HCSS Geo-economics

Moving towards circularity in Western Europe

Exploratory report on material resource and circular economy policies of the EU and neighboring countries of the Netherlands

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Monitoring en Sturing Circulaire Economie

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List of abbreviations

ADEME	Agence de l'environnement et de la maîtrise de l'énergie (French Environment and Energy Management Agency)
BEIS	UK Department for Business, Energy and Industrial Strategy
BMBF	Bundesministerium für Bildung und Forschung (German Federal Ministry for Education and Research)
BMU	Bundesministerium für Umwelt, Naturschutz und Nukleare Sicherheit (German ministry for Environment, Nature Conservation and Nuclear Safety)
BMWi	Bundesministerium für Wirtschaft und Energie (German Federal Ministry for Economic Affairs and Energy)
BSI	British Standards Institution
BU	Benelux Union
CE	Circular Economy
CEID	Circular Economy Initiative Deutschland
CEPRC	Circular Economy Policy Research Center
CGEDD	Conseil général de l'Environnement et du Développement durable (French General Council for Environment and Sustainable Development)
CIRIDD	Centre international de ressources et d'innovation pour le développement durable (French International Center for Resources and Innovation for Sustainable Development)
CRM	Critical Raw Material
CSCP	Centre on Sustainable Consumption and Production
DEFRA	United Kingdom Department for Environment, Food & Agricultural affairs
DREAL	Directions régionales de l'environnement, de l'aménagement et du logement (French Regional Directorates for Environment, Land Planning and Housing)
EC	European Commission
EIP	European Innovation Partnership
EPR	Extended Producer Responsibility
ERDF	European Regional Development Fund
EU	European Union
EWI	Departement Economie, Wetenschap en Innovatie (Flemish Department of Economy, Science and Innovation)
FEB	Federation of Enterprises in Belgium

INEC	French National Institute for Circular Economy
KrWG	Kreislaufwirtschaftsgesetz – German Circular Economy Law
MINEFI	French Ministry of Economy and Finance
MTES	French Ministry for Ecological and Inclusive Transition
NABU	Naturschutzbund Deutschland
NISP	UK National Industrial Symbiosis Program
NL	The Netherlands
OECD	Organization for Economic Cooperation and Development
OVAM	Openbare Vlaamse Afvalstoffenmaatschappij – Public Waste Agency of Flanders
PBL	Netherlands Environmental Assessment Agency
PIB	Partners in International Business
PNSI	Programme National de Synergies Inter-Entreprises
RE	Resources Efficiency
REBMs	Resource efficient business models
RETech	German Recycling Technologies and Waste Management Partnership
RMI	Raw Materials Initiative
SDG	Sustainable Development Goal
SEAPs	Sustainable Energy Action Plans
SITC	Standard International Trade Classification
SME	Small and medium-sized enterprises
SuMMA	Sustainable Materials Management Center
TAIEX-EIR P2P	Technical Assistance and Information Exchange – Environmental Implementation Review Peer to Peer
TM	Transition Management
TNM	Transitienetwerk Middenveld
TNO	Toegepast Natuurwetenschappelijk Onderzoek – Netherlands organisation for applied scientific research
UBA	German Federal Environment Agency
UK	United Kingdom
UN	United Nations
WRAP	Waste and Resources Action Program

Executive summary

As climate change is rapidly accelerating and the certainty of trade flows becomes more volatile in a fragmented world order, European countries grapple with their resource dependencies and try to become more self-sufficient. Just like the European Commission, the Netherlands is undergoing policy developments to close consumption and production cycles and use resource materials more efficiently, with the final aim of achieving a circular economy by 2050.

The concept of a circular economy seeks to achieve a major transformation of our current production and consumption patterns. Moving towards a circular economy presents a number of opportunities, including reduced pressures on the environment, less dependency on the (external) supply of material resources and energy, increased competitiveness and innovation, jobs and broader economic growth. However, it also poses serious challenges, such as financing, key economic enablers, demands for new skills, adapted consumer behavior, business model transformation, and multi-level governance.[1]

While the Netherlands is substantially committed towards a circular economy transition, it also recognizes that this is an inherently global challenge that requires joint efforts at supranational and bilateral levels. Raw material flows and production chains do not stop at the Dutch border. To this end, EU policy can be an important booster to achieve national circular economy targets and goals. Currently, the diverse approaches in the EU towards achieving circularity limit cross-border collaboration and the benefits these may offer. Therefore, it is important for policy makers in the Netherlands to keep track of what is happening in the field of the circular economy in its neighboring countries, learn from them, and develop partnerships along the way.

Study objective

To support the Netherlands Environmental Assessment Agency (PBL) in its task to develop the circular economy knowledge base for the Netherlands, this HCSS exploratory report provides a quick scan of the content, direction, and motivations underlying the current circular economy policies and related material resource policies of the EU and a number of countries neighboring the Netherlands: Flanders (Belgium), France, Germany and the United Kingdom (UK). This analysis also includes an assessment of the different interpretations these neighboring countries have of the terms 'circular economy' and 'resource efficiency', the key stakeholders involved, and identifies potential areas for cross-border cooperation with the Netherlands.

Definition and scope

In the absence of a single interpretation of circularity, this study assumes the European Commission definition used in its Communication 'Closing the Loop – An EU Action

[1] Didier Bourguignon, "Closing the Loop: New Circular Economy Package," EPRS | European Parliamentary Research Service (Brussels: European Parliament, January 2016).

Plan for the Circular Economy' (2015) that refers to the circular economy as an "economy where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized."[2].

Using the above definition, HCSS will adopt a similar **narrow interpretation of the circular economy** – one that is primarily focused on physical and material aspects and places an emphasis on creating closed loops of material flows, waste management, and reduced pollution in product life cycles.[3] In other words, **factors that affect the use and management of material resources** with the potential to achieve sustainable competitive advantages for the economy.

Hence, when assessing countries' circular economy approaches, policy areas such as resource efficiency, raw materials, security of supply, and waste management must be considered, as well as relevant environmental and industrial policies. Effectively, these areas constitute the central elements of a narrow interpretation of the CE, as described above. The eight main CE processes underlying these policy areas are summed up in Figure 1 below.

Use fewer primary resources
• Recycling • Efficient use of resources • Utilization of renewable energy sources
Maintain the highest value of materials and products
• Remanufacturing, refurbishment, and reuse of products and components • Product life extension
Change utilization patterns
• Product as a service • Sharing models • Shift in consumption patterns

Source: Rizos et al. (2017), adaptation from Rizos et al. (2018)

Figure 1. Central processes of the Circular Economy

Given the above narrow interpretation, this quick scan will *not* focus on a broader interpretation of the CE that highlights the importance of sustainable energy supply, energy efficiency, conservation, land management, soil protection and water management.[4] While these elements are all part and partial of the bigger CE transition,

[2] "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Closing the Loop: An EU Action Plan for the Circular Economy (COM(2015) 614 Final)" (European Commission, December 2, 2015), 2, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614.
[3] Vasileios Rizos et al., "The Role of Business in the Circular Economy" (CEPS, March 26, 2018), 5, https://www.ceps.eu/ceps-publications/role-business-circular-economy-markets-processes-and-enabling-policies/.
[4] Rizos et al., 3.

they form part of a larger cluster of policy areas that contribute to rather than define circular use and management of material resources.

Moreover, as the primary research goal of this study is to provide a *quick scan* of CE (related) policies in the EU and NL neighboring countries, a number of topics fall outside of the study's scope. They include:

- The current state of the Netherlands' own CE policies and stakeholders;
- The effectiveness and efficiency of the policies in NL neighboring countries;
- The operation of individual policy instruments;
- Lessons for the Netherlands based on detailed and specific evaluations of the operation of policy instruments.

The **key drivers** towards circular material resource policies can be broadly summarized for all countries or regions as **economic security, competitiveness, and environmental considerations**. However, national emphases differ concerning the way countries understand and have approached circularity so far. Overall, all countries are now aligning their circular material resource approaches with the EU, seeing this as a comprehensive project that encompasses more than just waste management but rather entire life cycles. While the Netherlands' approach is fairly comprehensive, aligning with the EU understanding and approach, Flanders' distinctive focus lies on multi-stakeholder engagement, France's on consumption behavior, Germany's on product design and material flows, and the UK's on shielding economic sectors from environmental impacts and dependencies.

