (SDG 12) other than green public procurement

Country	Initiatives related to sustainable production and consumption
Belgium (Flanders)	Targets to ensure sustainable consumption and production patterns through resource efficiency and closing the loops. Policy instruments include taxes on landfill and incineration; subsidies for recycling, reuse centres and mandatory sorting policies; and extended producer responsibility.
Belgium (Wallonia)	Strategic plan for the development, processing and consumption of organic agricultural products 2013-2020; the waste resources plan (adopted in 2017) aims to introduce new types of resources in various production sectors and incorporates a new component of public cleanliness; plans for sustainable nitrogen management and pesticide reduction in agriculture.
Serbia	A new industrial development strategy, which includes sustainability issues, is in preparation. This strategy will include environmental protection as a cross-cutting principle, thus achieving a link to SDG 8.4, Improve progressively through 2030 global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation.
Sweden	The Swedish Environmental Protection Agency and the cities of Gothenburg and Umeå arrange national meetings, LABs, on the topic of sustainable lifestyles, which are open to everyone. The idea is to inspire action by sharing experiences, creating networks and cooperation and increasing the number of platforms for sharing goods and services to decrease resource use and stimulate innovation. Sixty examples of best practice have been collected to be shared internationally. The purpose is to achieve the SDGs by taking action at both national and international levels.

Table 11.2 Examples of activities related to reducing food waste

Country	Initiatives related to minimising food waste
Belgium (Flanders)	Roadmap on food losses (2015-2030), with a target to reduce food losses by 30 % by 2030.
Belgium (Wallonia)	A general target to increase the sustainability of food supply chains by 2019. Activities include an online platform to facilitate the purchase of local products at the community level and a strategic plan to boost organic agriculture, running until 2020.
Ireland	Stop Food Waste Campaign (since 2009) and Food Waste Charter (since 2017) representing a call for stakeholders to align with SDG 12.3; collective industry commitment; forum on food waste biennial events, bringing together business, organisations, experts and consumers for discussion; and a Foodcloud app that links surplus food in the retail sector with charities.
Norway	Binding agreement to halve food waste throughout the value chain from primary producers to consumers by 2030, signed by the government and several food industry organisations; the government has decided to exempt food that is given to charity from value added tax (VAT).
Sweden	Three-year assignment of the Swedish Board of Agriculture, the Environmental Protection Agency and the National Food Agency to find ways to reduce food waste. It included information campaigns for consumers, increased collaboration along the food value chain and promoted using unavoidable food waste to produce biogas.
Switzerland	The Swiss green economy action plan assigns measures that contribute to the SDGs. One of the priorities is food waste.
United Kingdom (England)	The voluntary 10-year agreement, WRAP, the waste and resources action programme, brings together organisations across the food system to make food and drink production and consumption more sustainable. Waste hierarchy principles are applied strictly to food waste (food waste hierarchy); many local authorities have introduced a separate collection for food waste.

Part IV

Innovative approaches, good practice examples, synergies and policy initiatives

12 Examples of good practice and innovative approaches

This chapter provides an overview of initiatives that participants reported as examples of good practice or innovative approaches to supporting resource efficiency and/or the circular economy. Countries/regions were given a free hand in choosing the examples, as long as the work had already being implemented, and they were asked to provide short descriptions of them.

Together, the 32 countries provided more than 280 examples of good practice and innovative approaches. The titles of the initiatives and full details are available in the individual country profiles that accompany this report.

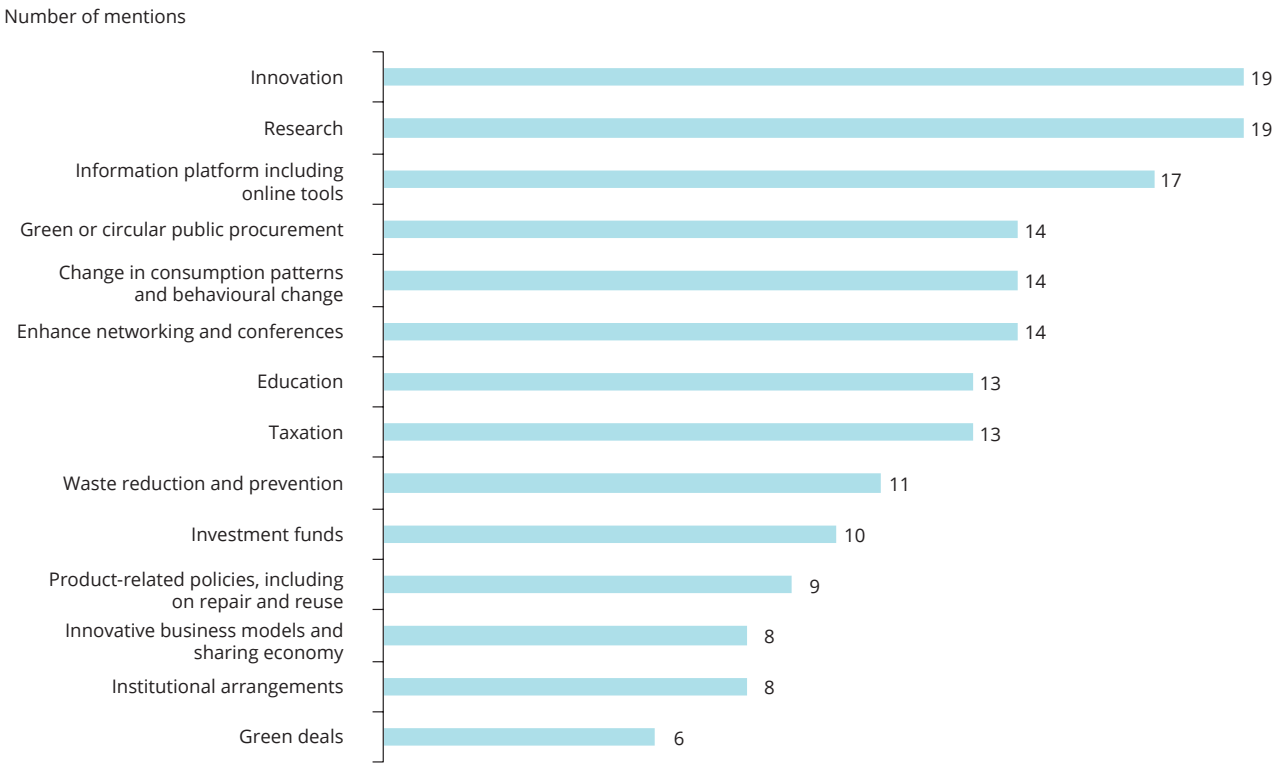
Most countries/regions reported initiatives undertaken by public bodies, although a few examples of private good practice initiatives were provided. Typical examples of reported initiatives include:

- resource efficiency/circular economy aspects taken up in other policy areas, such as innovation, education and product policy;
- policy instruments, for example taxation, green deals and information platforms;
- institutional set-ups to develop and monitor policies;
- new topics of interest, such as innovative business models for the circular economy.

The number of countries reporting good resource efficiency/circular economy practices per type of initiative is shown in Figure 12.1.

The many reported examples of good practice related to support for research and innovation reflect the fact

Figure 12.1 Reported examples of good practice, by type



that this is already a common practice. Environmental and resource efficiencies have been within the scope of research and development (R&D) and innovation funding for a good while, with the circular economy having appeared increasingly in recent years.

Countries/regions also use various economic instruments to stimulate material resource efficiency and/or the circular economy, including similar forms of taxation or financial support for research, innovation or investments. Taxation is a policy measure applied equally across all market players, whereas the public financial support for research, innovation and investment is allocated to those parties that successfully apply and/or go through competition for governmental support programmes. Research support aims to develop new knowledge; innovation support aims to convert knowledge into solutions, products or services with high technology- or market-readiness levels; and investment support aims to stimulate the implementation of existing solutions that contribute to public policy objectives.

12.1 Innovation

Examples of good practice in addressing innovation (Boxes 12.1 and 12.2) often include a stimulus for collaboration between companies and knowledge institutions, with small and medium-sized enterprises (SMEs) frequently identified as a special target group.

12.2 Research

Programmes for financially supporting industrial research with the potential to contribute to resource efficiency, the circular economy or raw material supply

Box 12.1 Denmark's eco-innovation programme

The main purpose of the Danish eco-innovation programme (MUDP) is to support the development and application of new environmental and resource-efficient solutions addressing prioritised environmental challenges. Furthermore, the ambition is to boost and strengthen cooperation between companies, knowledge-based institutions and partners in the EU within the field of environmental technology. MUDP is a public subsidy scheme with a general focus on the circular economy, recycling waste, water, adapting to climate change, cleaner air, reducing noise, using fewer hazardous chemicals, industry's environmental performance, and ecological and sustainable construction. For 2018 and 2019, the budget is DKK 90 million (EUR 12 million).

For further information, see http://eng.ecoinnovation.dk.

Box 12.2 Serbia — green innovation vouchers

The European Bank for Reconstruction and Development, with the support of the Austrian government and the Central European Initiative, has launched a programme of green innovation vouchers to encourage synergy between science and research organisations and the economy. The scheme aims to improve the process of introducing innovation in small and medium-sized enterprises in the field of green technology and resource efficiency, and thus support the long-term competitiveness of the Serbian economy and reduce its impact on climate change.

For further information, see http://inovacionivauceri.ebrd.rs (in English).

Box 12.3 Study on the macro-economic impact of Austria's traditional waste recycling economy

The aim of the study is to analyse the economic impacts of recycling iron and steel, aluminium, and paper and glass waste in Austria. In addition to the analysis of employment and value added, the study estimates the effects of recovering secondary raw materials to replace primary materials in Austria or for export, and the effects of current recycling on greenhouse gas emissions. The analysis is carried out using the WIFO.DYNK model, which has been adapted for this purpose. This includes the integration of data sets on primary and secondary production processes, in particular the use of energy and resources in production, calculated on the basis of physical material flows and prices.

For further information, see http://www.wifo.ac.at/publikationen?detail-view=yes&publikation_id=59194 (in German).

Box 12.4 United Kingdom — action-based research programme

Action-based research uses a combination of research, participation and action to solve a social problem. It is an iterative process that aims to improve a situation or practice through collaboration between researchers and practitioners on action in practical or real environments, such as in a business or community. Action-based research projects were recently funded to explore issues such as innovative ways to encourage small and medium-sized enterprises to be more resource efficient; product longevity for high-impact products; reuse and repair systems for household appliances; and the benefits of new business models, such as product service systems, through which the consumer purchases the use of a product rather than the materials/object.

Table 12.1 Examples of other platforms or online tools

Country	Theme	Target audience	Website	Language
Belgium (Flanders)	Circular economy	Companies, citizens	https://vlaanderen-circulair.be/en	English
France	Circular economy	Companies	www.economiecirculaire.org www.eclaira.org www.recita.org	French and English
Germany	Resource consumption	Engineers in industry	http://www.resource-germany.com	English
Ireland	Industrial symbiosis	Industry	http://www.smileexchange.ie	English
Netherlands	Circular economy	Companies and authorities	www.circulairondernemen.nl http://www.netherlandscircularhotspot.nlhome.html	Dutch and English
Portugal	Circular economy	Companies and consumers	http://eco.nomia.pt	Portuguese
Switzerland	Metal risk check tool	SMEs	http://www.metal-risk-check.ch	French and German

were highlighted. Several countries also reported various studies that are assessing the societal potential of a circular economy or the risks of material scarcity (Boxes 12.3 and 12.4).

12.3 Information platforms and online tools

Many of the good practices mentioned by respondents — Belgium (Flanders), Croatia, Czechia, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Northern Ireland (United Kingdom), Portugal, Scotland (United Kingdom), Slovakia, Spain, Sweden, Switzerland and Turkey — referred to using information platforms for a variety of stakeholders, including consumers, professionals, companies and authorities.

Their primary goal was to inform and inspire users through good examples, create a common vision or help them organise an event. Some of the examples of good practice also included online tools to be used by stakeholders, for example in Ireland and Switzerland (Table 12.1).

12.4 Green or circular public procurement

Green public procurement is a voluntary policy domain at the EU level. Several countries already include social aspects under the umbrella term of sustainable public procurement. In total, 14 respondents mentioned their efforts in green/sustainable/circular public procurement as good practice, because environmental, resource efficiency and circular aspects are integrated into the criteria of public tenders. Three responses from Denmark, the Netherlands and Flanders (Belgium) explicitly mentioned circular public procurement, launched as a green deal initiative, as an example of good practice. Wallonia (Belgium) is about to launch an action plan on circular public procurement (Box 12.5). Latvia mentioned a project on responsible

Box 12.5 Wallonia's (Belgium) action plan on responsible public procurement

In February 2017, the government renewed its commitment to the new action plan on responsible public procurement for 2017-2019, which aims to achieve 100 % responsible public procurement by 2020. This means public procurements that foster employment, contribute to the fight against climate change, contribute to efficient resource management, avoid social dumping and encourage small and medium-sized enterprises. One of the overarching strategic goals of this new action plan is to foster the efficient use of resources generally, using public procurement as leverage. Specific tools will be developed to achieve this goal, such as a specific information session on circular public procurement and an online platform to facilitate reuse in public procurement (developed by the Ressources network).

For further information, see www.leclicrecup.be (in French); http://developpementdurable.wallonie.be/theme/achats-publics-responsables (in French).

Box 12.6 Denmark — informing consumers on environment-friendly choices

In November 2017, the Danish Environmental Protection Agency launched a new website Mit miljø (My environment) providing information and advice for citizens on how to make more environmentally friendly choices in their daily lives. It includes more than 120 short articles in eight categories — the home, food, children, the sharing economy, consumption, gardens, holidays and nature. In the near future, the site may be expanded with even more information and advice, especially on the circular economy.

For further information, see http://mitmiljo.dk (in Danish).

Box 12.7 United Kingdom — outreach to consumers

WRAP, the waste and resources action programme, runs several consumer behaviour-changing campaigns, including the following:

Recycle Now (www.recyclenow.com): the national recycling campaign for England, supported and funded by the government, managed by WRAP and used locally by over 90 % of English authorities. Recycle Now is here to help people recycle more things, more often.

Managed by WRAP, **Love Food Hate Waste** (www.lovefoodhatewaste.com) aims to raise awareness of the need to reduce food waste and help consumers take action. It shows that, by doing some easy, practical everyday things in the home, everyone can waste less food, which will ultimately benefit family finances and the environment.

Love Your Clothes (www.loveyourclothes.org.uk) aims to raise awareness of the value of clothes and encourage people to make the most of the clothes they already have. The campaign is managed by WRAP and has been developed as part of the sustainable clothing action plan.

For further information, see country profile.

public procurement that aims to provide experience sharing and training for municipalities. The project involves 10 partners from seven countries — Denmark, Finland, Latvia, the Netherlands, Poland, Russia and Sweden. It is aimed at promoting the circular economy through innovative approaches to procurement and capacity building of partner institutions, which include Latvian municipalities. Flanders (Belgium) and Croatia have both adopted green, circular procurement initiatives, in 2017 and 2015 respectively.

12.5 Change in consumption patterns and behaviour

Although the EU action plan on sustainable consumption and production dates back to 2008, several EU actions continue today in relation to the Ecodesign Directive, labelling and providing information to consumers. Fourteen countries/regions reported initiatives aiming to influence the behaviour of consumers. Boxes 12.6 and 12.7 provide good examples of these.

12.6 Enhance networking and conferences

Initiatives falling within this category were mainly the organisation or sponsoring by authorities of various networks, conferences, fora or events related to resource efficiency and the circular economy, such as the Knowledge Transfer Network in the United Kingdom and the World Circular Economy Forum in Finland. Meanwhile, Serbia organised the first regional circular economy conference in the Balkans in November 2018 ([10]).

12.7 Education

Good practice related to education often refers to taking resource efficiency and the circular economy on board as subjects/courses in formal education curricula, sometimes as part of sustainable development. Other good practice refers to summer schools, educating professionals or master classes. Some initiatives focused on awareness raising for citizens, for example making it easier for them to imagine a circular city (Flanders (Belgium): www.reburg.world) or organising educational activities in a resource-efficient way (Ireland: https://recreate.ie).

Some recent examples of education curriculum developments are:

- Austria's sustainable resource management degree programme, offered by the University of Applied Sciences Campus Vienna;
- Flanders' (Belgium) Masterclass Circular Economy, which gives an introduction to circular trends and circular business strategies;
- Germany's BilRess education network, which brings together stakeholders from within and outside the educational system to anchor the topic of sustainable resource use and resource efficiency in schools, professional training, higher education and technical qualifications;
- Portugal's national environmental education strategy 2020;
- Slovakia's Green Education Fund, an innovative instrument bringing together businesses, civil society and state administration.

12.8 Taxation

Good practice reported by participants shows taxation used both as a stick — raising costs of unwanted effects — and as a carrot — tax discounts for preferred behaviour. Reported examples of economic instruments supported the implementation of new economic activities, beyond R&D, that are attractive from a resource efficiency or circular economy perspective (Table 12.2). Serbia produces an annual report with information from revenues from fees and charges, as well as subsidies and other incentives (Box 12.8).

12.9 Waste reduction and prevention initiatives

Good practice in waste reduction/prevention/management cannot be considered a surprise, as one of the objectives of both resource efficiency and the circular economy is the reduction and/or prevention of waste. The initiatives mentioned mainly focus on prevention for product groups, such as food, construction, textiles, packaging, agriculture and mattresses. The Netherlands launched the Plastics Pact in 2019, and Flanders (Belgium) reported working on an integrated policy plan for plastics. Both initiatives cover the life cycle of plastics and are also high on the EU policy agenda. One specific product group, the plastic carrier bag, appeared

Box 12.8 Serbia — report on economic instruments for environmental protection

The Serbian Environmental Protection Agency publishes an annual Report on economic instruments for environmental protection, thus indirectly providing a view of goals achieved and measures of environmental policy defined in strategic and planning documents. In the report, the following are presented, among other things: revenues from fees and charges, and funds for subsidies and other incentives.

For further information, see http://www.sepa.gov.rs/download/posebni/EkonomskiInstrumenti_2017.pdf (in Serbian and English).

([10]) http://ambassadors-env.com/en/2018/12/07/to-report-the-first-regional-conference-on-circular-economy-was-success

Table 12.2 Reported examples of using taxes or fees to support resource efficiency and the circular economy

Country	Tax or levy measure
Finland	Tax credit for small renovation works
Hungary	Environmental product fee, landfill tax (revision is ongoing)
Ireland	Polluter pays principle in extended producer responsibility schemes
Italy	Environmental contribution by plastic producers
Latvia	Natural resource tax
Lithuania	Environmental pollution tax
North Macedonia	Tax on imported used goods
Norway	Tax on packaging
	Tax exemptions for charitable food donations
Portugal	Tax deduction for R&D costs
Serbia	Tax benefits for reuse and use of waste as a secondary material
	Landfill fee
	Natural resource fees
Sweden	Reduced value added tax (VAT) for repairs
Switzerland	Landfill tax
United Kingdom (England)	Landfill tax
	Aggregates levy
	Plastic bag charge
United Kingdom (Scotland)	Carrier bag charge

many times, in line with the EU policy objective (Directive 2015/720 amending Directive 94/62/EC) on plastic carrier bags to be achieved by countries, 'ensuring that the annual consumption level does not exceed 90 lightweight plastic carrier bags per person by 31 December 2019 and 40 lightweight plastic carrier bags per person by 31 December 2025, or equivalent targets set in weight', and/or 'adoption of instruments ensuring that, by 31 December 2018, lightweight plastic carrier bags are not provided free of charge at the point of sale of goods or products, unless equally effective instruments are implemented'.

Countries still have the freedom to choose measures to achieve the objectives: 'measures may include the use of national reduction targets, maintaining or introducing economic instruments as well as marketing restrictions'. A variety of good practice measures reported by countries to reduce the use of single-use plastic bags is shown in Table 12.3.

12.10 Investment funds

Ten countries reported, as good practice, various programmes that support investment in technology, equipment or infrastructure and that contribute to policy objectives related to resource efficiency and the circular economy (Table 12.4). Estonia indicated that it has made available EUR 111 million for the support of SMEs for more resource-efficient solutions.

12.11 Product-related policies, including repair and reuse

New regulatory product policies applicable in EU Member States are usually developed at the EU level, based on internal market regulation. Thus, no respondents reported good practice examples related to new regulatory product policies on criteria for products entering the market. However, respondents did provide examples related to stimulating repair and reuse — Estonia and Sweden (Box 12.9) (and especially for product groups under extended producer responsibility schemes — Croatia, Ireland and Italy); internalising external costs — Ireland; a national reuse standard for shops that sell second-hand goods and support for an ecodesign centre — Scotland (United Kingdom); and a voluntary online tool, called TOTEM, for assessing environmental impacts of new or refurbished buildings — Flanders (Belgium).

Table 12.3 Examples of reported measures to reduce the use of single-use plastic bags

Country	Measures to reduce the use of single-use plastic bags
Austria	The Federal Ministry for Sustainability and Tourism's (BMNT) Pfiat di Sackerl (Goodbye Shopping Bags) initiative is a voluntary agreement by large Austrian retailers to drastically reduce plastic shopping bag distribution and consumption. The initiative, agreed in 2016, supports the amended EU Packaging and Packaging Waste Directive. However, the Austrian initiative aims to go beyond the EU target and has set its own target of a maximum of 25 bags per person per year by 2019. A new measure has been added recently: a ban on plastic carrier bags as of 2020 is planned (with the exception of bags made of renewable raw materials and completely biodegradable materials).
Finland	Green deal on plastic carrier bags: the Ministry of the Environment has concluded the first green deal agreement with the Federation of Finnish Commerce, a plastic carrier bag agreement, to implement the EU Packaging and Packaging Waste Directive by voluntary agreement instead of a legal instrument. The agreement, in force until the end of 2025, aims to ensure that Finland reaches the reduction targets for consumption of plastic carrier bags in the EU directive.
Hungary	Issued 3 years before relevant EU targets, an Act prescribes a significantly high fee for lightweight plastic carrier bags of HUF 1 900 (EUR 6) per kilogram at present. After the fee's entry into force, the number of marketing outlets that provided these plastic bags free of charge reduced remarkably — as did the number of such bags.
Serbia	Fees for landfilling waste are defined, as well as fees for the use of plastic bags as packaging and the use of natural resources.
Slovakia	Slovakia Without Plastic Bags: as the consumption of plastic bags in Slovakia, at 466 plastic bags per person per year, is more than double the EU average, the Ministry of Environment announced the Slovakia Without Plastic Bags initiative. Retail companies are committed to actively contributing to the reduction of plastic bags. The long-term goal is to eliminate their use. Parliament passed a ban on giving out plastic bags for free.
United Kingdom (England)	5p plastic carrier bag charge: on 5 October 2015, England introduced a 5p single-use carrier bag charge that applies to retailers with 250 or more employees. The scheme aims to reduce the use of single-use plastic carrier bags and the litter associated with them, by encouraging people to reuse bags. Since the introduction of the charge, there has been a reduction in the overall use of single-use carrier bags of around 9 billion, with approximately GBP 95 million from retailers put towards good causes.
United Kingdom (Northern Ireland)	Northern Ireland has continued to operate the carrier bag levy, which has continued to reduce the consumption of disposable bags (https://www.daera-ni.gov.uk/articles/northern-ireland-carrier-bag-levy-statistics), with the proceeds used to fund environmental projects (https://www.daera-ni.gov.uk/articles/daera-niea-challenge-fund-201617).
United Kingdom (Wales)	Carrier bag charge: in 2011, Wales was the first UK nation to introduce a carrier bag charge (http://gov.wales/topics/environmentcountryside/epq/waste_recycling/substance/carrierbags/?lang=en). The Welsh government's 2016 post-implementation review of the single-use carrier bag charge in Wales reported that single-use carrier bag use between 2011 and 2014 had declined by an estimated 71 %, and there was an estimated overall reduction in all bag use of 57 % over the same period.

Box 12.9 Sweden — inquiry to gather options for the circular economy

With the aim of stimulating the circular economy, the report of a special inquiry, with a primary focus on products for consumers, was presented in March 2017. It included additional suggestions for instruments to increase the second-hand market and the repair of various products. The main task of the inquiry was to analyse and propose policy instruments to promote increased use and reuse of products to prevent waste. The government's overarching aim in commissioning the inquiry was to achieve a more resource-efficient and circular economy. The inquiry therefore chose to describe what a circular economy involves and how Sweden can steer more forcefully in that direction.

For further information, see http://www.regeringen.se/49550d/contentassets/e9365a9801944aa2adce6ed3a85f0f38/fran-vardekejda-till-vardecykel-2017_22.pdf (in Swedish; English summary also available).

Table 12.4 Reported good practices supporting investments in resource efficiency and the circular economy

Country	Fund
Denmark	Green Investment Fund for Sustainable Development, green development and demonstration programme (GUDP).
Estonia	Investment support for resource efficiency in enterprises
Finland	Impact investment to promote well-being in a resource-wise way
Latvia	Investment in waste management infrastructure
Netherlands	Investment support for buying environmentally friendly products or company resources
	Flexible depreciation of investments
Portugal	Environment financial fund
Slovenia	Soft loans for environmental protection
Sweden	Grants for leading-edge technologies and new system solutions
Turkey	Solid waste investment programme
United Kingdom (Scotland)	SME loan fund for waste reduction
	Circular Economy Investment Fund
United Kingdom (Wales)	Infrastructure development in relation to recycling
	Circular Economy Investment Fund

Box 12.10 Innovation Norway fund

A government funding mechanism called Innovation Norway aims to support entrepreneurs and innovative business models through grants. Sustainability and green innovation are central elements of its services. Innovation Norway has existed for several years, and the grants and financial mechanisms have encouraged many innovative projects in various fields.

For further information, see: https://www.innovasjonnorge.no/en/start-page.

12.12 Innovative business models and the sharing economy

The EU action plan for the circular economy (COM(2015) 614 final) highlighted the need for innovative business models to create systemic changes towards a more circular economy. The EU announced finance for carrying out research into these new models and developing them. Product service systems is an example of a business model in which ownership of products shifts to leasing/renting products. The sharing economy is also considered one of these new business models for supporting the development of a circular economy.

The good practice mentioned by countries refers to online tools — Belgium (Flanders — the Circulator tool for business models); studies or research projects — England (United Kingdom), Switzerland and Slovenia; support mechanisms for entrepreneurs — Norway (Box 12.10), Scotland (United Kingdom) and Serbia; the competitiveness of industrial zones — Turkey; networks of non-profit organisations for the lifetime extension of products — Austria; and chemical leasing — Serbia.

12.13 Institutional set-up

Institutional set-ups for resource efficiency and the circular economy were the subject of a dedicated question in this survey, covered in Chapter 7. Nonetheless, a few countries also mentioned some good practice in this area. Examples included the launch of new relevant agencies or competent bodies — England (United Kingdom), Germany and Portugal; a circular economy toolkit for policymakers — Denmark (Box 12.11); and mechanisms to ensure active participation in public debates — Switzerland.

12.14 Green deals

The use of green deals was introduced by the Netherlands, often in the context of experimental projects that sometimes face implementation barriers under current regulations.

A green deal is a mutual agreement or covenant under private law between a coalition of companies,

Box 12.11 Denmark — CE100 government and cities programme

The Danish Environmental Protection Agency, together with the Danish Business Authority, has been a member of the Ellen MacArthur Foundation's CE100 government and cities programme for a number of years. In 2014-2015, Denmark was selected as a pilot country for the development of a step-by-step guide to help policymakers enable a transition to a circular economy, *Delivering the circular economy — a toolkit for policymakers.*

For further information, see https://www.ellenmacarthurfoundation.org/assets/downloads/government/Delivering_the_circular_economy_A_toolkit_for_policymakers.pdf (in English).

Box 12.12 France — commitments for green growth

Inspired by the Dutch green deals, the commitments for green growth (ECVs), the official name of this kind of voluntary agreement, lay down the reciprocal commitments between the state and companies. The objective of the agreement, based on the needs expressed by companies, is to put the state in a position to work on the obstacles encountered by companies by developing a project approach between companies with pioneering initiatives and ministerial departments. Project leaders commit to leading their innovation with the aim of creating examples for others to follow by disseminating results. For its part, the state commits to facilitating action, which may become more generalised. The first four ECVs were signed in 2016. Eight ECVs based on the circular economy have so far been signed and others are being developed. They concern, for example, plaster waste, acrylic glass, construction and demolition waste and heavy-duty tyres.

For further information, see https://www.ecologique-solidaire.gouv.fr/lengagement-des-entreprises (in French).

civil society organisations and local, regional and/or national governments. The green deal approach is one element in a standard range of policy instruments. It is used to supplement existing instruments, such as legislation and regulation, market and financial incentives, and measures to stimulate innovation.

The green deal approach is particularly suitable when innovation is actually put into practice, a phase during which projects often encounter barriers. The deal defines the initiative and the action involved as clearly as possible, in quantitative aims or outputs if possible, and likewise defines participant inputs as clearly as possible. In general, green deals also refer to an agreement in which all commitments from stakeholders are made public.

The green deal approach in the Netherlands is an accessible way for companies, other stakeholder organisations, local and regional governments and interest groups to work together with the central government on green growth and social issues. Since 2011, more than 200 green deals have been agreed in the Netherlands. Green deals cover nine themes: (1) energy; (2) the bio-based economy; (3) mobility; (4) water; (5) food; (6) biodiversity; (7) resources; (8) construction; and (9) the climate.

One of those green deals extended its geographical scope across borders (North Sea Resources Roundabout ([11])) and now other countries are also introducing the approach in the context of resource efficiency and the circular economy — for example, Belgium (Flanders), Finland, France (Box 12.12), the Netherlands and the United Kingdom.

([11]) https://www.greendeals.nl/nieuws/update-animatie-north-sea-resources-roundabout, https://www.green-alliance.org.uk/NSRR

13 Seeking synergies with other policy areas

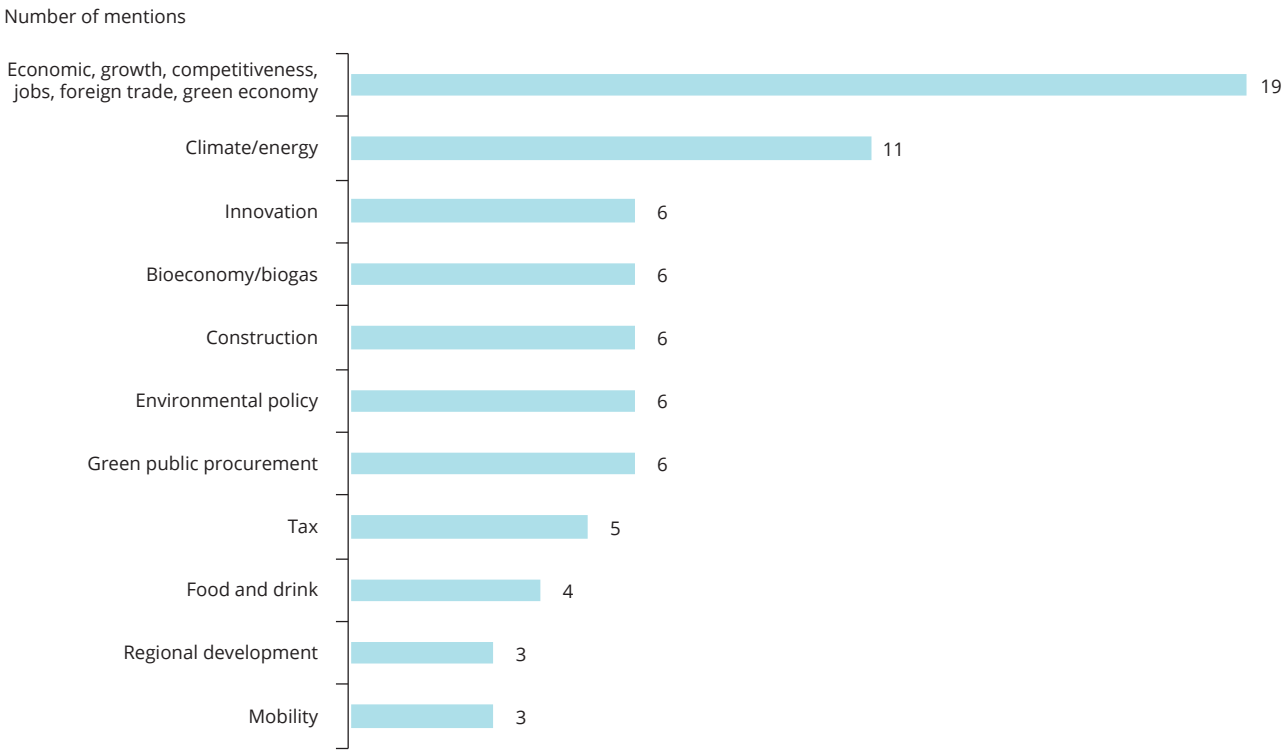
This chapter presents responses to question 7, in which countries were asked for examples of policy initiatives that deliberately seek to create synergies and co-benefits between resource efficiency/the circular economy and other policy areas. Countries were asked to provide information on deliberate, concrete and existing initiatives, rather than merely a statement on the general importance of synergies.

The thrust of this question was different from that of question 5, which looked at policies in which resource efficiency, the circular economy or raw materials are included in part within other topics such as waste, environmental action plans or sustainable development strategies.

Twenty-six out of 32 countries provided responses, which are presented in full in the individual country profiles. In general, responses presented the policy area targeted for synergy and co-benefits, the objectives of such initiatives and sometimes additional information on implementation.

Some of the responses were somewhat ambiguous about the exact nature of the synergy with resource efficiency/the circular economy. The policy area could be identified from the title of the initiative, its objectives or the type of instruments used. As an example, taxation could be mentioned as a synergetic policy area in itself, or used as an instrument to achieve the objectives of resource efficiency or the circular economy, or the expected objective could be a tax shift from labour to resource use. In any of these cases, taxation was interpreted as a synergetic policy area.