In terms of **policy development**, the Netherlands was among the first in the EU to introduce an explicit CE strategy in 2016, aligning with EU ambitions and initiatives. Flanders followed in 2017 and France in 2018, similarly inspired by the EU's *Circular Economy Package* presented in its *Action Plan* in 2015. While Germany does not yet have an integrated CE action plan, it has adopted comprehensive resource efficiency policies already since 2012, the most recent one having been adopted in 2016. The UK has initiated its CE transition process through other policies, the 2018 Plastics Act entailing elements of resource efficiency and circularity being the most current manifestation. This timeline is depicted in Figure 2 below.

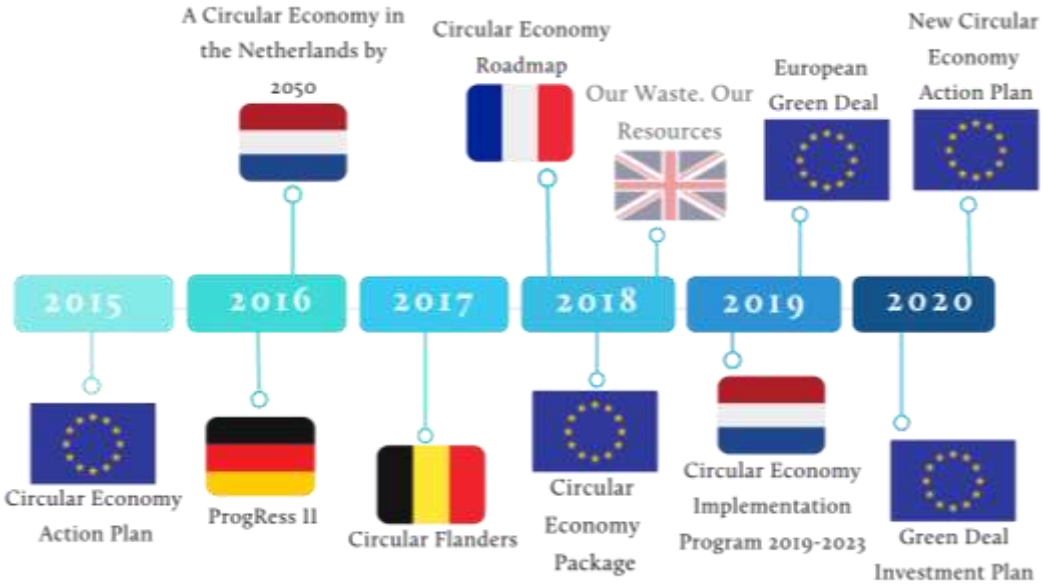


Figure 2. Timeline of Circular Economy strategic policy documents

Relevant **stakeholders** in the CE transition can generally be split into two groups: 1) governance and policymakers; and 2) research and implementation partners, although there can of course be overlap between the two. In terms of CE governance and policymaking, the majority of the countries researched have mandated their Ministries of Environment or Ecology to take on the lead policy responsibility, sometimes alongside other ministries. Specific elements or themes within the CE transition, such as industrial and energy policy and financing, are typically led by Ministries of Economy, Energy and/or Finance. Innovation actions, in turn, are more often the responsibility of Ministries of Education and Research. In all countries, CE research and implementation is carried out by various agencies, public-private partnerships, and specific for-profit and not-for-profit interest groups. To this end, all countries studied have some higher-level circular economy initiative, task force, or institute, connecting relevant business and trade, research and academia, as well as civil society networks. Many non-governmental initiatives work closely with public agencies to ensure concrete action plans are optimally aligned with broader CE targets and goals. The most relevant governance and policymaking actors are listed below in Figure 3, alongside a number of examples from the various countries' research and implementation actors.[5]

[5] The Netherlands has not been included in the stakeholder overview seen in Figure 3. The reason for this is that a detailed study of the Netherlands fell outside of the scope of this report. Further information about stakeholders, projects, and other approaches and practices in the Dutch CE can be found through, for example, the Netherlands Environmental Assessment Agency PBL, in e.g. Trudy Rood et al., "Circulaire economie in kaart" (The Hague: Planbureau voor de Leefomgeving, 2019), https://www.pbl.nl/sites/default/files/downloads/pbl-2019-circulaire-economie-in-kaart-3401_0.pdf.

	EU	Flanders	France	Germany	United Kingdom
Governance & policy	• Overarching institutions such as European Commission, Parliament, Economic and Social Committee • European Circular Economy Stakeholder Platform	• Ministry of Environment • Ministry of Economy and Innovation • OVAM Public Waste Agency of Flanders • Circular Flanders • Department of Economy, Science and Innovation	• Ministry for Ecological and Inclusive Transition • Ministry of Economy and Finance	• Federal Ministry for the Environment, Nature Conservation and Nuclear Safety • German Federal Environment Agency • Public entities e.g. the Deutsche Städtetag for communities' and cities' interests	• Department for Environment, Food and Rural Affairs • Department for Business, Energy and Industrial Strategy • British Standards Institution
Research & implementation	• European Environmental Agency • European Innovation Partnership on raw materials • Sustainable Procurement Resource Centre • LIFE Program • Circular Economy Stakeholder Platform	• Circular Economy Policy Research Center • VITO • Transitienetwerk Middenveld • The Shift	• General Council for Environment and Sustainable Development • Regional Directorates for Environment, Land Planning and Housing • French environment and energy management agency • National Institute Circular Economy • Association ORÉE	• German Mineral Resources Agency • Circular Economy Initiative Deutschland • German Recycling Technologies and Waste Management Partnership • VDI Centre for Resource Efficiency • Collaborating Centre on Sustainable Consumption and Production	• Waste and Resources Action Programme • Ellen MacArthur Foundation • Green Investment Group • Green Alliance • National Industrial Symbiosis Programme • Circular Economy Task Force

Figure 3. Relevant stakeholders in the CE transition in NL and neighboring countries (not exhaustive)

Three **main lessons** can be derived from comparing different regional and country approaches to achieving material resource circularity:

1. The circular economy needs to be addressed comprehensively while taking a multi-stakeholder approach paying respect to its multifaceted nature;
2. Cooperation on material resource use and circularity can be expanded by making use of existing EU platforms and initiatives, particularly to incentivize the private sector in participating in the transition;
3. Aligning strategies and working towards common monitoring and evaluation mechanisms amongst EU countries can maximize the joint progress and help to trace and compare progress in a consistent way.

While the Netherlands' positioning on and commitment to the CE is rather advanced compared to other European countries, the report concludes with **four key takeaways for the Netherlands to improve its current circularity strategy** based on circularity success stories of the EU and the selected countries for this study:

First, the Netherlands could further **expand cooperation** with the other countries addressed in this study in order to position itself as an international player when it comes to the CE. In this regard, practical commitments at local, national and international level could benefit from mutual knowledge exchange, innovation, awareness raising activities, and political action. **Existing EU platforms and initiatives provide vital resources** for joint projects and knowledge exchange and should be made use of.

Second, France and the UK have made strides in addressing the production side of CE through national schemes tackling **producer responsibility** – and in France to an extent also through consumer responsibility. Such initiatives, introducing a 'polluter pays' principle that should be applied to resource use in products and services, make it possible to hold businesses accountable for their products and treats any associated packaging issues as cornerstones to making societies and economies more circular. In particular, the French approach of increasing product warranty time, mobilizing industries and informing citizens about waste prevention and resource conservation (French 2019 anti-waste law), could serve as a role model of how countries can begin to transform consumption patterns as a whole.

Third, a number of UK (especially Wales and Scotland) initiatives can serve as inspiration for the Netherlands on how to **further incentivize the private sector** toward prioritizing regenerative design and resource reuse in their **business models**, while France's producer responsibility framework could form a complementary baseline for further development of responsible producer and consumer behavior in a CE.

Fourth, the Netherlands should continue to **align its CE strategy** with other countries. The former has a far-reaching and comprehensive strategy and policy framework that can serve as a model, while the latter can inspire the Netherlands to improve on its practical implementation. In this context, all countries addressed in this report (including the Netherlands) would benefit from a **common monitoring and evaluation mechanism** in order to track and compare progress and remaining obstacles in the quest towards achieving circular use of material resources.