Figure 13.1 Policy areas frequently reported as examples of synergies with resource efficiency/the circular economy



13.1 Overview of frequently mentioned policy areas with initiatives synergetic with resource efficiency and the circular economy

Figure 13.1 shows the policy areas frequently reported as building synergies and co-benefits with resource efficiency/the circular economy. The largest category was policies with an economic orientation (19 countries), followed by policies related to climate and energy (11 countries). The remaining categories were reported by six or fewer countries.

Many countries mentioned a variety of **economy-related policy areas**, such as job creation/employment (11), economic policy/growth (7), industrial development/sustainable industry (6), competitiveness (6), foreign trade/internationalisation (3) and green economy (2), with several countries mentioning a combination of them. As they all have an economic objective, they have been clustered in one category.

These policy areas have similar objectives that can be synergetic with resource efficiency/the circular economy: creating a more internationally competitive industry or supporting growth and new jobs through more resource efficiency and a more circular economy. Box 13.1 provides an example of an initiative with economic policy synergy.

One of the widest-reaching examples of a deliberate effort to create synergies between resource efficiency/the circular economy and other areas is the 2016 Dutch government programme for a circular economy by 2050 (Box 13.2).

Innovation (reported by six countries) is shown as a separate category, although innovation is often considered an important starting point for creating jobs or improving competitiveness (Box 13.3).

The **climate and energy area** was mentioned by 11 countries as a policy domain in which they have

Box 13.1 Croatia — industrial strategy 2014-2020

The industrial strategy of Croatia 2014-2020 (OG 126/14) is linked to a variety of different policy areas and therefore depends on other strategic documents. Establishing connections or co-benefits is especially important for the implementation process, in which one of the fundamental challenges is the clear definition of the responsibilities and powers of certain stages of the process. The industrial strategy identifies areas that largely determine competitiveness, namely innovation, investment, entrepreneurship and education. One of the key priority areas is strengthening cooperation between industry and education, science and technology. The system of education and science should be adapted to the needs of new technologies and the green economy, covering advanced manufacturing technology, bio-products, and energy and resource efficiency.

Box 13.2 The Netherlands — government programme for a circular economy by 2050 (2016)

The government programme for a circular economy deliberately seeks synergies and co-benefits between raw materials, resource efficiency, the circular economy, economic competitiveness and growth, and foreign trade. The programme includes all government policy efforts and was developed by the ministries responsible for infrastructure and the environment, economic affairs, interior and kingdom relations, and foreign affairs; it is a synergy in its own right.

Examples of intended synergies between resource efficiency, the circular economy and other policy areas include boosting economic competitiveness; innovation investment and employment; preventing climate change and reducing greenhouse gas emissions; and protecting the environment and natural resources.

Links are made in the 2016 government programme for a circular economy to a wide range of domains, including economic affairs; climate change and energy; infrastructure, transport and water management; agriculture, natural resources and food; education and science; treasury; social affairs and employment; foreign trade and development aid; housing; town and country planning; national and regional administration; defence; and public health, community care and sports.

The 2017 ex ante evaluation concluded that a 20-50 % reduction in the consumption of fossil materials, metals and other minerals is feasible, combined with reductions in land and water use and greenhouse gas emissions in the same range.

For further information, see country profile.

Box 13.3 Portugal's FITEC — an example of synergy with innovation policy

The goal of the Innovation, Technology and Circular Economy Fund — FITEC (Decree-law No 86-C/2016) — is to support policies for scientific and technological knowledge and its transformation into innovation, stimulating cooperation between higher education institutions, technological interface centres and business. It aims to build capacity to improve the use of resources, preserving their utility and value throughout the entire production and use chains through material and energy efficiency.

For further information, see https://dre.pt/web/guest/home/-/dre/105658706/details/maximized (in Portuguese).

Box 13.4 Examples of synergies with climate change policies

France: circular economy — the fight against climate change

The circular economy is an integral part of policies to combat greenhouse gas emissions. Thus, an entire section dedicated to the circular economy is included in the Energy Transition for Green Growth Act. It is an integral part of the climate plan.

For further information, see https://www.monprojetpourlaplanete.gouv.fr/pages/le-plan-climat (in French).

Switzerland: test of climate alignment of financial portfolios

In 2017, the Federal Office for the Environment and the State Secretariat for International Financial Matters in Switzerland initiated pilot tests to analyse the climate alignment of financial portfolios. All Swiss pension funds and insurance companies could voluntarily have their portfolios of stocks and corporate bonds tested, anonymously and free of charge, for their compatibility with the 2 °C global warming target. Some 79 pension funds and insurance companies, which represent about two thirds of the total market, as measured by assets under management, accepted this invitation. The climate impact tests carried out in 2017 show that investments currently support a path towards 4-6 °C warming, although there are large differences between individual insurance companies and pension funds.

Box 13.5 Reframing climate policy in Flanders (Belgium)

The climate challenge is often framed as an energy problem to be addressed by lowering energy demand and by greening energy supplies. But it is now understood that high energy demand is closely linked to the way resources are used. Framing global warming as a materials problem and one caused by the linear economy opens perspectives for new solutions. The Public Waste Agency of Flanders (OVAM) believes that the transition to a circular economy can be a cross-sectoral strategy to lower energy use in Flanders and abroad, thus helping to realise climate goals. OVAM is currently undertaking initiatives to investigate the link between the circular economy and combating climate change. A number of research projects are under way that investigate the impact of the circular economy or resource efficiency on greenhouse gas emissions. One example is a study in cooperation with the Flanders Environment Agency (MIRA) about the carbon footprint of Flemish consumption.

For further information, see https://www.milieurapport.be/publicaties/koolstofvoetafdruk-van-de-vlaamse-consumptie (in Dutch and English).

been or are seeking synergies and co-benefits. The connection between the circular and low-carbon economies has also received a lot of attention in EU policies in recent years. France, as an example, embedded its national circular economy roadmap, as an integral part of its climate change domain, into the Energy Transition for Green Growth Act (Box 13.4). This indicates that France expects a synergetic positive contribution from the circular economy to reducing climate change. Switzerland initiated, on a voluntary basis, a test of climate alignment of its investment funds (Box 13.4).

An interesting initiative is under way in Flanders (Belgium) to reframe the approach to climate policy in the context of resource efficiency and a circular economy (Box 13.5).

Box 13.6 Bio-based synergetic initiatives in Latvia

The Latvian bioeconomy strategy 2030 (adopted in 2017 under the auspices of the Ministry of Agriculture) sets five main directions, one of which is efficient and sustainable resource management. Specific measures related to resources, and also integrated with climate and energy policies, are targeted at the use of biomass for energy production, based on the cascading principle, and the reduction of greenhouse gas emissions in bioeconomy sectors. Employment, added value to extracted bioresources and consequent export growth are goals behind resource efficiency in bioresource use.

For further information, see http://tap.mk.gov.lv/lv/mk/tap/?pid=40433525&mode=mk&date=2017-12-19 (in Latvian).

Examples of synergetic initiatives related to the bioeconomy/biogas were reported by six countries (England (United Kingdom), Finland, Latvia, Lithuania, Norway and Spain). Typically, these are related to using biowaste as a renewable resource for biogas production or for nutrient recycling or to explore other ways that the bioeconomy can contribute to more sustainable resource use (Box 13.6).

Environmental policy was mentioned by only six countries in the context of synergies. This is most likely to be because many countries have already embedded elements of resource efficiency and circular economy policies into the environmental policy area, as shown in Chapter 4. Nonetheless, Flanders (Belgium), Germany and Sweden, among others, have also undertaken initiatives to address conflicts and co-benefits between resource efficiency/circular economy objectives and objectives or restrictions from other environmental policies, such as healthy living conditions or a toxin-free environment.

As shown in Figure 13.1, countries also reported synergies and co-benefits within three priority consumption domains: (1) housing/construction (six countries); (2) mobility (three countries); and (3) food (four countries). Other examples were mentioned under sustainable consumption and production (e.g. North Macedonia and Sweden). The Construction Alignment Group under the auspices of the Government of Wales (United Kingdom) published a guide to the opportunities of the circular economy for the construction sector.

Given their high environmental relevance, the appearance of these consumption categories is not unexpected. Another reason could be that the construction and food sectors usually generate large material flows in the economy. Several reported initiatives related to consumption referred to elements from the circular economy concept, including sharing economy schemes or using waste as a resource.

Green public procurement (mentioned by six respondents) has for many years been highlighted as a tool for supporting resource efficiency. Italy issued a law in December 2015 that made the use of minimum environmental criteria (MEC) mandatory for all public procurement. Furthermore, it applied MEC in the area of buildings and construction not only for the design of new buildings but also for the refurbishment and maintenance of existing buildings (Box 13.7). Circular procurement was mentioned by the Netherlands and Flanders (Belgium) as a topic of growing importance. Circular procurement calls for implementing more circular criteria in public tenders that can support a circular economy by, for example, calling for higher recycled content, better repairability and take-back obligations or shifting from ownership to services.

Taxation (mentioned by five respondents) is already a well-known tool used in a synergetic way with environmental policy. Estonia and Finland reported initiatives seeking synergies with resource efficiency/the circular economy, while North Macedonia introduced the possibility of using green tax reform in its sustainable development strategy of 2010. A recent concrete example was provided by Portugal, which introduced a tax incentive system.

The three reported examples of synergy with regional policy initiatives were related to enhancing cooperation between countries or regions in the context of EU cohesion policy.

13.2 Reflections on institutional approaches to support synergies between policies

Some of the countries shared reflections on their experience and lessons learned concerning institutional arrangements to support an effective drive for synergies between resource efficiency/the circular economy and other policy areas.

Box 13.7 Italy — minimum environmental criteria in green public procurement

With the adoption of Law 221/2015, Italy introduced the mandatory use of minimum environmental criteria (MEC) for all public procurement of products, services and works. The MEC give general guidelines to institutions for the rationalisation of purchases and provide them with principles of environmental quality linked to the different phases of procurement of supplies along the whole life cycle of services and products.

In relation to specific commodities or services, the MEC may involve prescriptions for eco- and modular design, durability of materials, recycled content and criteria for reuse and repair.

The Decree of 11 January 2017 extended the application of the MEC to the design of buildings, related to both new construction and refurbishment and maintenance of existing buildings. By Decree of 27 September 2017, the Italian Ministry of Environment issued the MEC for public lighting services.

For further information, see country profile.

Box 13.8 Institutional arrangements to support synergies in Flanders (Belgium)

In Flanders, the transition to a circular economy is the shared responsibility of two policy domains: (1) environment; and (2) economy and innovation. Innovation policy focuses on industrial spearhead-clusters that are key to the Flemish economy. These clusters are collaborations between companies, the knowledge community and the government. Together, they want to set the bar higher for strategic sectors. The Flemish government supports a total of 20 clusters, which together represent a significant portion of the region's economy. Circular Flanders is building circular economy principles into industrial clusters — that way circular economy becomes a recurrent theme of the innovation policy.

Flanders (Belgium) reported that the responsibility for the transition to a circular economy is a shared responsibility of stakeholders in two policy areas: (1) environment; and (2) economy and innovation (Box 13.8). Slovenia reported a partnership composed of an interministerial government group and stakeholder representatives to coordinate the sectoral policies and measures in the context of a green economy. Other countries decided to develop synergetic action plans or programmes as a joint effort between several ministries or authorities. For example, the Netherlands reported that the 2016 government programme for a circular economy was developed by the four ministries responsible for infrastructure and environment, economic affairs, interior and kingdom relations, and foreign affairs, but it contained all government policy efforts related to the circular economy and was launched as a full government initiative. Poland also pointed out the importance of involving different ministries during policy development. Several respondents reported having commissioned studies or pilot projects to learn more about possible synergies. For example, Flanders (Belgium) is trying to integrate circular principles in permits and brownfield reconversion agreements as a synergy between the circular economy and spatial planning policy areas.

When looking for an approach to new synergies, countries noted that they could seek assistance or inspiration from other countries and the United Nations Industrial Development Organization (Bosnia and Herzegovina, Box 13.9), the EU cohesion policy and fund (Slovenia) or Interreg-funded projects (Wales, United Kingdom).

Box 13.9 Bosnia and Herzegovina — national cleaner production programme and the competitiveness of enterprises and small and medium-sized enterprises programme

Bosnia and Herzegovina highlighted some national projects that promote synergy and co-benefits between resource efficiency/the circular economy and other policy areas.

1. National cleaner production programme (NCPP) in Bosnia and Herzegovina

The project's objective is to improve the efficiency of using natural resources and the environmental performance of companies in Bosnia and Herzegovina. The project is implemented by the United Nations Industrual Development Organization, with the financial support of the Government of Slovenia, and its implementation was supported by the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina.

For further information, see http://ncpp.ba/en/our-work.

2. Competitiveness of enterprises and small and medium-sized enterprises (COSME)

The agreement associating Bosnia and Herzegovina with COSME was signed in 2016. Running from 2014 to 2020, COSME is an EU programme aimed at strengthening the competitiveness and sustainability of small and medium-sized enterprises (SMEs). SMEs and entrepreneurs from Bosnia and Herzegovina can participate in COSME under the same conditions as their counterparts from EU Member States and other associated countries.

14 Resource efficiency and circular economy policy initiatives from subnational to local level

This report primarily examines nationwide policy initiatives for resource efficiency or the circular economy. In recent years, however, there has been an increasing number of examples of policy initiatives taken at a lower levels of governance.

This chapter provides an overview of country/regional responses on policy initiatives related to resource efficiency and the circular economy that have been taken at a regional or local level — province, city, etc. — or that target specific economic sectors or industries.

In total, 31 countries responded to this question, reporting more than 100 different initiatives. The level of detail varied significantly, ranging from listing one or two projects that included some aspects of the circular economy to dedicated regional strategies for resource efficiency or roadmaps for the circular economy. The majority of the examples of policy initiatives reported were projects linking the circular economy or resource efficiency to activities such as waste management, food waste prevention or industrial symbiosis.

14.1 Dedicated regional strategies or roadmaps for resource efficiency or the circular economy

Several countries including Finland, France, Germany, Italy, the Netherlands and the United Kingdom provided examples of regional or local strategies or roadmaps for resource efficiency or the circular economy. Examples covered a wide spectrum, ranging from resource efficiency strategies in some German federal states (*Länder*), through circular economy roadmaps adopted by cities, all the way to some municipalities developing a plan to become fully circular in the next few years.

Good examples coming from a country with a federal structure are the resource efficiency strategies developed by Baden-Württemberg and Bavaria in Germany (Box 14.1).

Finland reported a number of regional roadmaps for the circular economy and institutional support for circular economy initiatives taken at the regional or even municipality level. Portugal and Spain were two other countries that mentioned regional initiatives to set up a policy framework for the circular economy.

Two interesting examples of circular economy roadmaps established by big cities are in London (Box 14.2) and Amsterdam (Box 14.3).

The Netherlands promotes the use of green deals rather than legislation as a steering instrument for the removal of barriers to the sustainable use of resources and achieving a circular economy. A green deal is a mutual agreement or covenant under private law between a coalition of companies, civil society organisations and local and regional government. As a concrete illustration, eight cities, ministries, knowledge institutions and companies signed what is known as a City Deal, to stimulate the uptake of the circular economy. The signatories aim to take the lead in accelerating the transition to a circular economy at local and regional levels ([12]).

Several Dutch municipal governments have also set up circular initiatives, directed at their local businesses. Examples include Almere, Apeldoorn, Dordrecht, Haarlemmermeer and Venlo.

There were also reports of small municipalities preparing plans to achieve circularity in the next few years. One such example was provided by Denmark (Box 14.4).

Some regional initiatives focused on sustainable management and the use of specific materials. One such example is the Lombardy region of Italy, which in 2015 adopted a regional strategy for the sustainable management of raw materials focused on inert materials. It aims to update the regulatory framework on quarrying activities, with a particular focus on environmental assessments, rational land use, raw material saving and the environmental conservation of landscapes, including the recovery of abandoned

([12]) https://agendastad.nl/citydeal/circulaire-stad/ (in Dutch).

Box 14.1 Federal states respond to the German ProgRess strategy

Several German states have adopted their own resource efficiency strategy as a response to the ProgRess strategy adopted by the federal government.

In March 2016, Baden-Württemberg developed its own resource efficiency strategy. Among the objectives are:

- decoupling economic growth from resource use while maintaining and further developing most of the manufacturing sector as well as retaining the economic structure of Baden-Württemberg;
- supporting the objective of the national sustainability strategy and its target to double raw material productivity over the period 1994-2020;
- making Baden-Württemberg the leading market player in and leading supplier of resource efficiency technologies;
- ensuring a secure supply of raw materials through the more efficient extraction of primary raw materials and increasing the proportion of secondary raw materials.

For further information, see https://um.baden-wuerttemberg.de/fileadmin/redaktion/m-um/intern/Dateien/Dokumente/6_Wirtschaft/Ressourceneffizienz_und_Umwelttechnik/160301_Landesstrategie_Ressourceneffizienz.pdf (in German).

Another example of initiatives by the federal states is the **Rohstoffwende Bayern**, the goals of which are to establish Bavaria as a model for the symbiosis of ecology and economy; to decouple raw material consumption from economic growth and reduce the overall consumption of natural resources; and to continuously increase overall raw material productivity. The central building blocks to achieve these goals are:

- an increase in resource efficiency;
- further expansion of a sustainable environmental service branch;
- substitution of critical raw materials and environmentally harmful substances; and
- promoting a conscious and sustainable use of available resources.

quarry sites. Moreover, the strategy aims to create a database to track the flow of recycled materials and introduce a certification system for them.

In most countries, reported examples were a result of a voluntary effort, but some were required in regulations. For example, in France, regional authorities are encouraged to include the circular economy in the framework of their regional plans for waste prevention and management. Several French regions have set up circular economy initiatives with various governance schemes. They are summarised in the report *L'économie circulaire: quelle gouvernance en région?* ([13]).

Many of the circular economy initiatives at local or municipal level were also seen as a tool to strengthen the local economy, create jobs and promote sustainable well-being. For example, an economic analysis prior to the adoption of London's circular economy route map (Box 14.2) showed the potential for net benefits to the city of up to GBP 7 billion a year by 2036, as well as the creation of 12 000 new jobs in the areas of reuse, remanufacturing and materials innovation by 2030.

14.2 Other local or regional initiatives for resource efficiency/the circular economy

As described in the previous section, in some countries, regional or municipal authorities are developing policy frameworks — for example strategies or roadmaps — for resource efficiency or the circular economy.

However, the majority of examples reported were initiatives taken or projects carried out at the regional

([13]) https://www.are-normandie.fr/veille/leconomie-circulaire-quelle-gouvernance-en-region (in French).

Box 14.2 London's circular economy route map

The London Waste and Recycling Board (LWARB) was established in 2007 to provide a strategic approach to waste management. Its Circular London programme works to create the right conditions for circular economy businesses to flourish in London.

In June 2017, the LWARB published the circular economy route map for London, created with stakeholders from across different sectors, to set a pathway for London to accelerate its transition to circularity through a series of recommended actions for the LWARB and its stakeholders.

The focus is based on an analysis of economic impacts and residual waste streams within the city. The route map includes 100 practical actions across five focus areas: (1) the built environment; (2) food; (3) electricals; (4) textiles; and (5) plastics.

The route map also identified eight cross-cutting themes: (1) communication; (2) collaboration; (3) finance; (4) demonstration; (5) innovation; (6) policy; (7) procurement; and (8) business support.

For further information, see country profile.

Box 14.3 The Amsterdam metropolitan area as a circular raw materials hub

Although there are already many initiatives related to the circular economy in the Amsterdam metropolitan area, the local government and businesses have set out to speed up progress towards a circular economy and to strengthen the business case. In close collaboration with various parties in the metropolitan region of Amsterdam, a policy paper The Amsterdam metropolitan area as a circular raw materials hub, which presents a coordinated regional strategy for closing loops of raw and used materials, was published to stimulate product reuse and re-design and create new business.

For further information, see country profile.

Box 14.4 A municipality aiming to be circular by 2027

The small Danish municipality of Samsø, an island off the Danish coast with a population of 4 000, has adopted the goal of becoming circular by 2027, with particular focus on the biological circle. The municipality is already largely self-sufficient in renewable energy. It has now adopted a set of objectives to ensure the circular use of its resources, a list of principles and goals for its public procurement policy, and a range of specific initiatives including the training of all businesses in the municipality. Citizens have been involved in developing the initiatives to achieve a circular bioeconomy.

For further information, see https://www.visitsamsoe.dk/en/inspiration/waste-becomes-important-part-islands-circuit.

or local level, supporting specific aspects of resource efficiency or the circular economy. Most reported initiatives were taken by public authorities, typically municipalities, with some involving the private sector, trade associations or civic groups.

One frequently reported type of initiative was awareness-raising through campaigns, education and networking. In many cases, the awareness-raising campaigns, typically initiated in cooperation with universities or research organisations, focused on waste prevention by, for example, supporting repair activities. Among companies, the focus was often on clean technologies to reduce waste and wastewater generation and to save energy. For municipal waste, the target group was generally citizens, with a focus on waste as a resource — recycling, recovery and reuse — and avoiding landfilling. A common approach in the local initiatives reported was to set a target for the reduction of waste or energy use.

Overall, the majority of the examples of concrete projects or initiatives reported were related to waste management. Bulgaria provided detailed information on the responsibilities of the municipality mayor's office in organising the management of household and construction waste produced in its territory. In many cases, the initiatives targeted waste prevention,

especially for food and packaging; reuse, for textiles and construction waste; repair, especially of electronic appliances; and recycling, particularly of construction and demolition waste. However, the prioritisation of materials or sectors varied widely between countries/regions, driven by local needs and conditions (Table 14.1).

Some countries/regions reported support for companies that aim to adopt new business models or invest in innovation, both within or between different sectors. This was mentioned by Flanders (Belgium), Wallonia (Belgium), Denmark, Italy and the United Kingdom.

There was a wide variety of organisational approaches in the initiatives reported. Although municipality-driven initiatives account for the majority of examples provided, some citizen- or company-driven initiatives were also reported. For example, Zero Waste Riga in Latvia is a citizens' initiative that includes an interactive blog, with support from a local waste management company, that shares information and provides advice on how to live in a way that minimises waste generation. Regular informal meetings are organised as part of Riga's initiative to promote sustainable lifestyles.

The private sector-driven and public-private initiatives often reported a focus on specific material streams in the value chain. For example, Austria reported several activities related to food waste prevention, and Italy reported activities related to packaging. A certification system for recyclable waste fulfilling product requirements was developed by the Estonian Waste Recycling Competence Centre.

14.3 (Inter-)National support for regional or local initiatives

Regional, local and private (also small and medium-sized enterprises, SMEs) initiatives are often eligible to receive financial support, guidance or toolkits from, for example, national, EU or United Nations programmes to facilitate the running of their (pilot) projects.

Several countries/regions — Denmark, Finland, France, Germany, Italy, Northern Ireland (United Kingdom) and Turkey — have programmes in place to support the creation of local industrial symbiosis initiatives. Roadmaps have been developed in several municipalities in Finland and the United Kingdom, setting the goals and activities needed to reduce waste, improve material efficiency and use industrial by-products.

A few countries/regions — Austria, Bulgaria, Denmark, England (United Kingdom), Italy, Scotland (United Kingdom) and Spain — implemented various support programmes for SMEs to adopt innovative circular economy models. For example, the Danish Rethink business programme has supported SMEs in developing new business models for the circular economy, and the Design for Disassembly programme is currently supporting SMEs in designing their products for a circular economy ([14]).

A common feature in many country/region reports is national/regional, and in some cases European, financial programmes for the implementation of concrete measures at a local level that support the transition to a more circular economy and greater resource efficiency. The key sectors in which funding was allocated were housing, construction and management of municipal waste or wastewater. The typical aims of the programmes were to reduce waste generation, increase reuse through preventing materials from becoming waste, increase high-quality recycling and support the delivery of waste management services and energy efficiency.

Most countries reported initiatives carried out as pilot projects with a specific time frame, typically in cooperation with municipalities, universities, research organisations and companies, and (co-)financed by national/regional funding agencies or ministries.

Often projects have the aim of delivering tools and guidance for future use by other municipalities and communities. Examples are available in Annex 4.

It is interesting to note that several countries highlighted various EU-driven or internationally led initiatives (Box 14.5).

([14]) http://rethinkbusiness.dk (in Danish).

Table 14.1 Examples of focus areas in regional or local activities reported by at least three countries

Waste focus area	Countries reporting
Construction	Albania, Austria, Belgium (Wallonia), Bosnia and Herzegovina, Estonia, Finland, France, Germany, Italy, the Netherlands, North Macedonia, Slovakia, Slovenia, the United Kingdom
Food	Austria, Belgium (Flanders), Belgium (Wallonia), Bosnia and Herzegovina, Czechia, Finland, France, Hungary, Italy, Latvia, Norway, Sweden, the United Kingdom
Textiles/fashion/shoes	Belgium (Flanders), Belgium (Wallonia), Croatia, Czechia, Ireland, Latvia, North Macedonia, the United Kingdom
Plastic	Belgium (Flanders), Denmark, Finland, Italy, Norway, Poland, the United Kingdom
Furniture	Bosnia and Herzegovina, Croatia, Czechia, Ireland, Italy, North Macedonia
Packaging	Denmark, Italy, Latvia, Lithuania, the United Kingdom
Paper (cardboard)	Denmark, Italy, Latvia, the Netherlands, North Macedonia, Poland
Wood	Belgium (Wallonia), Denmark, Italy, Serbia, Slovakia
Waste electrical and electronic equipment	Austria, Czechia, North Macedonia
Steel	Italy, Slovenia, Spain
Composting	Estonia, Italy, Latvia

Box 14.5 Internationally driven local initiatives

This question largely elicited examples of EU-funded projects among the initiatives reported. EU financing mechanisms that were reported included the European Regional Development Fund (Flanders (Belgium), Italy, Scotland (United Kingdom)); Horizon 2020 (Italy and Portugal); European Structural and Investment Funds (Bulgaria); and the European Social Fund (Italy).

Aside from the financing, several initiatives reported were part of EU-wide programmes, such as the smart specialisation strategy and the European Innovation Partnership on Raw Materials (Wallonia (Belgium)); European Week for Waste Reduction Week (Latvia and Lithuania); the EU operational programme on environmental quality (Slovakia); and the Synergic circular economy across European regions (Screen) project, funded by the EU Horizon 2020 programme (Italy and Portugal).

Other international organisations or insititutions that were mentioned include the United Nations Industrial Development Organization (Serbia), the Organization for Security and Cooperation in Europe (Serbia), the German Corporation for International Cooperation (GIZ, mentioned by Serbia) and the Ellen MacArthur Foundation.

For further information, see country profiles.

Part V

Other resources

15 Examples of policies that go beyond 'material resources'

This chapter provides an overview of responses regarding national/regional policy initiatives supporting a resource-efficient circular economy that go beyond material resources.

As described in the introduction, the focus of this report is material resources. However, when developing the scope of this report together with Eionet (European Environmental Information and Observation Network), some countries requested an opportunity to go beyond material resources and report, on a voluntary basis, on policy initiatives related to, for example, water, biodiversity, land and soil, clean air, and resource conservation.

15.1 Examples reported by countries

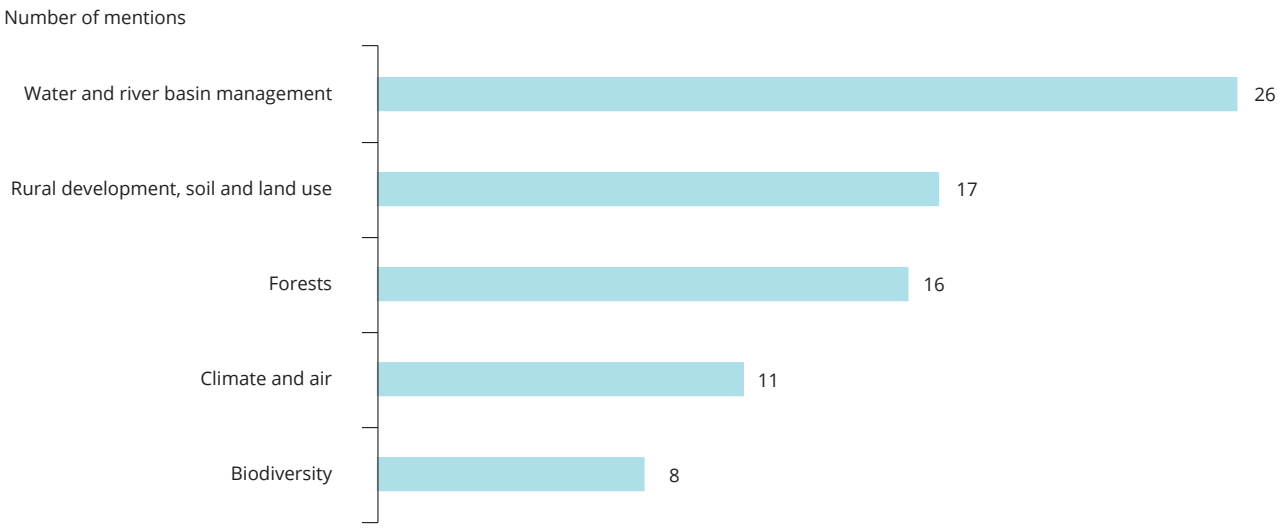
Twenty-six countries/regions responded to this invitation, presenting more than 70 examples of such policies or initiatives.

The examples reported have been grouped based on their thematic proximity. As shown in Figure 15.1, the most frequently mentioned were initiatives related to water and river basin management (26 mentions), followed by rural development, soil and land use (17 mentions) and forests (16 mentions). Examples related to air quality and climate change were reported 11 times and those related to biodiversity eight times.

Quite often, however, some of the policies or initiatives reported touched on several resources at the same time. Flanders (Belgium) even reported its fundamental reflections on the nature and scope of the circular economy, included in its Vision 2050 (Box 15.1).

The topic most frequently reported on was water and/or river basin management policy. The most common link to a resource-efficient circular economy was the scarcity of water and the need to use water efficiently and recycle it. Various water quality and management programmes were reported by 14 respondents: Bulgaria, Czechia, Denmark, Finland, Flanders (Belgium), Ireland, Lithuania, Portugal, Serbia, Slovakia, Slovenia, Spain (planned), Turkey and Wales (United Kingdom).

Figure 15.1 Policies that go beyond material resources, reported by countries and/or regions as relevant to resource efficiency/the circular economy



Box 15.1 Expanding the horizons — a new strategic outlook: Vision 2050 — a long-term strategy for Flanders (Belgium) (2016)

In Flanders, the concept of the circular economy was enlarged beyond material resources to include water, energy, spatial planning and food. The rationale for this was set out in the strategic outlook Vision 2050: a long-term strategy for Flanders, published by the Flemish government in March 2016.

This long-term strategy recognises the demand to accelerate some of the essential societal transformations, and the need for radical innovation in the way people live, work and enjoy life.

The circular economy transition priority is described in Vision 2050:

'In a circular economy, we are more efficient with raw materials, energy, water, space and food by closing cycles in a smart manner. Natural resources are reused wherever possible. Smartly-designed products based on biodegradable and recyclable materials will form the basis of smart material cycles, in order to create less waste and reduce resource consumption.'

For further information see https://www.vlaanderen.be/publicaties/vision-2050-a-long-term-strategy-for-flanders.

Box 15.2 Serbia's strategy for water management until 2034

Adopted in 2016, the strategy for water management in Serbia until 2034 is a comprehensive planning document outlining national long-term water management policy. It identifies action for sustainability in the areas of water use, water protection, the regulation of water flows and protection against the harmful effects of water. Significant improvement in the water sector, which is relevant for resource efficiency, will initially focus on reducing water leaks, reducing inefficiency in water use and recovering substances and energy from used water.

For further information, see http://www.rdvode.gov.rs/doc/Strategija_FINAL.pdf (in Serbian).

Box 15.3 Ireland's Community of Practice for Large Water Users

Ireland's Community of Practice for Large Water Users is made up of more than 120 of the largest production and service facilities across Ireland, along with key national stakeholders and development agencies, with the aim of addressing the challenges of sustainable water management at their sites. The focus is large water users as a catalyst for change in terms of water management practices along the supply chain and the collaborative development of specialised management tools and water stewardship roadmaps.

In 2016, under various project strands, member firms identified EUR 2.5 million in potential water and related resource efficiency savings across their sites and successfully delivered EUR 1 million in verified savings in the first 6 months of the year.

For further information, see https://www.central-solutions.com/sustainability-programmes/community-of-practice.

Initiatives ranged from Serbia's setting up of a strategic framework for water management (Box 15.2) to Ireland's Community of Practice for Large Water Users from 2016, focused on improving water management practices along the supply chain (Box 15.3).

However, countries also referred to water within the scope of other policies. For example, Denmark's growth plan for water, bio- and environmental solutions (2013) outlined initiatives to increase the efficiency of water use in production. Portugal has a range of water-related policies such as those on river-based management, water efficiency, water supply and sanitation, and water reuse. Finland identified nutrient recycling, in particular of phosphorus, as one if its priorities.

Forests were mentioned by six countries/regions (Albania, Hungary, Lithuania, Slovakia, Slovenia and

Box 15.4 Desertification risk map in Turkey

Parts of Turkey are under threat of desertification and drought owing to both its climate characteristics and its topographic structure.

Within the scope of the Turkey basin monitoring and evaluation system project (2013-2015), carried out with the cooperation of the General Directorate for Combating Desertification and Erosion and Turkey's Scientific and Technological Research Council (Tubitak), desertification criteria and indicators specific to Turkey were determined and a geographical desertification model was created to determine the areas at high risk of desertification.

For further information, see country profile.

Box 15.5 Flanders (Belgium) — synergies between soil management and the circular economy

The Public Waste Agency of Flanders (OVAM) is the authority responsible for waste, the circular economy and sustainable soil management in Flanders. As a result, the links between soil management and the circular economy are actively explored. With polluted or abandoned sites often well located for a circular purpose, efforts are being made to integrate circular principles into permits and policy instruments, such as brownfield reconversion agreements.

For further information, see country profile.

Box 15.6 Protecting biodiversity in Lithuania

The action plan on conservation of landscape and biodiversity for 2015-2020 sets a strategic goal to halt biodiversity loss and degradation of ecosystems and their services and, where possible, to restore them. The process of preparation and implementation of management plans for protected areas, as well as action plans for protected species, is ongoing.