1. Introduction

As the world order is becoming increasingly fragmented, climate change is rapidly accelerating, and the certainty of trade flows becomes more volatile, European countries grapple with their resource dependencies and try to become more self-sufficient. Just like the European Commission, the Netherlands is undergoing policy developments to close consumption and production cycles and use raw materials more efficiently, with the final aim of achieving a circular economy by 2050.

Moving towards a circular economy (CE) presents a number of opportunities, including reduced pressures on the environment, less dependency on the external supply of material resources and energy, increased competitiveness and innovation, new jobs and broader economic growth. However, it also poses challenges, such as financing, key economic enablers, skills, consumer behavior, business model transformation, and multi-level governance.[6]

While the Netherlands is making good progress towards a circular economy transition, it also recognizes that this is an inherently international challenge that requires joint efforts at supranational and bilateral levels. Raw material flows and production chains do not stop at the Dutch border. In fact, EU policy can be an important booster to achieve national CE targets and goals. Currently, the diverse approaches in the EU towards bringing about a CE limit cross-border collaboration and the benefits these may offer. To this end, it is important for policy makers in the Netherlands to keep track of what is happening in the field of the CE in its neighboring countries, learn from them, and develop partnerships along the way.

To support the Netherlands Environmental Assessment Agency (PBL) in its task to develop the CE knowledge base in the Netherlands, this HCSS report analyzes the content, direction, and underlying motivations of the current CE and related resource policies in the EU and four (near-) neighboring countries of the Netherlands: Flanders (Belgium), France, Germany and the United Kingdom (UK). The analysis includes an assessment of the different interpretations of the concepts 'circular economy' and 'resource efficiency', the progress being made related to CE and related material resource policies, and potential areas for cross-border cooperation.

In the absence of a single interpretation of a CE, this study assumes the European Commission definition used in its Communication 'Closing the Loop – An EU Action Plan for the Circular Economy' (2015) that refers to the CE as an economy "where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized".[7] Using the above definition, this study will use a narrow interpretation of the circular economy – one that is primarily focused on physical and material aspects and places an emphasis on creating closed

[6] Bourguignon, "Closing the Loop: New Circular Economy Package."
[7] "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Closing the Loop: An EU Action Plan for the Circular Economy (COM(2015) 614 Final)," 2.

loops of material flows, waste management, and reduced pollution in product life cycles. In other words, factors that affect the use and management of material resources.

Using the above definition and scoping, this study seeks to answer the following research questions:

- How are the terms 'circular economy' (CE) and 'resource efficiency' (RE) interpreted in the EU and countries selected for the analysis? Are there differences to be identified in comparison with the Netherlands and why? Can other relevant terms be identified in these countries?
- Which material resources policies are being put forward in neighboring countries?
- What are the driving forces in neighboring countries to pursue certain material resources policies?
- What are the most important stakeholders in the neighboring countries regarding the CE?
- Insight into the economic structure of these countries; which economic sectors are important from the perspective of a resource-efficient CE?
- Where are the possibilities for cross-border cooperation for the Netherlands?
- What are key takeaways for the Netherlands at the level of policy strategy and approach?

As the primary research goal is to assess CE (related) policies in the EU and NL (near-) neighboring countries, a number of topics fall outside of the study's scope. To this end, the following topics will **not** be addressed explicitly:

- The current state of the Netherlands' own CE policies and stakeholders;
- The effectiveness and efficiency of the policies in the surrounding countries;
- The operation of individual policy instruments;
- Lessons for the Netherlands based on detailed and specific evaluations of the operation of policy instruments.

1.1 Research design

1.1.1 Definition and scope

This report explores circular economy policies of the EU and neighboring countries of the Netherlands. The concept of a circular economy, however, is quite broad and – while it is used extensively by government, business and academia – it is not framed or used in a consistent way. Therefore, in the absence of a single interpretation of a CE, this study assumes the European Commission definition used in its Communication 'Closing the Loop – An EU Action Plan for the Circular Economy' (2015) that refers to the CE as **an economy "where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste**

minimized."[8] The economic dimension of the CE plays a central role in the EU definition, as transition policies are framed as opportunities to transform the economy and create sustainable competitive advantages.

Using the above definition, this study will use a **narrow interpretation of the circular economy** – one that is primarily focused on physical and material aspects and places an emphasis on creating closed loops of material flows, waste management, and reduced pollution in product life cycles. In other words, factors that affect the **use and management of material resources.** The study will *not* focus on a broader interpretation that highlights the importance of sustainable energy supply, energy efficiency and conservation, land management, soil protection and water management.[9]

As of now, there are a number of policy areas related to the CE that are "often approached in isolation in policy, in technology, and in research and innovation."[10] All of these areas constitute vital elements of what a comprehensive CE approach needs to entail (See Figure 4). Hence, when assessing countries' CE approaches, policy areas such as resource efficiency, raw materials, security of supply, and waste management must be considered, as well as relevant environmental and industrial policies. Effectively, these areas constitute central elements of a narrow interpretation of the CE, as described above.

Use fewer primary resources
• Recycling • Efficient use of resources • Utilization of renewable energy sources
Maintain the highest value of materials and products
• Remanufacturing, refurbishment, and reuse of products and components • Product life extension
Change utilization patterns
• Product as a service • Sharing models • Shift in consumption patterns

Source: Rizos et al. (2017), adaptation from Rizos et al. (2018)

Figure 4. Central processes of the Circular Economy

[8] "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Closing the Loop: An EU Action Plan for the Circular Economy (COM(2015) 614 Final)," 2.
[9] Rizos et al., "The Role of Business in the Circular Economy," 3.
[10] Mieke De Schoenmakere et al., *Paving the Way for a Circular Economy: Insights on Status and Potentials*, ed. Bart Ullstein and Helen de Mattos, European Environment Agency Report 11 (Luxembourg: Publications Office of the European Union, 2019), 34, http://publications.europa.eu/publication/manifestation_identifier/PUB_THAL19014ENN.

1.1.2 Approach and Methods

Countries in the EU have approached the road towards a circular economy in different ways, leading to a somewhat fragmented picture of the progress made so far. In order to capture the diverse ways in which countries are approaching sustainable resource use, and to avoid a top-down frame of reference that may omit promising initiatives, HCSS has looked at policy drivers from a region- or country-specific perspective. Relevant interpretations, understandings, approaches, motivations and targets are presented from the region/country's perspective. This explains why in some chapters, a certain policy area, e.g. product design, might be mentioned (because it matters from its RE/CE perspective) whereas for another country this is not the case (being rather irrelevant). HCSS chooses this approach because, in addition to providing 'domestic lenses', it provides better insights into the evolution of policies over time. Some countries, for example, may have already made substantial progress on resource efficiency and waste management while lacking a comprehensive approach for achieving a CE. By focusing only on the latter, we might miss important progress made in relevant policy areas.

For the purposes of this exploratory report, HCSS undertook an extensive literature review to assess the Netherlands' (near-) neighbors' and the EU's policies and approaches regarding material resource use and management. Examining newspaper and scholarly articles, policy documents and legislation, it was possible to identify developments, discourses, approaches and key drivers underlying these. Since the evolution of these policies differs, this approach provides insights into country-level drivers and approaches towards achieving a CE,[11] and where countries are leading and trailing in terms of the Netherlands and the EU.

The main output of this report is a quick scan of the EU and selected countries' approaches and level of progress vis-à-vis the circular economy in general and material use and management in particular. Building on the narrow interpretation of the CE, HCSS opted not to cover *all* CE related policies in detail. Similarly, in terms of stakeholders, HCSS chose to focus on the key public and private actors responsible for the steering and implementation of CE and material resource policy. Given the complex inter-sectoral, multi-level playing field involved in the transition to a circular economy, a mapping of all relevant actors would constitute an entire report in itself. Nonetheless, we feel a snapshot of the most important actors provides a good sense of where key roles and responsibilities are delegated.

1.1.3 Data sources: justification and use

In support of the exploration of country level CE policies, this report draws upon open source data in order to show trends within the CE framework for the EU and selected

[11] It must be pointed out that the conclusions drawn from this approach were derived from HCSS' assessments based on available open-source information.

countries of interest. Country level data is drawn from Eurostat and UN Comtrade. For the United Kingdom, Eurostat and UN Comtrade data is supplemented by data published by DEFRA statistics (the United Kingdom department for Environment, Food & Agricultural affairs).