For further information, see country profile.

Wallonia (Belgium)). Hungary revised its Forest Act in 2017, emphasising natural management methods and initiatives to help boost afforestation. It should be noted that, in answering the question in this chapter, respondents focused on the need to work on the conservation of forests for multiple reasons — leisure, biodiversity, etc. — rather than on timber production.

Another important issue is rural development and soil and land use, reported by Czechia, Flanders (Belgium), Serbia, Slovakia, Slovenia, Sweden, Turkey and Wallonia (Belgium). Soil is an important resource to preserve, as it provides many natural resources for the economy. In some cases, concerns about land and soil were exacerbated by local water shortages, as in Poland, or desertification, as in Turkey (Box 15.4), or contaminated sites, as in Serbia. Land is also a scarce resource in densely populated areas and needs to be managed effectively to continue meeting the needs of society (Box 15.5).

Croatia, Czechia, Lithuania and Portugal mentioned their programmes to combat air pollution as relevant to resource efficiency or the circular economy. Some examples related to climate change adaptation were reported by Czechia, France, Hungary, Poland, Slovakia, Sweden and Wales (United Kingdom), although some other countries/regions covered the topic of climate change when reporting on synergies between resource efficiency/the circular economy and other policies (Chapter 13).

Biodiversity was mentioned explicitly by Bulgaria, Lithuania, Serbia, Slovakia and Slovenia as a resource that should be preserved to maintain its important natural functions (Box 15.6).

Several countries, rather than focus specifically on biodiversity, noted their initiatives on protecting natural capital or ecosystem services. Italy recently published reports on the state of natural capital, while

other countries (Bulgaria, Ireland, North Macedonia, United Kingdom (England)) included references to this topic in other strategies.

Finally, a number of interesting examples were mentioned by single countries. North Macedonia pointed out that human resources are also an important national resource to take care of, identifying this as one of its priorities: 'intellectual energy and human resources: with special emphasis on preventing loss of such resource due to emigration'.

Austria noted its national indicator set in the report How is Austria?, which measures the well-being and progress of Austrian society. Published annually, the indicator set aims to capture the connections between economic development, social cohesion and environmental conditions — including resource use and environmental accounting. Estonia, as part of its EU Presidency in 2017, promoted eco-innovation and digitalisation as a measure to support a transition to a circular economy. Sweden noted its initiatives related to sustainable urban development.

Part VI

The way forward

16 Reflections on the future direction of policies on resource efficiency and the circular economy

This chapter provides an overview of countries' responses to the question: What are your reflections on the main challenges to the implementation of resource efficiency, circular economy and raw materials policies, and the way to tackle them?

Twenty-nine countries responded to the question, and details are available in the individual country profiles. In general, reflections on challenges, suggestions for the way forward and initiatives to tackle challenges at the international level were not specific to any one of the three policy areas — material resource efficiency, the circular economy and raw material supply. An overview of responses is therefore provided without making a distinction between the three policy areas. Countries' feedback is organised into sections addressing responses on:

- challenges of and barriers to material resource efficiency, circular economy and raw materials policies;
- views on how obstacles can be overcome and suggestions for action;
- reflections on ways to tackle challenges at the EU and international levels.

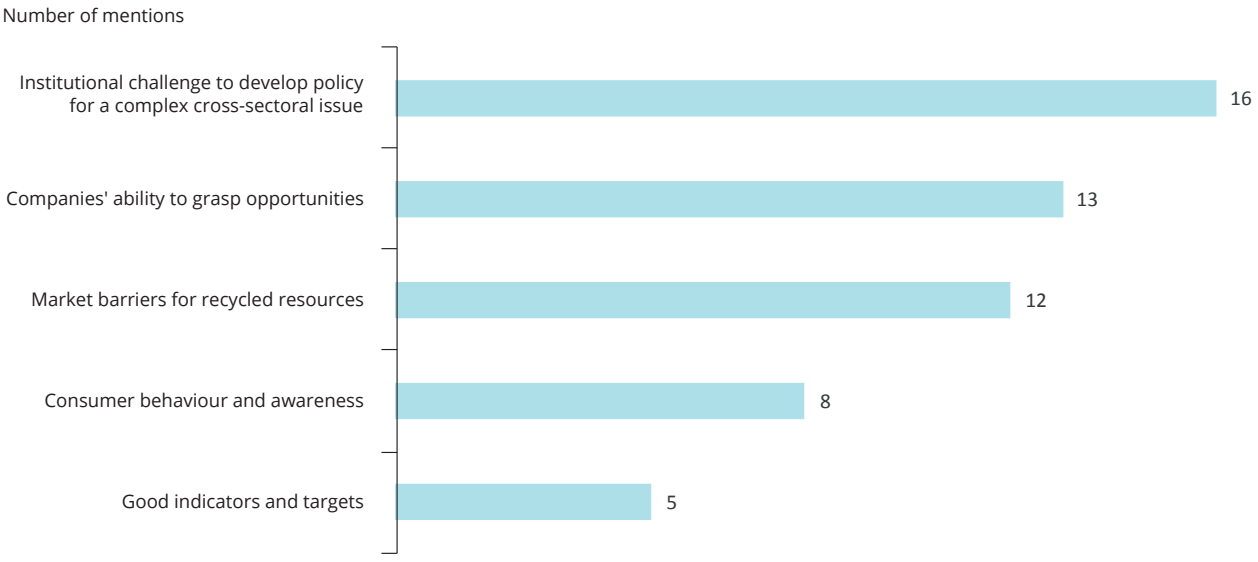
16.1 Challenges of and barriers to material resource efficiency, circular economy and raw material supply policies

Figure 16.1 presents an overview of responses to challenges and barriers, grouped by topic and ranked by the number of mentions.

16.1.1 Institutional challenges to developing policies for complex cross-sectoral issues

The challenges mentioned most often referred to difficulties in developing coherent and synergetic policy responses to complex cross-sectoral issues that touch on different competences of institutions across the same governance level, or when competences are divided between different governance levels (Box 16.1). Overlapping or unclear institutional

Figure 16.1 Challenges of and barriers to resource efficiency/the circular economy, by type



responsibilities make it difficult to respond to new issues quickly. Existing legislation may, at times, also pose a barrier, as mentioned, for example, by Denmark, Finland, Flanders (Belgium) and Scotland (United Kingdom).

Another challenge is related to the capacities and expertise of policymakers who need to have an understanding of complex issues, including the concept of circularity itself, the systems approach and international value chains (Box 16.2).

The challenge for the efficient use of raw materials and the security of supply gets even bigger when taking into account that an energy transition towards a low-carbon economy will also require significant amounts of material resources. Conversely, the closing of material cycles will also require energy (Box 16.3).

16.1.2 Companies' ability to seize opportunities

Thirteen countries reported that companies also face challenges in implementing initiatives on material resource efficiency and the circular economy. Some of these barriers are linked to perceptions in which the investment risk may seem too high. New opportunities may require investment first and may deliver returns only years later, which makes internal approval difficult. Opportunities can be overlooked, especially if the prevailing perception is that the circular economy is mostly about higher recycling rates.

Another issue is resistance to change, when companies feel that, if business is going well, there is no need to make a change. Capacity in terms of manpower and competences, or lack of previous experience, was particularly visible among small and medium-sized enterprises (SMEs). Seizing existing opportunities may require changing traditional business models, initiating cooperation in value chains, or including social aspects of innovation in technically oriented companies.

16.1.3 Market barriers for recycled materials

Recycled materials are competing in the market with virgin materials. Respondents mentioned different types of challenges — economic, technical, environmental, perceptional — for recycled resources to be able to compete with virgin materials. Some of the concerns are low prices of virgin raw materials, perceived low quality of secondary materials, risk of disseminating pollutants, bad reputation of recycled materials, volatility of prices, which makes long-term investments risky, and the uncertainty of securing a steady supply of recyclate.

16.1.4 Consumer behaviour and awareness

This is a typical challenge for many environmental or sustainability objectives, in which a change in consumer behaviour is needed. Specific issues that were raised by Belgium, England (United Kingdom) and Poland include how to inform the consumer, how to create awareness and, finally, the most difficult one, how to change consumer behaviour.

Box 16.1 Institutional challenges to developing coherent policies

Belgium (Federal): as the issues are complex and require the intervention of several policy domains, it is often complicated to coordinate policies efficiently. Obviously, this is because of the country's institutional structures — with competences split between the federal government and the regions, as well as governments with different compositions at each level. Although dialogue bodies do exist, this structure complicates making decisions that best complement one another.

Belgium (Flanders): the region has encountered specific legislative barriers that hinder the transition to a circular economy. In the specific context of a federal country such as Belgium, legislative obstacles also stem from the fact that competences that are relevant to the circular economy are spread over different policy levels.

Estonia: the biggest challenge is how to bring different stakeholders together in the transition to a circular economy and how to ensure policy coherence.

Latvia: the main challenge is the cross-sectoral nature of the issue and the complexity of designing a unified policy framework for coordinated and mutually targeted activities covering all relevant sectors whose targets and priorities might not be complementary.

Portugal: the challenge is the capacity of the state and its agencies to address innovation adequately, in particular as regards the response times to new issues and legal frameworks that prevent the emergence or maintenance of innovation.

Box 16.2 Challenges related to available capacities and expertise

Poland: implementing a systems approach, required by the circular economy concept, which — considering the complexity of various environmental/natural and industrial processes — poses a considerable challenge to policymakers.

Slovenia: an additional challenge is how to train/educate civil servants to improve their understanding of the concept of a circular economy and help them start working across sectors.

Box 16.3 Challenge of related transitions and ensuring a coherent approach

Germany: this is becoming more challenging as a transformation of Germany's energy system, away from fossil energy carriers, is needed to stop climate change. This transformation may require large amounts of raw materials, making it clear that implementing increased resource efficiency is absolutely necessary, as described by the United Nations International Resource Panel.

Poland: recycling may require a lot of energy, which in the end may not be as efficient as it might seem and may, under some circumstances, not support transition to a circular economy.

Box 16.4 Availability of indicators and targets

Flanders (Belgium): currently, Flanders lacks quantified targets for the circular economy. The political will to establish a circular economy exists and the development of indicators is ongoing, but the challenge of how to link research on indicators to proper circular economy targets that go beyond traditional waste targets remains.

Czechia: a problem connected to the targets is unification and clarification of definitions, data collection and statistics. Without this, it will be not possible to control the fulfilling of the targets or compare Member States.

Latvia: there is a need to design a unified policy framework for coordinated and mutually targeted activities covering all relevant sectors that might be controversial in their targets and priorities.

Netherlands: the main challenges of the implementation of circular economy policies include the understanding of the nature of transitions and the development of indicators for monitoring progress.

Scotland (United Kingdom): developing suitable indicators to measure progress and set targets is challenging, particularly for circularity. The focus on emission-based carbon targets for nations, rather than consumption-based targets, also hinders progress on designing circular systems for products and services.

16.1.5 Availability of indicators and targets

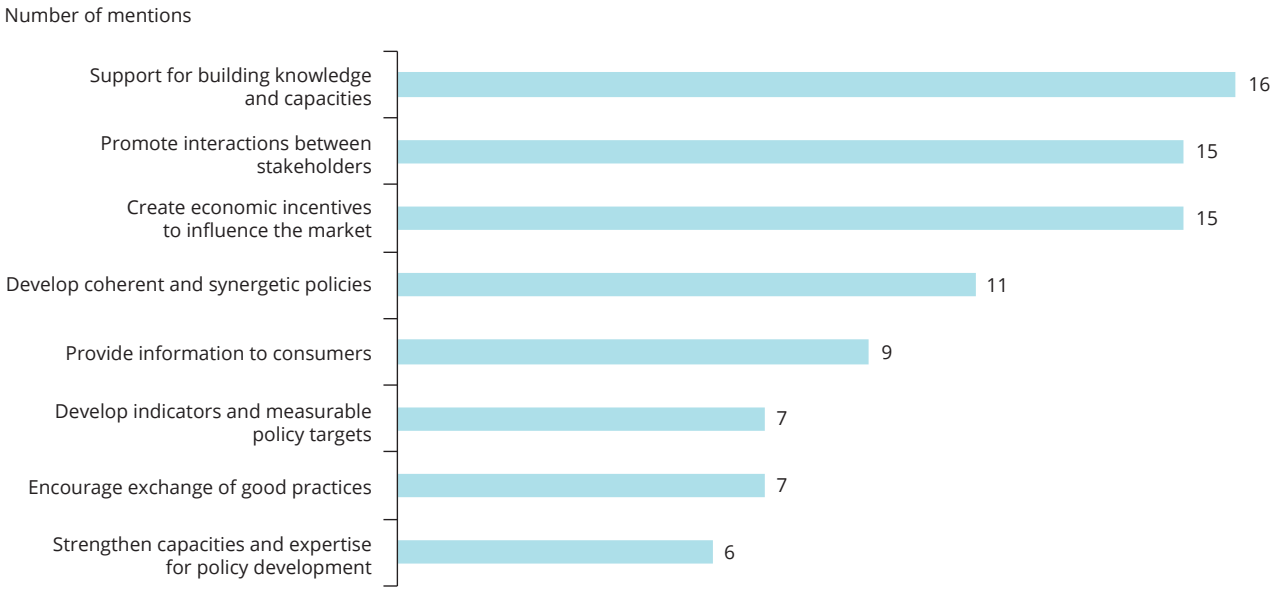
The countries/regions that mentioned challenges related to developing indicators mainly referred to indicators for the circular economy (Box 16.4). Resource efficiency has a longer track record, and a broad set of indicators is already available through the EU Resource Efficiency Scoreboard. Nine EU Member States have adopted national resource efficiency targets, although the EU itself does not have such a target. For the circular economy, more time and effort is needed to develop coherent indicators and targets.

16.2 How to overcome obstacles and suggested actions to take

Countries and regions shared many reflections on how to address obstacles and how they see the way forward. An overview of those suggestions, grouped into the seven most frequently mentioned categories, is shown in Figure 16.2.

Looking at the types of actions mentioned, it would appear that countries have high expectations for softer stimulating measures and for providing incentives

Figure 16.2 Suggested actions to overcome barriers, by type



and information to stimulate stakeholders to take action. More information should also be created and shared. Policy development should increasingly aim for coherence and creating synergies, which will require capacity building for policymakers, as well as wider engagement with stakeholders.

16.2.1 Support knowledge and capacity building

Examples of action suggested by countries ranged from a general call for increasing knowledge on resource efficiency/the circular economy to sponsoring academic or industrial research and development. The required knowledge and innovation not only are of a technological nature but should also include the social aspects of innovation, as pointed out by the Netherlands and Belgium (Flanders). England (United Kingdom) reported having a dedicated research programme, aiming to apply behavioural insights to policymaking. The important role that digital solutions can play in promoting the circular economy was highlighted by Bulgaria and Finland. There is also work to do in curriculum development in education (Belgium (Federal) and Croatia), as well as in the development of standards (Hungary and North Macedonia). At the international level, Austria suggested setting up a United Nations (UN) Intergovernmental Panel on Resources to bring the work of the current UN International Resource Panel closer to policymakers.

16.2.2 Promote interactions between stakeholders

This category of action is different from supporting knowledge building in that it encourages action and initiatives by and with stakeholders. Examples provided show a variety of suggestions, such as supporting bottom-up citizen initiatives (Belgium (Federal)) and encouraging more cooperation between sectors, including through industrial symbiosis (Bulgaria and Croatia). More cooperation between industrial companies was suggested by England (United Kingdom), with a suggestion to encourage bigger companies to support SMEs in unlocking their potential in a circular economy. Several countries also mentioned the importance of participation of stakeholders in policy development (Denmark, Germany, Hungary, Serbia, Scotland (United Kingdom) and Switzerland.

16.2.3 Create economic incentives to influence the market

Economic incentives can be used to encourage market players (producers or consumers) to contribute to achieving the policy objectives of material resource efficiency, a circular economy and raw material policies. For example, placing a higher price, through taxes or fees, on unwanted behaviour, such as disposal when recycling or reuse is possible, will encourage a shift to a more circular use of products and materials. How

producers and consumers consequently change their behaviour in response to higher prices is up to them, but the role of policymakers is to create enabling conditions and set the direction (Denmark).

Respondents also mentioned new business models that can support a closed-loop economy (Poland and Portugal), for example benefiting from lower taxes on repair activities. Creating a market demand for recycled materials, for example through public procurement, may also help break the vicious circle in which there are no recycled materials, so there is no demand for recycled materials. Liechtenstein highlighted how markets today are international, making it sometimes difficult for local recycled materials to compete with much cheaper materials from abroad. Supporting investment in resource-efficient technologies in companies or households is another known option for raising resource efficiency in general.

16.2.4 Develop coherent and synergetic policies

Chapter 13 provided an overview of existing synergies between policies that are already being exploited. The answers to the question on the way forward also show that many respondents believe in future synergetic approaches for material resource efficiency, the circular economy and the supply of raw materials. Several countries pointed to the multidisciplinary character of these three policies and called for good coordination with other policies such as those on climate and energy, waste and some environmental topics (Austria, Bulgaria, Germany, Ireland, Portugal, Serbia and Spain), keeping in mind that some of these may be at different levels of governance within a country or region. To develop effective policies, some respondents (Croatia and Slovakia) considered it very important to involve stakeholders from different parts of the value chain and from all relevant sectors involved. Finally, as noted by Slovenia, a good policy should also anticipate those that may be potential losers from a new circular economy policy and develop ways of addressing their needs and the situation.

16.2.5 Provide information to consumers

Suggestions in this category focused on informing consumers to help them make informed choices when buying or using goods or services. Another aspect can be creating awareness by providing easily accessible information about the underlying societal problem and its relation to consumers' activities. Flanders (Belgium) points to the new opportunities that big data may provide in helping to supply information. Ireland pointed out that emphasis on messaging is needed so that the public and business operators think about resource efficiency in the same way that thinking about energy efficiency has now become natural.

16.2.5 Develop indicators and measurable policy targets

Four respondents indicated that developing indicators is an important step, especially for a complex topic such as the circular economy (Flanders (Belgium), Hungary, the Netherlands and Poland). Indicators are needed for monitoring progress and steering policies. For resource efficiency, indicators already exist, and Austria and Germany reflected on the usefulness of having a resource efficiency target and the importance of building a political consensus on its significance. Targets are an effective means of highlighting political priorities, raising awareness and helping to communicate with stakeholders.

16.2.6 Encourage exchange of good practice

The exchange of good practice was mentioned by seven countries, with examples ranging from knowledge sharing between businesses to supporting international exchanges on the circular economy concept and its implementation (Box 16.5).

16.2.7 Strengthen capacities for and expertise in policy development

The last category of recommended action relates to helping policymakers to do their work better by increasing their understanding of complex issues, launching multidisciplinary task forces or developing better statistical databases. Strengthening expertise and capacity building was reported by Bosnia and Herzegovina, Montenegro and North Macedonia in the context of their candidacy for EU membership, but some EU Members States (Denmark, Slovenia) also highlighted this issue.

16.3 Linking challenges and recommended action

The recommended types of action can be linked to the frequently mentioned challenges, as shown in Table 16.1. The conclusion is that each identified challenge has several types of suggested action that can help address it.

Box 16.5 Exchange of good practices

Estonia: possible solutions are highlighted in good practices that show the difference between traditional and new solutions and why the latter should be used.

Finland: Finland can provide good examples from forerunner circular business models as well as policy programmes targeting a circular economy and resource efficiency.

Serbia: awareness-raising and the dissemination of knowledge on the concept of a circular economy need to accelerate and, although conferences and workshops are already being held, work in this field must be intensified. In addition, it is extremely useful to connect with international stakeholders which are developing policies for resource efficiency and the circular economy, through either networking or the implementation of international projects.

Scotland (United Kingdom): the Circular Economy Business Service aims to facilitate the exchange of good practice by both helping companies understand and develop opportunities and showcasing what individual companies have achieved.

Table 16.1 Recommended actions to overcome challenges reported

	Challenges			
Recommended actions	**Institutional challenge to develop policies for complex cross-sectoral issues**	**Market barriers to recycled resources**	**Companies' ability to seize opportunities**	**Consumer behaviour and awareness**
Create economic incentives to influence the market		×		
Support knowledge and capacity building		×	×	
Promote interaction between stakeholders			×	×
Develop coherent and synergetic policies	×	×		
Provide information to consumers				×
Encourage exchange of good practice	×		×	×
Strengthen capacities for and expertise in policy development	×			

Note: The lack of indicators and targets was often reported as a challenge, and developing indicators and targets was also listed as a way forward. As this does not provide new insights, indicators and targets have been omitted from Table 16.1.

16.4 Suggestions for how to tackle the challenges at EU or international level

In total, 14 countries/regions shared their views on how the challenges of resource efficiency/the circular economy listed above could be tackled at the EU and international levels.

Most of the reflections and expectations were addressed at the EU level, including:

- the need for a target for material resource efficiency (Austria);
- better integration of the EU product policy with the circular economy (Flanders (Belgium) and Denmark);

- the need to create a market for secondary material resources (Poland);
- harmonisation of EU policies to promote the circular economy (Czechia, Finland, Wales (United Kingdom));
- more EU policy regarding end of waste (Hungary);
- creating provisions to use EU structural funds more in the context of a circular economy (Serbia).

Reflections on international goals and action included:

- considering the launch of a UN Intergovernmental Panel on Resources similar to the Intergovernmental Panel on Climate Change (Austria);
- taking the objective of resource efficiency as a global challenge (Germany and Slovenia);
- developing international standards, such as one on mineral resource inventories (Hungary and North Macedonia);
- considering the importance of the UN Sustainable Development Goals as a motivating framework (Ireland);
- creating a level playing field internationally (Italy).

16.5 Then and now — a comparison of challenges and recommended action reported between the 2016 *More from less* report and this survey

Given the somewhat overlapping scope of the 2016 survey — resource efficiency and closing material loops — it is worth briefly comparing reflections on the future direction of material resource efficiency policies in 2016 and 2018. Box 16.6 presents the key issues that were reported in 2016.

In the current survey, the issues of better definitions, scope and focus and improving data availability were mentioned less frequently than in 2015. It is not clear whether this is because more data are available through various EU initiatives — for example the Resource Efficiency Scoreboard, the Raw Materials Scoreboard and the monitoring framework for the circular economy — or because the most interested countries are already working on their own indicators for the circular economy (Chapter 10).

However, this time countries mentioned the complexity of the two policies and the need for a systemic approach much more often, as well as the challenge of setting up good indicators and targets. This may be explained in part by the inclusion of circular economy and raw material supply policies in the survey, which touch on many different economic activities.

The need for integration with and into other policies has remained important over time. The global nature of the challenges was also stressed in both surveys.

Box 16.6 Overview of respondents' suggestions on future directions of resource efficiency, presented in the 2016 *More from less* report

- better definitions, scope and focus;
- integration of material resource efficiency into other policies and broader stakeholder involvement;
- improvement of data availability;
- adopting a more systemic approach;
- addressing other challenges:
  - resource efficiency should focus on the materials first, rather than waste;
  - globalisation and its consequences remain a challenge to the governance of material resource efficiency;
  - recycling presents an increasing techno-economic challenge because of the ongoing dispersion of ever more different materials in ever smaller amounts in a large variety of products.

17 The road ahead

This is the third EEA survey since 2011 looking at national policy responses in its Eionet (European Environmental Information and Observation Network) member countries. While the scope of these surveys has evolved over the years along with the policy agenda, together they provide significant food for thought on continuities, differences and new trends and what these mean for the development of policies on resource efficiency and the circular economy.

Although policies on resource efficiency, raw material supply and the circular economy have different trajectories and focuses, all three are strongly related and mutually supportive. Resource efficiency addresses the relationships between nature and our socio-economic system. In particular, it calls for society to manage natural resources sustainably and efficiently, in their role either as the source of raw materials or as a sink for environmental pressures. The circular economy therefore addresses the requirements of our socio-economic system and calls for us to maintain the value of materials and products for longer by introducing more circular production and consumption patterns, reducing resource inputs from nature and discharging less into the natural world.

In this survey, waste policy came out as an important element for both material resource efficiency, for example through waste prevention, and the circular economy, which aims for more circular patterns through higher recycling, reuse and recovery rates or a sharing economy. Raw material supply policies, in particular those looking at ensuring the secure supply of critical materials, have a clear link to all of the above.

As shown by the information reported by the countries, borders between policy areas are being crossed more and more frequently — the circular economy can be part of an energy transition addressing climate change, resource efficiency can be part of a national circular economy policy, the resource productivity indicator — gross domestic product (GDP)/domestic material consumption (DMC) — can be part of a circular economy monitoring framework, and both resource efficiency and the circular economy can strengthen sustainable development and economic policies.

It is encouraging to see so many countries — both EU Member States and non-EU Member States — developing national or regional circular economy action plans or strategies. Their evident appeal probably comes from the win-win character of the circular economy and stakeholders' belief in its potential for the economy and the environment.

Another possible factor is the maturing of the concepts themselves. Evidence that demonstrates a business case for resource efficiency and the circular economy is increasingly available. Several countries reported that, as part of policy development, they estimated benefits from the implementation of the circular economy — not only of resources saved or the consequent contribution to GDP, but also of the jobs created or the reduction of greenhouse gas emissions.

One specific shortcoming is a paucity of targets for resource efficiency and the circular economy. Countries noted that adopting national targets is politically difficult, but they also pointed to the question of indicators. Clearly, a comprehensive monitoring framework for resource efficiency and the circular economy is needed. A lack of comprehensive and universally accepted indicators is sometimes given as the reason why very few targets have been adopted.

It is interesting that there is little correlation between countries having a dedicated strategy or a roadmap for resource efficiency and the circular economy and those having concrete targets. It would seem that targets relevant to resource efficiency and the circular economy are more easily defined for specific policies — waste, products or sectors. Looking at ongoing work on indicators in several countries and at an EU level, it seems that a topic for discussion for EU Member States could be the choice between what needs to be developed at an EU level and what can be done better at a national or regional level.

Looking at the country reports, it appears that regulatory policy instruments are more suitable for well-defined topics, and that the objectives of resource efficiency and the circular economy can be better addressed by voluntary approaches, such as support for innovation,

information-based instruments, exchange of good practice and developing transition agendas.

There are interesting examples of policies for resource efficiency or the circular economy developed at a local (provincial or city) level. Clearly, these topics are no longer the exclusive domain of central government. In addition to allowing a broader stakeholder involvement in policy development, this local scope could help take into consideration potential societal losers from the transition to a circular economy.

However, countries — implicitly and explicitly — also recognised the strong role of the EU. Important aspects included putting a regulatory framework in place, setting up financial support mechanisms and outlining the strategic direction for policies.

Last but not least, one noticeable new trend in this latest survey was the increased emphasis participants gave to creating synergies between resource efficiency, the circular economy and other policy areas. The two most visible examples were the implementation of the Sustainable Development Goals (SDGs) and the low-carbon and climate change agenda. Several countries reported that, from a policy viewpoint, they embrace the SDGs as a good overall framework to align with, and there were also a few examples of how private companies are connecting to the SDGs.

The link to the climate change agenda is perhaps most obvious, given the interdependencies between how we source and use material resources; the importance of access to raw materials, some of which are critical for the low-carbon economy; and how we dispose of some waste streams. Two countries are already reframing their climate change agendas as a materials problem, in which moving away from the linear economy offers perspectives for new solutions.

The wealth of material reported by the participating countries is a good starting point to build on, whether on a bilateral basis or on a wider scale. Ultimately, one would hope that the circular economy will in time become a term as common and natural to use as resource efficiency is today.

Considerations for policy

Designing and developing policies

- Estimating the benefits of the circular economy — in terms of not only resources and money saved but also jobs created or greenhouse gas emissions avoided — is effective in making the business case for the circular economy during policy development.
- A frequent approach in many circular economy roadmaps or strategies is to identify priority areas and then develop sectoral action plans or transition agendas to address them.
- Periodic evaluations and revisions of resource efficiency strategies can help ensure their continued relevance in a changing policy landscape.
- Economic interests, raw material supply and reducing dependence on imported resources continue to be predominant drivers for material resource efficiency and the circular economy. Policies must allow secondary materials to compete with virgin raw materials, addressing economic, regulatory, environmental, technical and international challenges.
- The importance of policies and strategies specifically aimed at materials management has been recognised and translated into concrete policy initiatives.
- National raw material strategies should support the economic sustainability of the industries they supply. This can be achieved by combining efficiency targets with coherent, customised policies that help businesses overcome the perceived barriers to improved resource efficiency.
- National initiatives on reuse and repair, information tools and platforms, and circular public procurement initiatives are increasing and hold further potential.
- Policy areas are being crossed more frequently. For example, the circular economy can be part of an energy transition addressing climate change, resource efficiency can be part of a national circular economy policy, the resource productivity indicator gross domestic product/domestic material consumption can be part of a circular economy monitoring framework, and both resource efficiency and the circular economy can strengthen sustainable development and economic policies.

- To transform society into a real circular economy, instead of only increasing recycling and preventing waste, a systemic approach and cooperation along the whole value chain is needed.
- As a concept, resource efficiency needs to be used as widely and naturally as energy efficiency is used today.

Building synergies

- While synergies between waste management and environmental policies are taken for granted, synergies can also be achieved between resource efficiency/circular economy policies and the low-carbon/climate change agenda.
- Different approaches for identifying critical raw materials provide an opportunity for exchange between national approaches and the European Commission's methodology for determining critical materials.
- At an institutional level, synergies can be stimulated by giving ministries and/or agencies shared responsibility for a policy area or by creating working groups or task forces for new policy development.

Indicators and targets

- The introduction of indicator frameworks that specifically measure progress towards a circular economy is challenging. Those in existence typically consist of about a dozen indicators, in most cases drawing on those already available, and aim to cover all stages of a life cycle — production, consumption and waste management.
- The objectives and systemic challenges of a circular economy make target setting not straightforward. It may be easier to define concrete targets within specific policies — for example, those related to waste, products or specific sectors.
- Targets to reduce or ban landfilling within a few years, combined with increasingly tight limits on waste incineration, may encourage action on circular solutions and on closing material loops. This is reflected in the new EU waste policy.
- There is no obvious correlation between having a dedicated policy for resource efficiency or the circular economy and adopting dedicated targets for resource productivity.
- Waste targets continue to predominate when it comes to material resource efficiency, probably because EU legislation imposes a number of such targets. Waste targets are also increasingly important in the context of circular economy policy.
- The use of indicators allows the measurement and monitoring of progress towards a more resource-efficient circular economy. Availability of good indicators is a condition for setting targets, whereas developing good data for indicators often requires political will to set a target first. A lack of comprehensive and universally accepted indicators is sometimes quoted as the reason why very few targets have been adopted for resource efficiency and the circular economy.
- Rates of recycling, recovery of certain waste streams or information on economy-wide material flow can be used as indicators for the circular economy. However, economy-wide material flow analysis-based indicators have limitations, such as not accounting for imported raw material needs.
- There are ongoing efforts to align national sustainable development indicator sets with the United Nations (UN) Sustainable Development Goal (SDG) indicators.
- The EU Resource Efficiency Scoreboard, maintained by Eurostat since 2013, can be a source of inspiration when developing national indicator frameworks.

Institutional arrangements and stakeholder involvement

- In most countries, several ministries are involved in developing policies for resource efficiency and the circular economy, with overlapping responsibilities and competencies.
- Systemic changes and value chain cooperation increase the need for stakeholder involvement, through public consultations, networking events, online platforms, green deals, pacts, charters and public-private partnerships. Emphasis on stakeholder involvement and societal buy-in is increasing, while in some countries/regions the role of government seems to be slowly shifting from that of regulator and enforcer to that of facilitator and promoter of processes.

- National raw material platforms and fora can facilitate an exchange of expertise and insights among different sectors involved in raw material strategies, often integrating research institutes, policymakers and companies.
- Strategic direction setting at the EU level is successfully being translated into action at the local level, frequently with international cooperation between participants as a collateral benefit.
- The EU's main roles are seen as providing a policy framework, ensuring better integration between related policy areas and adapting EU financial mechanisms to support circular economy activities. On the international level, the global nature of challenges is recognised, along with the role of the UN SDGs and the UN International Resource Panel, and there is a proposal to set up an Intergovernmental Panel on Resources, similar to the Intergovernmental Panel on Climate Change and the UN International Resource Panel.
- The institutional context — many institutions with overlapping responsibilities and/or lack of know-how on how best to address complex policy fields — is a factor that slows down policymaking.
- It is important to identify the stakeholders that may be losing out on the transition to a circular economy and address their needs.

Initiatives at regional and local levels

- Regional and local initiatives are at the forefront of the transition towards a more circular economy. Experience from existing regional strategies may provide useful input for countries planning to develop their own regional policy initiatives.
- Countries that have adopted a dedicated strategy, action plan or roadmap for the circular economy are more likely to have concrete initiatives in which resource efficiency and the circular economy are already used as a tool to achieve SDGs.
- Mandatory waste management plans or waste prevention programmes can be used as legal vehicles for developing regional programmes related to resource efficiency and the circular economy.

International dimension

- Despite the importance of global trade in international value chains, very few institutional arrangements or political activities take the international dimension of resource efficiency and the circular economy into account.
- EU regulatory requirements or recommendations that give Member States freedom to choose their own implementation mechanisms often stimulate countries to develop their own local policy responses, which many then consider local good practice.
- In developing responses to the SDGs and the International Resource Panel, more attention could be given to taking account of resource efficiency and the circular economy.
- Most European countries' economies and industries do not rely significantly on imports of raw materials, but rather on imports of parts, components or intermediate products. It may be of value to use these criteria in assessing the criticality of materials for national economy or industries.

Abbreviations

CRM	Critical raw material
DMC	Domestic material consumption
EEA	European Environment Agency
Eionet	European Environment Information and Observation Network
ETC/WMGE	European Topic Centre on Waste and Materials in a Green Economy
EU	European Union
GDP	Gross domestic product
MEC	Minimum environmental criteria
MFA	Material flow account
OECD	Organisation for Economic Co-operation and Development
OVAM	Public Waste Agency of Flanders
PET	Polyethylene terephthalate
PPP	Purchasing power parity
R&D	Research and development
RMC	Raw material consumption
SDG	Sustainable Development Goal
SMEs	Small and medium-sized enterprises
UN	United Nations
WEEE	Waste electrical and electronic equipment

Annex 1 Questions covered in the survey

Policy framework

Question 1: What are the main needs and motivations in your country which drive the development and implementation of policies related to material resource efficiency, circular economy and raw material supply?