The above data sources have been selected for the following reasons:

- Eurostat standardizes data across European countries that may have different methods of data measurement or reporting, making it possible to reliably compare data between countries;
- The international trade data published by UN Comtrade is more up to date than is available from competing sources;
- The analysis drawn from UN Comtrade data can be more accurately linked to the current situation than can be drawn from other sources.

UN Comtrade data is mainly used to analyze critical raw material (CRM) imports into the countries of study. To this end, this report uses the third list of CRMs outlined by the European Commission in 2017 to identify relevant CRMs. UN Comtrade data on individual CRMs falls under the Standard International Trade Classification at the HS6 level. In using this classification, there were a small number of disparities when compared to the EU Commission reporting of CRM data. Where there is disparity between SITC and the EC, the following classifications were used; Germanium, Gallium, Hafnium and Vanadium appear in the categorization as Other Metals. Helium is included as Rare Gases. Fluorspar is included as acid grade, which accounts for 65% of the market.

When looking to European level data, the report uses the EU28 grouping which includes the United Kingdom. Since the UK is a country of analysis and the latest available data stems from 2018, this suits the goal of this study. When assessing security of supply, this report will not deal with the risks associated with the stock of natural material resources. Instead, it will consider the geopolitical factors that are associated with international trade in CRMs, including e.g. the deterioration of relations between international actors that could impact CRM availability. In the analysis of imports into the EU28 of CRMs, the data indicates that there is a large amount of intra-European trade. Since the four countries assessed in the study are not naturally resource wealthy in CRMs, it is likely that these countries appear in the data as re-exports. However, HCSS opted to focus on trade flows, which may be between European countries, rather than delve into the global mining of critical raw materials to provide insights into the EU's security of supply.

1.1.4 Structure of the report

This report is structured in seven chapters. Chapter 2 elaborates on the EU circularity and material resource policy priorities. Chapters 3 through 6 assess national circular economy and related resource policies and approaches in Flanders (Belgium), France,

Germany and the United Kingdom. For comparability, the EU and country chapters have an identical structure, starting with an overview of the EU/country's understanding and interpretation of the key terms related to CE and material resource use, followed by a section on relevant stakeholders. Then, relevant policy developments are presented. This can entail a focus on CE policy areas such as raw materials use, security of supply, product design, and waste management. The country chapters conclude with a section on the potential for cooperation with the Netherlands, before concluding with a recap of the main takeaways. The final Chapter 7 draws comparisons between the different countries assessed and provides the main conclusions and recommendations of the study.

2. European Union

Summary. The EU is committed to becoming a leader in a CE transition. Its CE thinking and policies have been driven by economic and environmental considerations, such as global developments stressing resource scarcities, dependencies, and unsustainable consumption patterns. Following the adoption of the Commission Communication 'Closing the Loop – An EU Action Plan for a Circular Economy', a broader package of initiatives has been introduced and benchmarks set to transform the EU's economic model into a circular one.

In terms of implementation and progress, the EU depends on its Member States and their willingness to adopt such a comprehensive approach. Apart from this, there could also be more coordination between various policy sections related to the CE. The Netherlands' CE transition efforts align – at least on paper – to a great extent with the goals set forth at the EU level, constituting ideal conditions for cooperation. The Netherlands could make use of and is even working to improve upon existing EU frameworks in order to ensure fruitful cooperation and strive for alignment with the European Commission's CE monitoring framework in order to ensure common standards and baselines for evaluating the CE (transition).

2.1 Resource efficiency and circular economy in the European context

2.1.1 Circular economy

At EU level the Circular Economy (CE) is defined as an **economic model** based, among other things, on sharing, leasing, reusing, repairing, refurbishing, and recycling in an (almost) closed loop, which aims to retain the **highest utility and value of products, components, and materials** at all times.[12] Thereby, the life cycle of products is extended. In practice, CE implies reducing waste to a minimum and keeping products' materials within the economy wherever possible.[13] This is a **departure from the traditional, linear economic model**, which is based on a take-make-consume-throw away pattern.

2.1.2 Resource efficiency

For the EU, the European Commission defines resource efficiency as **using the earth's limited resources in a sustainable manner** while **minimizing impacts on the environment**, allowing the European economy to create more with less and **delivering**

[12] Bourguignon, "Closing the Loop: New Circular Economy Package"; "Circular Economy | EPRS | European Parliament," accessed January 30, 2020, https://www.europarl.europa.eu/thinktank/infographics/circulareconomy/public/index.html.
[13] European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Closing the Loop: An EU Action Plan for the Circular Economy (COM(2015) 614 Final)" (European Commission, December 2, 2015), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614.

greater value with less input.[14] The general *Union Environment Action Programme to 2020* outlines a 2050 vision of turning the EU into a resource-efficient, green, and competitive low-carbon economy.[15] In this sense, resource efficiency involves **transitioning from linear economic models** – where products become waste after use – **to a circular economy** as outlined above.

2.2 Policy developments towards a resource-efficient circular economy

In the past decade, the EU's CE research and policy direction expanded outside the realm of resource management alone, in strategic frameworks and action plans concerning the low-carbon economy, climate-neutral economy, circular economy, and bio-economy.[16] In Annex 1 it is laid out how the most important competences and laws pertaining to raw materials and other forms of material resources are covered in the EU's Treaties.

On an overall level, the EU's circular economy approach can be traced back to economic and environmental considerations and policy evolutions over the past two decades.[17] Below, the key drivers are presented in a nutshell, before this chapter dives into a more detailed outline of how these evolved.

Key drivers of the EU's circular material resource policies

- Ensuring and boosting economic growth and competitiveness
- Protecting the economy from resource scarcities and dependencies
- Maintaining secure and sustainable access to raw materials
- Positioning as international leader

In the following sections are outlined the relevant policy developments that help make up the current material resources policies underlying the EU's circular economy strategy, namely:

- Raw Materials and Security of Supply;
- Resource Efficient Europe;

[14] "Resource Efficiency - Environment," European Commission, July 8, 2019, https://ec.europa.eu/environment/resource_efficiency/.
[15] European Commission, "EU RE Scoreboard 2015."
[16] De Schoenmakere et al., *Paving the Way for a Circular Economy*, 7; European Commission, "Communication from the Commission to the European Council, The European Economic and Social Committee and the Committee of the Regions - Tackling Challenges in Commodity Markets and on Raw Materials" (European Commission, 2011), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0025; European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Innovating for Sustainable Growth: A Bioeconomy for Europe (COM(2012) 60 Final)" (European Commission, 2012); European Commission, "Closing the Loop: An EU Action Plan for the Circular Economy"; European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — A Clean Planet for All: A European Strategic Long-Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy (COM(2018) 773 Final)," 2018; European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A Sustainable Bioeconomy for Europe: Strengthening the Connection between Economy, Society and the Environment (COM(2018) 673 Final)," October 11, 2018.
[17] "Closing the Loop: An EU Action Plan for the Circular Economy" (European Commission, December 2, 2015), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614.

- Product design;
- Waste management;
- Industrial policy;
- European CE Action Plan and Package;
- European Green Deal.

2.2.1 Policy developments

Figure 5. Timeline: EU policy developments towards circular governance

Raw materials and security of supply

Raw materials are defined by the European Commission as follows: "a basic substance or mixture of substances in an untreated status which either enters a production process or is consumed directly. Traditionally, [raw materials] have undergone no treatment besides extraction from the environment. However, an increasing proportion of raw material inputs can be recovered from waste streams."[18]

There are a number of incentives for EU countries to pursue more sustainable material resources policies. One key driver is that the EU's industry and economy are reliant on international markets for access to many important raw materials, which the Commission has listed as 'Critical Raw Materials'. These critical raw materials (CRMs) are used in the following sectors that form a central part of sustaining Europe's economic growth:[19]

- Defense;
- Automotive manufacturing;
- Construction;
- Green technology;

[18] "Raw Materials," Eurostat, accessed March 16, 2020, https://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources-old/natural-resources/raw-materials.
[19] "Critical Raw Materials", CRM Alliance

- Consumer electronics;
- ICT.

Critical raw materials are often produced and supplied by third countries. They tend to be associated with supply risk and have high economic importance. In light of import dependence and increasing demand, therefore, CRM availability can be a liability in the security of supply for the European Union. Security of supply for CRMs can become threatened in different ways: first, due to volatility associated with international trade or market imbalances, and second, by geopolitical risks, such as export restrictions or unstable governance.[20] In the latter case, supply of the materials for industries that Europe relies upon are vulnerable to political and economic shocks that can dry up supply and damage crucial economic sectors.

The countries on which the EU depends for at least 1/5th of its supply of one or more of its CRMs are shown below in Figure 6, with the size of the bubble representing the number of CRMs the country in question critically supplies to the EU. Figure 6 illustrates, for example, that in 2018 China was the EU's largest supplier for CRMs, constituting over a third of the EU's CRM imports. Within the 10 CRMs it supplies, China possesses 66% of the European import market for cobalt, a material essential in the production of green energy. Apart from China, Russia and the United States, all other import partners only supply the EU with 1 CRM at a market share of more than 20%. The full list of CRM imports into EU28 countries in 2018 is included as Annex 1.

Figure 6. Countries with over 20% of EU market share in one or more CRMs in 2014[21]

[20] Paolo Ferro and Franco Bonollo, "Materials Selection in a Critical Raw Materials Perspective," *Materials & Design* 177 (September 5, 2019): 107848, https://doi.org/10.1016/j.matdes.2019.107848; Margarethe Hofmann et al., "Critical Raw Materials: A Perspective from the Materials Science Community," *Sustainable Materials and Technologies* 17 (September 1, 2018), https://doi.org/10.1016/j.susmat.2018.e00074.

[21] To give insight into sources of EU supply, the market share of each CRM was calculated, and the frequency with which a country appeared in the dataset with an import percentage ≥20% was recorded. Percentage is rounded to nearest whole number.

In Europe's economy, raw materials are closely linked to clean technologies.[22] For example, the production of solar panels relies upon steel, copper and critical raw material silicon (see Table 1 below). The production of low-carbon technologies – necessary for the EU to meet its climate and energy objectives – is expected to increase the demand for certain raw materials by a factor of 20 by 2030.[23] Securing reliable and undistorted access to certain raw materials is therefore of growing concern within the EU as well as across the globe.[24] Although the domestic production of certain CRMs takes place in the EU, notably hafnium, in most cases the EU is dependent on imports from non-EU countries (predominantly China, the USA, and Russia), as seen in Table 1. Recycling and/or substitution of these materials is therefore a priority.

Hardware		Energy storage		Distribution & fuel	
Usage	Raw materials	Usage	Raw materials	Usage	Raw materials
Wind turbines	Silver	Lithium batteries	Lithium	Power grids	Gold
Solar panels	Steel		Cobalt	Wiring	Silver
	Silicon		Nickel		Copper
	Copper		Graphite		Aluminum
			Vanadium	Nuclear fuel	Steel
			Graphene		Uranium

Table 1. Raw materials needed in the production of low carbon technologies[25]

Another important driver is the EU's commitment to the United Nation's (UN) sustainable development goals (SDGs) and applying these to all EU policies and initiatives.[26] The European Commission helps to implement the SDGs in non-energy extractive industries, through its Raw Materials Initiative and through policies and programs related to trade, environment, research and investment, development, and fiscal transparency.[27]

Because of the EU's increasing reliance on access to international markets, the **Raw Materials Initiative (RMI)** was set up by the Commission in 2008 to manage responses

[22] "Critical Raw Materials," Text, Internal Market, Industry, Entrepreneurship and SMEs - European Commission, July 5, 2016, https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en. ; European Commission, "Report on Critical Raw Materials and the Circular Economy PART 1/3" (Brussels, January 16, 2018), https://ec.europa.eu/commission/publications/report-critical-raw-materials-and-circular-economy_en.
[23] European Commission, "Raw Materials, Metals, Minerals and Forest-Based Industries," Text, Internal Market, Industry, Entrepreneurship and SMEs - European Commission, November 7, 2019, https://ec.europa.eu/growth/sectors/raw-materials_en.
[24] Oakdene Hollins and Fraunhofer ISI, "Study on Critical Raw Materials at EU Level: A Report for DG Enterprise and Industry" (Buckinghamshire: Oakdene Hollins, December 16, 2013).
[25] Table indicates the raw materials needed for a sample of green energies. Critical raw materials are colored blue. Data from Jeff Desjardins, "The Raw Materials That Fuel the Green Revolution," Visual Capitalist, January 10, 2018, https://www.visualcapitalist.com/raw-materials-fuel-green-revolution/.
[26] Council of the European Union, "Towards an Ever More Sustainable Union by 2030 - Council Conclusions (9 April 2019)" (Brussels: Council of the European Union, April 9, 2019), https://www.consilium.europa.eu/en/press/press-releases/2019/04/09/sustainable-development-council-adopts-conclusions/.
[27] European Commission, "Commission Contributions to the Implementing of Sustainable Development Goals (SDGs) in the Scope of Non-Energy Extractive Industries - Policies Derived from the Raw Materials Initiative and Trade, Environmental, Research and Innovation, Development and Fiscal Transparency Policies" (Brussels: European Commission, September 12, 2017), https://ec.europa.eu/docsroom/documents/25401.

to raw materials issues. It is the EU's first integrated strategy and strategic policy framework on the security of supply of raw materials that establishes targeted measures to secure and improve access for the EU.[28] One of the priority actions of the RMI was, for example, to establish the list of designated CRMs at EU level.[29]

The RMI consists of **three pillars**:

1. Fair and sustainable access to raw materials from global markets;
2. Sustainable supply of raw materials within the EU; and
3. Resource efficiency and supply of so-called 'secondary raw materials' through recycling.

These three pillars reflect that **European raw material policy is predominantly concerned with security of supply.**

Resource Efficient Europe

The ***Resource Efficient Europe*** **policy (2011) was the first major step towards a Europe-wide CE policy**. Based upon the premise that current growth models expressed in terms of natural resources reserves are unsustainable, and that there is a need to maintain secure and sustainable access to raw materials, this policy seeks to **balance growth across all sectors with efficient use of raw material resources in the coming future**, outlining milestones to be reached by 2020. The policy framework focuses upon maximizing innovation and resource efficiency in order to maintain competitiveness and growth in the face of increasing scarcity and price volatility of essential raw materials and minerals. Since Europe has a limited stock of natural raw materials and relies heavily on imports, the policy seeks to involve both industrial actors and consumers across all sectors.

Product design

The European Commission has identified a number of areas as most relevant concerning **consumption patterns**: textile, construction, automotive, electric and electronic, furniture, and packaging. The implementation of circularity standards (essentially: **reuse, repair, and recycle**) could aid the overall CE goals of the Union.[30] An example of a direct policy initiative in this field is the requirement for semi-finished products to contain certain shares of recycled materials by 2030 and 2050. The overarching goal with this being to ensure that "by 2030 all European public and corporate procurement over a certain threshold should include criteria supporting circularity and other environmental objectives."[31]

[28] "The Raw Materials Initiative — Meeting Our Critical Needs for Growth and Jobs in Europe" (Commission of the European Communities, April 11, 2008), https://doi.org/10.1163/2210-7975_HRD-4679-0058.
[29] European Commission, "Report on Critical Raw Materials and the Circular Economy PART 1/3."
[30] Jonathan Bonadio and Roland Joebstl, "Destination Climate Neutrality" (European Environmental Bureau, September 2019), https://circulareconomy.europa.eu/platform/sites/default/files/report-destination-climate-neutrality-web2.pdf.
[31] Bonadio and Joebstl, 35.

Waste management

The *EU Waste Framework Directive* works towards effective waste management. The main driver of the *EU Waste Framework Directive* has been to **unify and streamline the existing legislative and conceptual environment surrounding waste management legislation**. Historically, policies were focused on downstream solutions in waste management. However, a truly circular approach goes beyond this, i.e., involves **waste prevention alongside waste repurposing**.[32] By providing clarity of the conceptual environment surrounding waste management, the Directive lays the groundwork to construct further policies targeting waste management and resource efficiency. In this way, the policy supports the EU's circularity strategy.

Industrial policy

The growing need to become more independent in terms of raw materials and become more resource efficient can be directly linked to the EU's industrial policy. The Commission's 2014 Communication on an 'European Industrial Renaissance' calls for growth and **modernization through a strong industrial base with production and investment as key drivers**.[33] Central actions of the communication include the **boosting of the EU's competitiveness and internal market and the integration of EU firms in global value chains** – underscoring the goal of more **self-sufficiency** in an increasingly critical global setting in need of more **sustainable economic actions**, and thereby, traceable to subsequent CE approaches.