Question 2: Has your country adopted a dedicated national material resource efficiency strategy, an action plan or a roadmap? If so, what are its key objectives and main initiatives?

Question 3: Has your country adopted a dedicated national circular economy strategy, an action plan or a roadmap? If so, what are its key objectives and main initiatives?

Question 4: Does your country have a dedicated national — or sectoral — strategy for raw materials? If so, what are its key objectives and main initiatives?

Question 5: Which other policies in your country cover material resource efficiency, circular economy and raw material supply in part, as one topic among various other things? What are the related key objectives, main initiatives and planned actions?

Examples of innovative approaches and good practice

Question 6: Please share examples from your country of initiatives which you consider to be good practice or an innovative approach to support resource efficiency and/or circular economy. Some areas of high interest to Eionet countries include:

- product-related policies, including on repair and reuse;
- producer responsibility/supplier responsibility;
- taxation and economic instruments to encourage investment in resource efficiency and circular economy;
- financial support programmes;
- research and innovation;
- innovative business models;
- public procurement;
- change in consumption patterns and consumer behaviour;
- sharing economy, buying services instead of purchasing products, etc.;
- institutional and regulatory arrangements to support the transition towards a resource-efficient circular economy;
- spatial planning and urban policy;
- education.

You are welcome to provide examples from other areas which you find important.

Question 7: Can you share examples from your country of policy initiatives that deliberately seek to create synergies and co-benefits between resource efficiency/circular economy and other policy areas?

Question 8: Please share examples from your country of policy initiatives for resource efficiency and/or circular economy which are taken below the central/national level, for example at the local levels (e.g. province, city, municipality), or in specific industrial or economic sectors.

Monitoring and targets

Question 9: What targets (measurable goals with a specific timeline) have been adopted in your country for a resource-efficient circular economy?

Question 10: How do you monitor progress towards a resource-efficient circular economy? Which indicators do you use?

Question 11: Do you have national examples of concrete initiatives where resource efficiency/circular economy are used in your country as a way to achieve the UN Sustainable Development Goals for the year 2030?

Institutional set-up

Question 12: What is the institutional set-up in your country for material resource efficiency, circular economy and raw material supply? How is stakeholder engagement organised and facilitated?

Other issues

Question 13: Can you share examples from your country of policy initiatives which seek to make imports of materials and products more sustainable?

Question 14: How do you evaluate impacts and effectiveness of policies for a resource-efficient circular economy?

Question 15: Can you give examples of national initiatives supporting a resource-efficient circular economy which go beyond 'material resources'?

Question 16: What are your reflections on the main challenges to the implementation of resource efficiency, circular economy and raw materials policies, and the way to tackle them?

Annex 2 Selected examples of policies, instrument or targets reported by Eionet countries

Map A2.1: Selected examples of policies, instruments or targets reported by Eionet countries

Albania
- National Agency of Natural Resources
- Forest cutting ban moratorium

Austria
- 2017 waste prevention programme
- Online platform Circular Future

Belgium
- Circular economy roadmap at the federal level
- Circular Flanders
- Walloon waste-resources plan

Bosnia and Herzegovina
- Competitiveness of enterprises and small and medium-sized enterprises
- SDG Dashboard

Bulgaria
- Governmental programme 2017-2021
- Strategy for development of the mining industry

Croatia
- Waste prevention plan
- Action plan for green public procurement

Czechia
- Raw materials policy in the field of mineral materials
- Secondary raw materials policy, with follow on action plan

Denmark
- Advisory board on circular economy
- Strategy on the sharing conomy

Estonia
- General principles of Earth's crust policy until 2050
- Support programme for resource efficiency in enterprises

Finland
- Circular economy roadmap
- Experimental Finland platform
- From recycling to a circular economy - national waste plan to 2030

France
- Circular economy - the fight against climate change
- Monitoring the circular economy: 10 key indicators
- Plan for natural resources

Germany
- ProgRess II
- Total raw material productivity target
- Stakeholder engagement mechanisms

Hungary
- National forest strategy (2016-2030)
- National industrial symbiosis programme/circular economy

Ireland
- National planning framework (Ireland 2040)
- Tool for resource efficiency (TREE)

Italy
- Reports on natural capital (2017, 2018)
- Circular Economy and Resource Efficiency: Indicators for circular economy (2018)

Latvia
- Bioeconomy strategy
- Resource productivity targets

Liechtenstein
- Waste management plan
- Phosphorus recovery from wastewater

Lithuania
- Eco-Innovation LT+
- Unified accounting information system for products, packaging and waste

Montenegro
- National strategy for sustainable development until 2030
- National and sectoral targets for resource productivity

Netherlands
- Programme for a circular economy by 2050
- Transition agendas
- Reduction target for the use of primary raw materials

North Macedonia
- Green tax reform
- Ecolabels for tourist facilities

Norway
- White paper on waste and the circular economy
- Strategy for green competitiveness

Poland
- Roadmap towards the circular economy transition
- Strategy for responsible development

Portugal
- Circular economy action plan
- National environmental education strategy 2020

Serbia
- New waste management strategy 2019-2025
- Circular Economy Department of the Chamber of Commerce and Industry of Serbia (CCIS)

Slovakia
- Circular economy chapter in 2030 environmental strategy
- Waste prevention programme 2019-2025

Slovenia
- Roadmap towards the circular economy
- Material productivity target

Spain
- Big deal for a circular economy
- Green jobs programme

Sweden
- Partnership programme circular and bio-based economy 2016-2018
- RE: Source - a Swedish national strategic innovation programme

Switzerland
- Ordinance on the avoidance and the disposal of waste (VVEA)
- Resource efficiency network: Reffnet

Turkey
- Resource efficiency guidelines for sectors
- Programme for reducing import dependency

United Kingdom
- London's circular economy route map
- Making Things Last, Scotland's circular economy strategy; Welsh natural resources policy

Annex 3 Targets for material resource efficiency, the circular economy and raw material supply strategies reported by countries

The table below shows the targets reported by countries. Those listed are the targets that have a quantified objective and a future deadline or period in which to achieve it. While some countries reported on energy targets — particularly those that include energy in the scope of material resource efficiency because of the link to fossil materials — others did not, because they consider energy policy a separate field. Explicit targets on supply of biofuels or bio-based materials are included, targets on renewables in general are not included. EU imposed waste targets were also out of scope so are not included below, but some countries provided a wide array of EU-related waste targets that are available in their country profiles.

Country	Targets reported in the country profiles
	Economy-wide resource productivity (ten countries, 12 targets)
Austria	Overall improvement of resource efficiency by 50 % by 2020, compared with 2008, and 4- to 10-fold by 2050
Estonia	10 % increase to EUR 0.46/kg (gross domestic product (GDP)/domestic material consumption (DMC)) by 2023
France	Increase resource productivity (GDP/DMC) by 30 % between 2010 and 2030
Germany	Double abiotic material productivity (GDP/DMC) over the period 1994-2020
	Trend in total raw material productivity to continue increasing at 1.5 % per year in the period 2010-2030
Hungary	Reduce material intensity (DMC/GDP) to 80 % of the 2007 level by 2020
Latvia	Increase resource productivity (GDP/DMC) to EUR 710/tonne in 2030, with an intermediate target of EUR 600/tonne in 2020
Montenegro	60 % increase in resource productivity in the period 2013-2020
	103.8 % increase in resource productivity in the period 2013-2030
Portugal	Increase the productivity of materials (GDP/DMC) from EUR 1 140/tonne of materials consumed in 2013 to EUR 1 170/tonne in 2020 and EUR 1 720/tonne in 2030
Slovenia	Increase overall resource productivity (GDP/DMC) to EUR 1 500/tonne by 2023
	Achieve EUR 3.5 PPP/kg (purchasing power parity/kg) in 2030
Spain	Raise material productivity by 30 % in the period 2015-2030 (target to be adopted mid-2019)
	Raw materials supply (six countries, seven targets)
Belgium	Flanders: • By 2020: harvesting 135 000 tonnes of low-grade wood from the Flemish forests (branches, treetops, other low-grade wood), compared with 2013 harvest levels of 90 000 tonnes. • By 2020: harvesting 114 000 tonnes of woody biomass from the maintenance of roadsides and small landscape elements — hedgerows, roadside trees and wood on road shoulders
Hungary	Reducing import dependence on fossil fuels by 2020 to 75 % of the level of 2007
North Macedonia	Increasing the share of biofuels in total fuel consumption in the transport sector to 10 % by 2020
Netherlands	50 % reduction in the use of primary raw materials (minerals, fossil materials and metals) compared with 2014 by the year 2030
Portugal	Increasing the volume of timber and other certified forest products traded on the market by 50 % between 2010 and 2020
Serbia	Increasing the share of biofuels in total fuel consumption in the transport sector to 10 % by 2020
	Circular economy (one country, one target)
Belgium	Flanders: • Reuse: by 2022, 7 kg/person/year of reuse has to be reached

<table>
<tr><th>Country</th><th>Targets reported in the country profiles</th></tr>
<tr><td colspan="2">Waste (25 countries, 103 targets)</td></tr>
<tr><td>Austria</td><td>• Plastic shopping bags should be reduced to a maximum of 25 bags per person per year by 2019
• A ban on plastic carrier bags as of 2020 is planned
• A reduction in consumption of plastic packaging of 25 % by 2025
• To halve food waste in both trade and consumption by 2030</td></tr>
<tr><td>Belgium</td><td>Flanders:
• Residual waste of 116 kg/person/year for suburbs in 2022
• Residual waste of 258 kg/person/year for coastal municipalities in 2022
• Total average residual waste of 140 kg/person/year in 2022
• Household waste generation per person should not be more than 502 kg in 2022
• Litter will decrease by 20 %, meaning that a maximum of 14 000 tonnes will be generated by 2022
• Motorway car parks, public transport stops and waste collection points must improve their cleanliness index by 10 % by 2022, compared with 2014
• 15 % less industrial residual waste will be generated by 2022
• Optimal reuse of food processing residues from production, distribution and catering; 15 % more reuse by 2020 and 25 % by 2030
• Percentages of separately collected biowaste to be recycled by 2021:
• vegetable/fruit/garden waste: 95 %
• green waste: 95 %
• other organic-biological waste: 90 %
• Diverting at least 10 % of roadside mowing residues to anaerobic digestion by 2020
• By 2020, at least 50 % of the Flemish production of B-grade wood waste has to undergo additional sorting to create recyclable and non-recyclable wood-waste fractions
Wallonia:
• Reducing food loss and wastage by 30 % by 2025 compared with 2015</td></tr>
<tr><td>Bulgaria</td><td>Systems for separate collection of packaging waste cover no less than 6 million inhabitants of the country and must include resort towns and all cities with a population of 5 000 inhabitants or more by 2020</td></tr>
<tr><td>Croatia</td><td>• Reduce the total amount of municipal waste generated by 5 % by 2020 compared with 2015
• Separately collect 60 % of the mass of generated municipal waste, primarily paper, glass, plastic, metal and biowaste, by 2020 compared with 2015
• Separately collect 40 % of the mass of biowaste generated by 2020 compared with 2015
• Dispose of less than 25 % of the mass of generated municipal waste in landfill by 2020 compared with 2015
• Separately collect 75 % of the mass of construction by 2020 compared with 2015</td></tr>
<tr><td>Czechia</td><td>• Landfill ban of recoverable and utilisable waste and municipal solid waste after 2024
• Increase separate collection of waste tyres — 80 % in 2020
<table>
<tr><th>Packaging waste</th><th colspan="2">By 2019 (%)</th><th colspan="2">By 2020 (%)</th></tr>
<tr><td></td><td>Recycling</td><td>Overall recovery</td><td>Recycling</td><td>Overall recovery</td></tr>
<tr><td>Paper and cardboard</td><td>75</td><td></td><td>75</td><td></td></tr>
<tr><td>Glass</td><td>75</td><td></td><td>75</td><td></td></tr>
<tr><td>Plastic</td><td>45</td><td></td><td>50</td><td></td></tr>
<tr><td>Metal</td><td>55</td><td></td><td>55</td><td></td></tr>
<tr><td>Wood</td><td>15</td><td></td><td>15</td><td></td></tr>
<tr><td>Consumer packaging</td><td>48</td><td>53</td><td>50</td><td>55</td></tr>
<tr><td>Total</td><td>65</td><td>70</td><td>70</td><td>75</td></tr>
</table>
</td></tr>
</table>

Country	Targets reported in the country profiles
Denmark	• Recycling of organic waste, paper, cardboard, glass, wood, plastic and metal waste from households, including packaging: the target is to reach 50 % by 2022 • Separating 50 % of dry and wet organic household waste, such as paper, cardboard, glass, plastic and metal, in 2020 • Collection of waste electronic equipment from all sectors is expected to reach 65 % by 2018 (one year earlier compared with EU target)
Estonia	• The landfill share of biodegradable municipal waste is not to exceed 20 % by 2020 (national waste management plan 2014-2020) • The recycling target for biodegradable waste is 13 % of total municipal waste generation by 2020 (national waste management plan 2014-2020). • The demolition and construction waste recovery rate is to be 75 % by 2020 (national waste management plan 2014-2020)
Finland	Halving food waste and food loss by 2030

France	• A decrease of 10 % in household and similar waste and per inhabitant, and a reduction in the quantity of waste from economic activities per unit of value in 2020, compared with 2010
	• A 60 % share of reused or recycled building waste materials in road construction materials purchased by national and local authorities in 2020
	• A recycling rate of non-hazardous, non-inert waste of 55 % in 2020 and 65 % in 2025
	• A reduction of 50 % in the quantities of non-hazardous waste landfilled in 2025 compared with 2010
	• To progress towards 100 % recycled plastics in 2025
	• Waste clothing, household textiles and shoes (formal extended producer responsibility (EPR) scheme):
	  • collection target: 50 % of the quantities placed on the market by 2019
	• Waste packaging and plastic products for agricultural supplies (voluntary EPR scheme):
	  • collection target of 35-90 % in 2020
	• A 50 % reduction in food waste between 2013 and 2025

Germany	A 50 % increase in the quantity of separately collected organic waste and high-quality recycling/recovery of such waste by 2020 relative to 2010
Ireland	Achieve a 1 % annual reduction in the per person quantity of household waste over the period 2015-2021
Italy	Emilia Romagna region: • Separate waste collection: 73 % by 2020 • Per person waste generation: a decrease of 25 % by 2020 relative to 2011 • Recycling: 70 % by 2020 Lazio region: • Separate waste collection: 65 % by 2020
Latvia	• Reduce the amount of biodegradable municipal waste going to landfill after 16 July 2013 to 35 % by 16 July 2020 • By 30 June 2021, increase the collection rate of waste electrical and electronic equipment (WEEE) to 40.5 % and from 1 July 2021 to either 65 % of the average weight per appliance placed on Latvian market in the last 3 years or to 85 % of all WEEE produced in Latvia • Recycling targets depend on the type of WEEE and fluctuate between 55 % and 85 % of collected WEEE (from 1 July 2018 and increasing to 2021) • The volume of used tyres to be recycled and recovered (regenerated) from the amount collected and handed over after 2016 to be reached by 31 December each year is 80 % • Recycle 80 % of collected waste by 2030 — all types of waste are included
Lithuania	From 2016, recycling and recovery of tyres (80 %), oil or petrol filters for internal combustion engines, intake air filters for internal combustion engines (80 %), and hydraulic shock-absorbers for motor vehicles (80 %)
Montenegro	• An established waste management system: by 2020, at least 50 % of the total quantity of collected waste (glass, paper, metal and plastic) is to be recycled, as well as at least 70 % of non-hazardous construction and demolition waste • By 2020, landfilling of biodegradable waste reduced to 35 % compared with 2010 • 95 % of total generated waste is to be collected by 2030