European Circular Economy Action Plan and Package

The **2015 Circular Economy Action Plan** was the first EU-level plan to present a range of measures covering the **whole CE cycle: from production and consumption to waste management**.[34] The proposed actions in the Plan include comprehensive commitments on eco-design, the development of strategic approaches on plastics and chemicals, an initiative to fund innovative projects in the EU's *Horizon 2020* program, and targeted action in areas such as plastics, food waste, construction, critical raw materials, industrial and mining waste, consumption and public procurement. Alongside lowering current carbon dioxide emission levels, the main policy drivers for the Plan include: "**boosting the EU's competitiveness** by protecting businesses against scarcity of resources and volatile prices helping to create new business opportunities and innovative, more efficient ways of producing and consuming."[35]

Based on this plan, the **Circular Economy Package was introduced in 2018** with the aim of **increasing the European circular material use rate** which measures the contribution of recycled materials to overall demand.[36] It includes a range of 'soft law'

[32] De Schoenmakere et al., *Paving the Way for a Circular Economy*, 10.
[33] "Towards an Industrial Renaissance," European Commission, accessed February 20, 2020, https://ec.europa.eu/growth/industry/policy/renaissance_en.
[34] European Commission, "Closing the Loop: An EU Action Plan for the Circular Economy."
[35] European Commission.
[36] In 2016, on average, only 12% of material resources used in the EU came from recycled products and recovered materials. Bourguignon, "Closing the Loop: New Circular Economy Package."

measures, such as a Europe-wide *Strategy for Plastics in the CE* and options to address the interface between chemical, product, and waste legislation; a report of critical raw materials and the CE; and a Monitoring Framework on progress towards circularity.

In the absence of a universally recognized indicator for 'circularity', the monitoring framework presented in the 2018 Package aims to measure progress at EU level in a way that encompasses its various dimensions at all stages of the life cycle of resources, products, and services. Therefore, the resulting **EU Framework has a set of ten indicators** grouped into **four stages** and aspects of the circular economy: **production and consumption, waste management, secondary raw materials, and competitiveness and innovation** (see Table 2).

No.	Name	Relevance	EU levers (examples)
Production and consumption			
1	EU self-sufficiency for raw materials	The CE should help to address the supply risks for raw materials, in particular critical raw materials.	Raw Materials Initiative; Resource Efficiency Roadmap
2	Green public procurement*	Public procurement makes up large share of consumption and can drive the CE.	Public Procurement Strategy; EU support schemes and voluntary criteria for green public procurement
3a-c	Waste generation	In a circular economy waste generation is minimized.	Waste Framework Directive; directives on waste streams; Strategy for Plastics
4	Food waste*	Discarding food has negative environmental, climate, economic impacts.	General Food Law Regulation; Waste Framework Directive; various initiatives (e.g. Platform on Food Losses and Food Waste)
Waste management			
5a-b	Overall recycling rates	Increasing recycling is part of the transition to a CE.	Waste Framework Directive
6a-f	Recycling rates for specific waste streams	This reflects the progress in recycling key waste streams.	Waste Framework Directive; Landfill Directive; directives on specific waste streams
Secondary raw materials			
7a-b	Contribution of recycled materials to raw materials demand	In a CE, secondary raw materials are commonly used to make new products.	Waste Framework Directive; Eco-design Directive; EU Ecolabel; REACH; initiative on the interface between chemicals, products and waste policies; Strategy for Plastics; quality standards for secondary raw materials

8	Trade in recyclable raw materials	Trade in recyclables reflects the importance of the internal market and global participation in the CE.	Internal Market policy; Waste Shipment Regulation; Trade policy
Competitiveness and innovation			
9a-c	Private investments, jobs and gross value added	This reflects the contribution of the circular economy to the creation of jobs and growth.	Investment Plan for Europe; Structural and Investment Funds; InnovFin; Circular Economy Finance Support Platform; Sustainable Finance Strategy; Green Employment Initiative; New Skills Agenda for Europe; Internal Market policy
10	Patents	Innovative technologies related to CE boost the EU's global competitiveness.	Horizon 2020

Table 2. Indicators on the circular economy included in the monitoring framework[37] * Indicators under development

The framework's indicators provide a broad picture of the key leverage points to increase the circularity of the EU's economy and offer a baseline for Member States of the relevant components for a comprehensive CE approach. Figure 7 below shows how the framework elements in Table 2 come together.

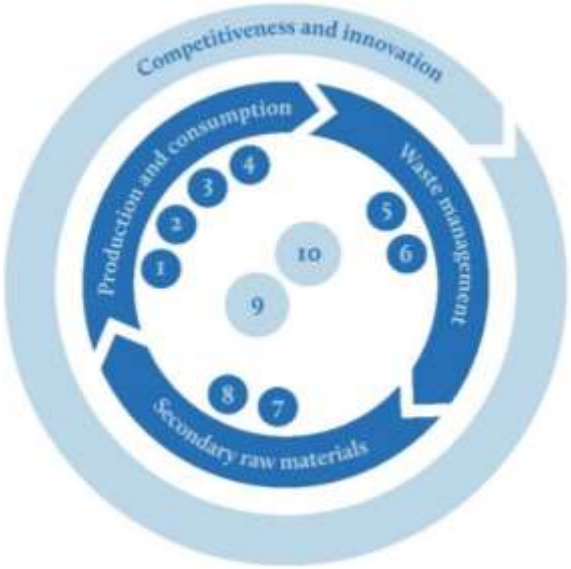


Figure 7. Circular Economy Framework[38]

While the above framework constitutes the most comprehensive CE definition so far, it still remains to be comprehensively applied and – to date – rather constitutes a loose guideline that is slowly, but surely, attracting states' attention. Some Member States adopted this definition and developed CE strategies in accordance with the EU (such as

[37] European Commission, "On a Monitoring Framework for the Circular Economy" (Brussels: European Commission, January 16, 2018), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A29%3AFIN.
[38] European Commission.

the Netherlands and France) while others still adhere to national frameworks and (sometimes diverging) approaches (as for instance Germany). Moreover, there is the need and potential for further improvement in the EU's and Member States' performance given that there is significantly more progress in some areas (such as trade in recyclable raw materials) than in others (such as green public procurement). This is also reflected in many countries' adopting isolated policies rather than comprehensive CE ones (as outlined further in the country chapters of this report).

European Green Deal

Most recently in policy developments that contribute to furtherance of the CE is the European Green Deal, adopted by the European Commission in December 2019. It sets out the goal of making Europe climate neutral by 2050, protecting life forms by reducing pollution, helping companies in developing clean products and technologies, and assisting in an inclusive transition towards a more circular model. It is understood as both an economic growth and environmental protection strategy. In order to do so, it intends to include several economic sectors and thereby, decarbonize the energy sector, make buildings more energy-efficient, support green industry innovation, as well as develop more sustainable means of public and private transportation.[39] Moreover, a European Green Deal Investment Plan was introduced in January 2020 as part of the deal with the aim of facilitating public and private investment for a CE transition.[40] Moreover, in the framework of the Green Deal, a new CE action plan and a corresponding industrial strategy ensuring such a transition are foreseen for 2020. The 2020 CE action plan comprises initiatives, actions and both legislative and non-legislative measures to prolong products' life cycles, focusing on their design, circular processes and sustainable consumption.[41] The corresponding industrial strategy is centered around three core drivers with the goal of transforming the European industry, supporting small and medium-sized enterprises (SMEs) and keeping Europe sustainable and competitive.[42] The drivers are the **green transition** embedded in the EC's Green Deal, the **digital transition** and **competitiveness on the global stage**.[43]

2.3 Public-private cooperation in relation to the circular economy

Whether exclusive, shared or national competence, the *Circular Economy Action Plan* rightfully mentions that next to action from the EU, long-term involvement at all levels is required, i.e., "from Member States, regions and cities, to businesses and citizens. Member States are invited to play their full part in EU action, integrating and

[39] "Communication on The European Green Deal," Text, European Commission, November 12, 2019, https://ec.europa.eu/info/publications/communication-european-green-deal_en.
[40] "Green Finance," Text, European Commission, accessed January 28, 2020, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/green-finance_en.
[41] "New Circular Economy Strategy," European Commission, accessed April 6, 2020, https://ec.europa.eu/environment/circular-economy/.
[42] "European Industrial Strategy," Text, European Commission, accessed April 6, 2020, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en.
[43] "European Industrial Strategy."

complementing it with national action."[44] With the participation of stakeholders from industries as well as research and government, there are some major initiatives for strengthening public-private cooperation in areas related to the CE. These are important cornerstones of the EU's CE strategy and vital for its successful implementation.

- The **European innovation partnership (EIP)** on raw materials is a multi-stakeholder platform with the mission of reinforcing and implementing the RMI by translating the strategic policy framework into concrete actions and by mobilizing the stakeholder community to implement them as well as securing necessary resources.[45]
- A specific platform for knowledge sharing and idea exchange is the network **EUROCITIES**, comprised today of over 140 European cities in 39 European countries, and it often works together with EU institutions. It organizes forums, working groups, project, activities and events furthering the sharing of information with regards to environmental challenges.[46] An example of an EU-funded project that EUROCITIES is involved with is the **Covenant of Mayors.** The Covenant is concerned with implementing the EU's energy, resource efficiency, and climate goals, and it is acknowledged as the most ambitious initiative that engaged signatory cities in curbing their CO_2 emissions by at least 20%. Signatories submit *Sustainable Energy Action Plans* (SEAPs) outlining their objectives and corresponding implementation plans, including both public and private sectors.[47]
- In terms of sustainable procurement, the initiatives **Procura +** and the **Sustainable Procurement Resource Centre** stand out.[48] Both are concerned with providing stakeholders such as public authorities, procurers, policymakers, and researchers with support, guidance, and resources in implementing sustainable procurement.
- The European Commission's **LIFE Program** is the only EU fund entirely dedicated to environmental and climate objectives. It also covers the development and demonstration of innovative technologies, implementation, monitoring and evaluation of EU environmental policy and law. From 2021-2027, an updated LIFE Program is foreseen to also support CE-related projects (among others).[49]
- Finally, the **Circular Economy Stakeholder Platform** is a virtual open space which aims at promoting Europe's transition to a CE by facilitating policy dialogue among stakeholders and by disseminating activities, information, and good practices on the

[44] European Commission, "Closing the Loop: An EU Action Plan for the Circular Economy."
[45] Piotr Ingling, "The European Innovation Partnership (EIP) on Raw Materials," Text, Internal Market, Industry, Entrepreneurship and SMEs - European Commission, July 4, 2019, https://ec.europa.eu/growth/sectors/raw-materials/eip_en.
[45] Ibid.
[46] "Green Finance."
[47] "Green Finance."
[48] "Green Finance."
[49] Filipe Araujo, "Environment," EUROCITIES, n.d., http://wsdomino.eurocities.eu/eurocities/forums/environment&tpl=home.

CE.[50] Stakeholders can take part in the Platform by participating in annual conferences and by interacting on the website to look for good practices, and to engage with other stakeholders via a repository of EU platforms and networks.[51]

2.4 Conclusion

In brief, the EU is committed to becoming resource efficient as well as a leader in the CE transition, motivated by both economic and environmental gains. While by now the 54 actions listed in the Circular Economy Action Plan from 2015 have officially been completed or implemented,[52] monitoring results indicate that the circular transition is still in very early stages.[53] Hence, it is relevant to regard other policy and research fields where Europe could also make progress as it further enhances its material resources strategy – such as product design, waste policy, and the link with dematerialization and decarbonization.[54] Apart from this, there could also be more coordination between the various policy sections related to material resource management.[55] The main focus for the EU will need to be on decarbonizing and dematerializing consumption patterns, if the 2050 vision of "living well, within the limits of the planet" is to be attained.[56] While currently the objectives that work towards this are covered in different EU strategies – covering climate neutrality, the bio-economy, and circularity – these topics actually reflect different sides of the same coin, and are closely interconnected.

Moreover, it is important that the EU's CE monitoring scheme is updated and aligned among Member States. While not yet entirely implementable, much effort is being put into furthering discussions on how to align with, and even move beyond, this EU CE monitoring scheme. Since the EU scheme is as of yet the only overarching CE framework, it forms a starting point to expand intra-EU cooperation and helps Member States align their policies. Initiatives to move forward are already being actively discussed in order to bring the EU CE monitoring scheme towards one that is actionable and implementable. These discussions involve local and international parties, including the European Commission, the European Environmental Agency, the OECD, World Business Council for Sustainable Development, the Platform for Accelerating the Circular Economy (PACE), as well as the PBL Netherlands Environmental Assessment Agency and its partners in neighboring countries.

[50] "European Circular Economy Stakeholder Platform | A Joint Initiative by the European Commission and the European Economic and Social Committee," October 10, 2019, https://circulareconomy.europa.eu/platform/en.
[51] "European Circular Economy Stakeholder Platform | A Joint Initiative by the European Commission and the European Economic and Social Committee."
[52] European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - on the Implementation of the Circular Economy Action Plan (COM(2019) 190 Final)," March 4, 2019, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0190&from=EN.
[53] European Commission, "On a Monitoring Framework for the Circular Economy."
[54] Bonadio and Joebstl, "Destination Climate Neutrality," 35.
[55] "Freek van Eijk Appointed as Director Holland Circular Hotspot - Holland Circular Hotspot," Holland Circular Hotspot, accessed January 30, 2020, https://hollandcircularhotspot.nl/en/news/freek-van-eijk-appointed-as-director-holland-circular-hotspot/; De Schoenmakere et al., *Paving the Way for a Circular Economy*.
[56] De Schoenmakere et al., *Paving the Way for a Circular Economy*, 7.

3. Country focus: Flanders (Belgium)

Summary. Flanders was the first region among the Netherlands' neighboring countries to adopt a comprehensive circular economy approach, namely 'Circular Flanders', in 2016. Since the 1990s, Flanders has made efforts to uplift its waste management policy, aiding its move towards a CE. Today, in Flanders, the CE is approached comprehensively, in alignment with the EU's and the Netherlands' understanding thereof; and involves and transcends traditionally separated sectors. Understanding the CE as a wide and rather fragmented policy field, Flanders' approach focuses strongly on involving as many stakeholders and sectors as possible in improving its material resource management. To date, there exist several initiatives at macro and micro level already, supported by subsidies and public-private knowledge communities, with the aim of facilitating links between sectors in a way that eases and encourages circular thinking in industries as well as households.

3.1 Key terms

3.1.1 Circular economy

The Government of Flanders describes the CE as a model in which one has closed off circuits of raw materials, materials, energy, water, space and food as much as possible. It regards the CE as a wide policy field, encompassing more than just material resource management, and the country's strategies have been presented through a lens of creating economic and other innovation opportunities in areas such as product design, manufacturing, services, new business models, and agri-food.[57]

3.1.2 Resource efficiency

The use of the term resource efficiency happens largely in the context of discussions on Flanders' implementation of EU-wide goals – all the more given the re-emphasis on this term in the Commission's recent European Green Deal.[58] Apart from this, in Belgium the term is most used in the context of waste management – rather than on management of all forms of material resources – on which most focus has been in the country over the past few decades.

[57] Government of Flanders, "Vision 2050. A Long-Term Strategy for Flanders" (Brussels: Department of Public Governance and the Chancellery, January 2019), https://www.vlaanderen.be/en/publications/detail/vision-2050-a-long-term-strategy-for-flanders-1.
[58] European Commission, "Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - The European Green Deal (COM(2019) 640 Final)" (European Commission, December 11, 2019), https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf.