Country	Targets reported in the country profiles
Netherlands	• By 2020, the annual volume of household residual waste will be a maximum of 100 kg per person; by 2025, the maximum will be 30 kg per person per year • By 2022, the volume of residual waste from companies, organisations and governments that is comparable to household residual waste will be halved compared with 2012 • By 2025, citizens and companies will use consumer goods in such a manner as to allow them to remain in the cycle; not littering will have become the standard
Poland	• By 2025, 60 % of municipal waste should be recycled • By 2030, 65 % of municipal waste should be recycled • By 2030, municipal waste landfilling reduced to a maximum of 10 % of municipal waste generated
Portugal	• Increasing the incorporation of waste into the economy from 56 % in 2012 to 68 % in 2020 and 86 % in 2030 • Achieving a selective waste collection rate of 47 kg/year per person by 2020 • Decoupling economic growth and waste production: reducing it from 0.10 tonnes of produced waste/EUR 1 000 generated wealth in 2008-2012 to 0.082 tonnes in 2020 • Reducing waste production by 15 % by 2020 • Reducing the landfill of biodegradable municipal waste by 35 % by 2020, relative to 1995 • Progressively eliminating waste disposal in landfill, with the overall aim of eradicating the direct deposition of waste in landfill by 2030 • Achieving a minimum 10 % reduction by weight of waste generated per person relative to 2012 and ensuring that this does not exceed 410 kg/year/person by 31 December 2020
Slovakia	• Recycling of metal packaging waste is to be 55 % and recycling of wood-based packaging waste is to be 25 % • The objective for biodegradable industrial waste is to reach 75 % material recovery by 2020, with 10 % energy recovery and a maximum of 5 % landfill • The objective for waste from ferrous and non-ferrous metals is 90 % material recovery by 2020, with zero energy recovery and a gradual decrease in landfill to a maximum of 1 % • The objective for waste tyres is 80 % material recovery by 2020, with 15 % energy recovery and a gradual decrease in landfill to a maximum of 1 % • The objective for waste oils is 60 % material recovery by 2020, with 15 % energy recovery and zero landfill
Slovenia	• By 2025, a prohibition on the dumping of waste that could be recycled will be implemented • By 2025, marine litter and food waste will be reduced by 30 %
Spain	• Construction and demolition waste: 10 % reduction in waste generated by 2020 relative to 2010 • By 2020, at least 50 % (by weight) recycling of domestic and commercial waste paper, glass, plastic, biowaste and other recyclables
Sweden	Recycling targets for packaging before and after 2020

	Before 1 January 2020 (%)	After 1 January 2020 (%)
Metal packaging (excluding metal packaging of beverages)	70	85
Paper packaging	65	85
Plastic packaging (excluding polyethylene terephthalate (PET) bottles)	30	50
Glass packaging	70	90
Metal packaging of beverages	90	90
PET bottles	90	90
Wood packaging	15	15
Packaging of other materials	15	15
Total packaging waste	55	65

<table>
<tr><th>Country</th><th>Targets reported in the country profiles</th></tr>
<tr><td>Switzerland</td><td>• The recovery of phosphorus from sewage treatment plants is going to be mandatory in 2026
• If the recycling share for PET plastics, aluminium and glass drops below 75 %, a deposit-based solution will be implemented</td></tr>
<tr><td>Turkey</td><td>• Reuse, recovery and recycling targets set by the By-Law on the Control of End-of-Life-Vehicles (ELVs)
Article 16 — (1) Parts from ELVs are reused if they comply with environmental and vehicle safety standards. Parts which are not reused are recycled or recovered. These steps are taken in conformity with environmental requirements such as emission and noise controls. Financial operators follow these criteria:
• reuse and recovery shall be 85 % by average weight per vehicle and year and reuse and recycling shall be a minimum of 80 % by average weight per vehicle and year for ELVs;
• starting 1/1/2020, reuse and recovery shall be increased to a minimum of 95 % by average weight per vehicle and year and reuse and recycling shall be increased to a minimum of 85 % by average weight per vehicle and year for ELVs.
<table><tr><th colspan="6">Annual recovery targets for packaging waste (%)</th></tr><tr><td>Year</td><td>Glass</td><td>Plastic</td><td>Metal</td><td>Paper/cardboard</td><td>Wood</td></tr><tr><td>2019</td><td>58</td><td>58</td><td>58</td><td>58</td><td>13</td></tr><tr><td>2020</td><td>60</td><td>60</td><td>60</td><td>60</td><td>15</td></tr></table></td></tr>
<tr><td>United Kingdom</td><td>England:
• Work in partnership with food businesses 'from farm to fork', through the Courtauld Commitment to deliver a 20 % per capita reduction in food waste by 2025
• Eliminate all avoidable plastic waste by the end of 2042, including extending the 5p plastic charge to all retailers
• No food waste entering landfill by 2030, ensuring that a valuable resource remains in our economy
• A 20 % reduction in food and drink waste arising in the United Kingdom (Courtauld Commitment England)
• For clothing, a 15 % reduction in waste to landfill from 2012 to 2020 (sustainable clothing action plan)
• For clothing, a 3.5 % reduction in waste arising over the whole product life cycle (sustainable clothing action plan)
• Recycling targets set by the Mayor of London and national government of 65 % of municipal recycling by 2030
Scotland:
• A ban on biodegradable municipal waste going to landfill from 1 January 2021
• 60 % recycling/composting and preparing for reuse of waste from households by 2020
• Reduce waste arising by 15 % against the 2011 baseline of 13.2 million tonnes by 2025
• No more than 5 % of all waste to go to landfill by 2025, (following ban on biodegradable municipal waste to landfill from 2021)
• 70 % recycling/composting and preparing for reuse of all waste by 2025
• Reduce all food waste arising in Scotland by 33 % by 2025 and work with industry to reduce on-farm losses of edible produce
Wales:
• To reduce waste by 65 % by 2050
• Recycling target of 70 % is set for 2025
• Energy from waste is capped at 25 % by 2025
• To reduce landfill to less than 5 % by 2025
• Halve the amount of food being wasted in Wales by 2025 (under consultation)
• Recycling target of 80 % for municipal waste recycling for 2030 (under consultation)</td></tr>
</table>

Country	Targets reported in the country profiles
	Other targets on resource use, land use, public procurement (six countries, 21 targets)
France	• A 30 % decrease in office paper consumption by 2020 • A 40 % use of recycled paper (defined as paper containing more than 50 % recycled fibres) by 2020, with the remaining part coming from sustainably managed forests • A decrease in the use of phytosanitary products (pesticides, fungicides and herbicides) of 25 % by 2020 and 50 % by 2050 in relation to 2015
Latvia	• 18 % of Latvia's territory to achieve specially protected nature area status • Agricultural land maintained biologically (percentage of total agricultural land managed) — 15 % of managed agricultural land under organic farming • Ecological footprint — below 2.5 global hectares per inhabitant (holistic reduction of all kinds of resources calculated as an integrated indicator)
Montenegro	• A reduction in DMC of 20 % by 2030 in relation to the average for 2005-2012, i.e. an annual DMC reduction of 1.1 % until 2030 or a DMC reduction of 1 tonne per capita by 2030 • An increase in resource productivity in the services sector (tourism) of 164.6 % by 2020 compared with 2013 • An increase in resource productivity in agriculture and fisheries of 93.6 % by 2020 compared with 2013 • An increase in resource productivity in the construction industry of 201.1 % by 2020 compared with 2013 • An increase in resource productivity in the energy sector of 158.4 % by 2020 compared with 2013 • An increase in resource productivity in the processing industry of 9.7 % by 2020 compared with 2013 • The proportion of construction/built-up areas over the total area of coastal municipalities does not exceed 10 %
Portugal	Public procurement strategy goals For direct and indirect public administration: • Goal 1 — 60 % of pre-contractual public procurement procedures for goods and services covered by the green public procurement national strategy for 2020 include environmental criteria • Goal 2 — 60 % of the value associated with public pre-contractual procurement procedures for goods and services covered by the green public procurement national strategy for 2020 include environmental criteria For the state business sector: • Goal 1 — 40 % of public pre-contractual procedures for the acquisition of goods or services covered by the green public procurement national strategy for 2020 include environmental criteria • Goal 2 — 40 % of the value associated with pre-contractual public procurement procedures for goods and services covered by the green public procurement national strategy for 2020 include environmental criteria
Serbia	• Increase the functionality of the ecological network of Serbia from 5 % to 50 % during the period 2018-2025 • Increase the size of protected areas in relation to the total area of Serbia from 7.4 % to 12 % during the period 2018-2025 • Increase the area of the ecological networks of Serbia in relation to the total area of Serbia from 20 % to 25 % during the period 2018-2025
Wales (United Kingdom)	Ecological footprint is reduced to the global average availability of resources — 1.88 global hectares per person by 2050

Annex 4 Examples of resource efficiency/circular economy initiatives from subnational to local levels

Examples of organisational approaches for resource efficiency/circular economy initiatives from subnational to local levels

Country/region	Examples of organisational approaches
Belgium (Flanders)	**Sector federations are partners in Circular Flanders.** Circular Flanders is a private-public partnership in which several important sectoral federations are actively involved as partners. Agoria (technology sector), Fevia (food sector), Vlaamse Confederatie Bouw (VCB) (building sector), Essenscia (chemical industry and life sciences) and Go4circle (environmental companies) also pool resources to make the transition to a circular economy in Flanders possible. Circular Flanders works closely with the key Flemish industrial clusters Catalisti (sustainable chemistry and plastics), SIM (materials), Smart Energy Region (energy) and VIL (transport and logistics). For an overview of the many initiatives taken by different stakeholders in Flanders, see http://www.vlaanderen-circulair.be/nl/doeners-in-vlaanderen (in Dutch).
Belgium (Wallonia)	In Wallonia, the circular economy activities were developed as part of the **competitiveness clusters policy** in the context of the smart specialisation strategy, supported by the European Regional Development Fund (ERDF), which focuses on the joint use of material flows and energy. A competitiveness cluster is a grouping of companies, training centres and public or private research units in Wallonia committed to a partnership-based approach intended to generate synergies in relation to common projects of an innovative nature. The six sectoral competitiveness clusters in Wallonia are agro-industry; aerospace; green chemistry and durable materials; biotechnology and health; transport and logistics; and mechanical engineering. For further information, see http://clusters.wallonie.be/federateur-en.
Denmark	At **Kalundborg Symbiosis**, public and private companies buy and sell waste from each other in a closed cycle of industrial production. A variety of by-products are traded, such as steam, ash, gas, heat, sludge and others that can be physically transported from one company to another. Kalundborg Symbiosis is the world's first fully functioning example of industrial symbiosis. From 2011 to 2015, added value increased by 32 % on average for companies in Kalundborg, as opposed to 4 % for Denmark in general. For further information, see https://issuu.com/vaeksthus/docs/v__kstvilk__r_2017_-_kalundborg (in Danish); http://www.symbiosis.dk/en.
Finland	**Finnish Sustainable Communities** (FISU) is a network of frontrunner municipalities aiming to achieve carbon neutrality, zero emissions, zero waste and globally sustainable consumption by 2050. In FISU, municipality authorities, companies and other local stakeholders build a common vision and roadmap to achieve their targets. Currently the municipalities of Forssa, Ii, Jyväskylä, Kuopio, Lahti, Lappeenranta, Turku and Vaasa belong to the FISU network, which is co-ordinated by the Finnish Environment Institute (SYKE) and Motiva, a sustainable development company. For further information, see http://www.fisunetwork.fi/en-US (in English). http://www.fisunetwork.fi/fi-FI/Tiekartat_ja_tyokalut (in Finnish). The **Finnish Industrial Symbiosis System** (FISS) was launched in September 2014. Motiva is the national coordinator, with regional partners supporting businesses in their respective areas. FISS is based on the collection of resource information, matchmaking and active facilitation. FISS also runs a synergy database (not publicly available) to identify possible synergies and collect information on the impact of industrial symbiosis on the environment and economy. At present, around 730 companies from different sectors are involved all over the country. For further information, see http://www.industrialsymbiosis.fi.

Country/region	Examples of organisational approaches
Germany	A circular and resource economy cluster has been working since 2012 as a **cross-border platform of medium-sized companies** in Saxony-Anhalt, Saxony and Thuringia. The aim is to organise cooperation and development projects between companies, associations, educational and research institutes, other service providers and politicians and administrations. The cluster is co-ordinated by the Central German Waste Management Association. Development of regional value chains is one of the main targets, but the actions also include the building of an internationally active training network (the Virtual Academy of Circular Economy and Resource Management) and European cooperation with other resource management clusters.
Ireland	Part of the national waste prevention programme, the **Local Authority Prevention Network** (LAPN), which started as a pilot in 2005, is now a well-established network involving all local authorities (municipalities) in Ireland. LAPN provides funding, training, technical support and networking for local authority staff, with a view to supporting sustainability and waste prevention initiatives at the local level. The wide scope of activities undertaken by LAPN participants works towards creating more sustainable communities in Irish society. For further information, see http://localprevention.ie.
Slovakia	**Mobilising institutional learning for better exploitation of research and innovation for the circular economy** (Moveco). The Slovak Business Agency has been cooperating on the Moveco Interreg project to explore the potential of extended producer responsibility schemes to improve the design of products. The Moveco partnership comprises representatives from various backgrounds, including policymakers, business support organisations, research and development institutions, and civil society organisations — all committed to unleashing the potential of the circular economy in the Danube region.
Slovenia	**Wcycle project**, with a budget of USD 50 million for the period 2017-2020, aims to transform Maribor, the second largest city, into a circular economy municipality. The underlying idea is to focus on the communication among public utilities, since waste from one sector can be used as a new material in another. Wcycle aims to transform waste into new useful materials and consequently lower the amount of all kinds of waste — municipal waste, construction waste, biological materials, etc. Other goals are to recycle soil and produce energy. The project will also create about 100 new jobs, including 20 % with higher education. For further information, see https://www.circularchange.com/news/the-strategy-for-the-transition-of-the-city-of-maribor-to-the-circular-economy?rq=Wcycle.
Turkey	The Bursa Eskişehir Bilecik Development Agency (BEBKA) initiated a **regional industrial symbiosis programme** in 2014 to promote the efficient use of resources to ensure the sustainable development of the region. The main goal of the programme is to raise awareness and encourage the dissemination of industrial symbiosis applications in the region by determining existing potential and strategies through regional and sectoral analyses, carrying out feasibility studies, conducting communications activities and implementing the planned work by creating an infrastructure for the sustainability of industrial symbiosis applications.
United Kingdom (England)	There is a city partnership group in Manchester in which WRAP, the waste and resources action programme, and the Greater Manchester Waste Disposal Authority (GMWDA) have jointly set up **Resource Greater Manchester** to provide a strategic programme of work to help the GMWDA realise its ambitions of zero waste by achieving improvements and greater efficiencies in waste prevention, reuse and recycling. For further information, see https://zerowastegm.co.uk/resource-greater-manchester.
United Kingdom (Scotland)	**Zero Waste Scotland** is trialling a cities and regions approach, making the most of synergies at a more local level, as cities are an ideal location for new circular business models, such as reverse logistics, material recovery, reuse, leasing and sharing. With funding from both the Scottish government and the ERDF, Zero Waste Scotland is currently supporting four circular cities and regions: Glasgow, Tayside, north-east Scotland and Edinburgh. Across each city and region, the project aims to open new revenue streams, increase competitive advantage and realise financial savings. These initiatives are being driven in each area by business engagement partners.

Examples of projects that aim to provide tools, guidance and good practice examples on local resource efficiency/ circular economy initiatives

Country/region	Description of initiative
Austria	The **Resourceneffiziente Gemeinde** project, financed by the Austrian programme for rural development, aims to raise awareness and strengthen the exchange of experience at local and regional levels for more resource-efficient ways of life. Municipalities are invited to participate in interactive workshops and test their potential for resource prevention and resource efficiency by taking an online check. The project is carried out by Resource Forum Austria, the Resource Management Agency and the Austrian Association of Municipalities in cooperation with the Ministry for Sustainability and Tourism (BMNT). For further information, see http://gemeindebund.at/ressourcen (in German).
France	As part of the **Zero Waste Zero Wastage** programme initiated in 2015, the winners of calls for proposals can sign a waste and circular economy (CODEC) contract. The aim of this project is to support voluntary communities in an exemplary and participative approach to promote the circular economy, through the mobilisation of all local stakeholders — associations, companies, the public, administrations and businesses. In total, 153 territories have been designated as winners. For further information, see http://www.optigede.ademe.fr/territoires-zero-dechet-zero-gaspillage (in French).
Finland	The **Helsinki Metropolitan Smart & Clean Foundation** was established in 2016 with the aim of making the Helsinki metropolitan area the world's best testing area for smart and clean solutions. The aim is to boost cooperation between cities, businesses, research and development organisations, the state and citizens. Smart & Clean operates in five areas: (1) smart mobility; (2) the circular economy; (3) net positive sustainably built environments; (4) clean energy; and (5) solutions for resource-wise citizens. For further information, see: https://smartclean.fi/en.
Ireland	In Ireland, the **Resource Efficiency Toolkit** (http://toolkit.localprevention.ie/index.html) was developed as a guide for municipalities and other organisations to implementing waste prevention programmes. The toolkit was developed using the experiences and materials already produced by participants of the Environmental Protection Agency-led local authority prevention demonstration (LAPD) programme and the LAPN programme. It provides a step-by-step approach to resource efficiency, and gives tips and links to the materials in the LAPN project catalogue along the way. For further information, see http://repository.localprevention.ie.
Poland	The national fund for environmental protection and water management (NFEP&WM), five municipalities and another five municipalities (districts) agreed, in 2017, to pilot the implementation of **circular economy and resource efficiency projects** at the local level. The programme, with funding of about EUR 11 million, will support the implementation of measures by municipalities in the transition to a circular economy and resource efficiency model, with a particular focus on local knowledge and public education. Examples of actions eligible for financial support include separate waste collection, recycling and prevention; circular economy in households, agriculture and the processing of agricultural products; material and water saving as well as a decrease in waste generation by households, municipal management and local enterprises; and education for the circular economy related to social behaviour, building the competencies of leaders, sharing experience and good practice, and providing necessary infrastructure. For further information, see http://nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/gospodarka-o-obiegu-zamknietym/ (in Polish).

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