3.2 Main stakeholders

3.2.1 Governance

- The Flemish Government appointed two ministers responsible for the circular economy transition, namely the **Minister of Environment** and the **Minister of Economy and Innovation**.[59]
- The **federal government and the regions** are responsible for certain **distributed policy domains**, as there is no hierarchy between the federal and regional governments. **Environmental and waste management has mostly become a regional competence**, falling under the responsibility of the regions: Brussels Capital Region, Flanders, and Wallonia. **The federal government has retained limited responsibility for certain specific environmental matters**, including nuclear installations and waste, waste transit, product standards, import/export/transit of non-indigenous vegetal and animal species, and activities in the North Sea.
- **OVAM (the Public Waste Agency of Flanders**) is responsible for waste and soil management, as well as materials management since more recently. OVAM policy initially focused on handling waste and setting up an effective waste management infrastructure, but by now its focus has moved towards waste prevention, or 'sustainable materials management'.[60]

3.2.2 Public-private and non-governmental stakeholders

- **Circular Flanders** functions as a "partnership between public authorities, businesses, civil society and the knowledge community that undertake collective action," supported by a team that is an integral part of OVAM, the Flanders Public Waste Agency.[61] Circular Flanders' work is divided roughly into three pillars, circular procurement, circular business, and the circular city. An example of their work includes setting up the Green Deal on Circular Procurement in 2017 in order to boost participating organizations' commitments to move towards circular resource use for products and services.
- Research into the CE is housed largely under the **Circular Economy Policy Research Center (CEPRC)**, which brings together **researchers** from KU Leuven, Ghent University, the University of Antwerp, and **VITO** (an independent Flemish research organization on clean technologies and sustainability). This consortium builds upon the Sustainable Materials Management (SuMMa) center's results (2012-2016), and it aims to streamline research into policy measures for Flanders' CE. The CEPRC is co-

[59] Government of Flanders, "Startnota Transitieprioriteit Circulaire Economie 'Vlaanderen Circulair'" (Brussel: Overheid van Vlaanderen, February 17, 2017), https://www.vlaanderen.be/vlaamse-regering/transitie-circulaire-economie#publicaties.
[60] "'Closing Loops - Transitions at Work'. About the organisers," OVAM English, accessed March 26, 2020, https://www.ovamenglish.be/about-ovam.
[61] "Circular Flanders: Retrospective Report 2017-2019, the First Period" (Mechelen: OVAM, n.d.), 5.

funded by OVAM and the **Department of Economy, Science and Innovation (EWI)**.

- The **Transitienetwerk Middenveld** (TNM) is a network of Flemish trade unions, the environmental movement, North-South organizations, social organizations, the cultural sector, alternative media, and scientists aiming to achieve the transition to a sustainable society by joining forces.[62] Similarly, **the Federation of Enterprises in Belgium** (FEB) encourages its members to embrace a more circular economy, guided by the belief that companies are part of the solution in moving towards a more sustainable society.[63] Both work together with **The Shift**, the Belgian sustainability network which is committed to such a transition as the core of its work.[64]

3.3 Country overview and policy developments

Key CE and material resource policy development in Belgium takes place at regional level. Flanders, an immediate neighboring region to the Netherlands, is driving innovation in this policy area for Belgium and is a region that the Netherlands is relatively used to working with across different policy areas. The key drivers behind Flanders' policies around circular use of material resources can be traced back to economic and environmental considerations, a desire to stay ahead within the EU in having an impact on waste prevention and management, as well as certain policy evolutions that occurred over the past two decades, which are outlined in this section.

In a nutshell, the region's drivers of material resource policy are the following:

Key drivers of Flemish circular material resource policies
• Ensuring economic growth and competitiveness • Compensating for dependency-related vulnerabilities stemming from material-intensive industry • Positioning as a leader in research & innovative technologies in sustainability • Structurally integrating circular, sustainable products into the entire society

The next section provides an overview of the main resource material policies underpinning Flanders' CE approach.

[62] "Partners Who We Work with to Realize Our Goals," The Shift, 2020, https://theshift.be/en/about-us/partners.
[63] "Partners Who We Work with to Realize Our Goals."
[64] "About Our Belgian Meeting Point for Sustainability," accessed January 29, 2020, https://theshift.be/en/about-us/our-story.

3.3.1 Policy overview

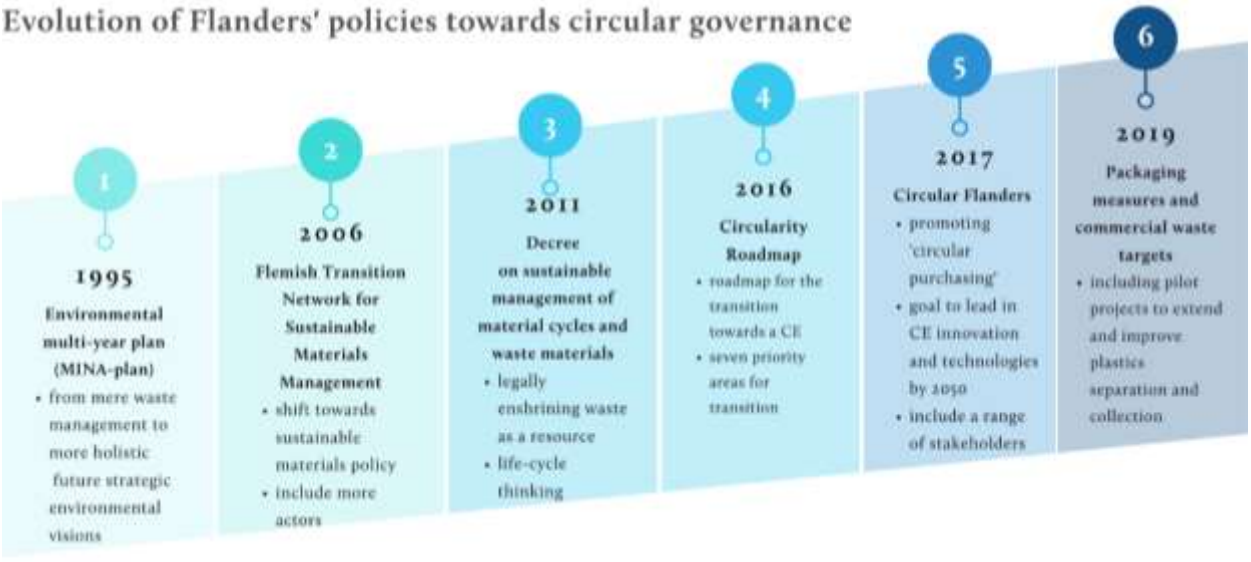


Figure 8. Evolution of Flanders' policies towards circular governance

Raw materials and security of supply

The Flemish material use footprint is unsustainably high.[65] The region's consumption of materials ranks well above the EU average, and only 10% of this consumption is covered by the mining of its own raw materials. Flanders has few raw materials of its own and imports high volumes. This import dependency means that geopolitical relations and price fluctuations might make the longer-term outlook for these imports uncertain. Similar to its neighboring countries – and most EU countries, for that matter – depends on imports for many raw materials, such as energy commodities, metals, and other materials used in the industrial sector. This is especially concerning when it comes to critical raw materials, as Belgium as a whole is vulnerable to changes in security of supply arising from trade from the global market.[66]

Figure 9 shows that Belgium's largest supplier in 2018 for CRMs is China, accounting for 21% of total CRM imports. And although Belgium imports CRM's from other European countries (Germany, the Netherlands, Luxembourg and the United Kingdom) it is unlikely that these countries are producers. Instead, the imports of CRMs into Belgium from Europe are likely to be re-exports in transit from the global market. For example, South Africa is the largest EU supplier of platinum (see Annex 2). So Belgian platinum imports from Germany may be mined in South Africa. The reliance

[65] "The Flemish Material Footprint Is Higher than What Is Sustainable" (OVAM - Public Waste Agency of Flanders, January 20, 2020), https://www.ovam.be/sites/default/files/atoms/files/2020121_material_footprint_Flanders_too_high.pdf.

[66] Data is obtained from UN Comtrade for 2018 at country level. Percentage value is averaged percentage import per CRM per country. For clarification, where there is disparity between OEC and EU report classifications, the following classifications were used; Germanium, Gallium, Hafnium and Vanadium appear in the categorization as Other Metals. Helium doesn't appear in the dataset individually, so is included in this analysis as Rare Gases. Silicon is included as silicon <99.99% pure as this is how it appears in European level reports. Similarly, acid grade Fluorspar is included in this analysis, as acid grade accounts for 65% of the market. The graphic is constructed to compare EU and Non-EU partners, here delimited by color.

on import partners abroad means that, should geopolitical relations deteriorate, or the global market suffer unforeseen shocks, there is a risk of high economic costs as the market concentration must readjust. Together, even though Belgium imports a large proportion of its total CRM imports from inside Europe and it is reasonable to assume that relations between Belgium and other EU member states will remain steadfast, the likelihood that these imports are in transit from the global market serves to undermine security of supply in Belgium. It is necessary for Belgium to manage uncertainty surrounding imports of CRMs to keep the economy stable, forming an important driver for its material resource management strategy.

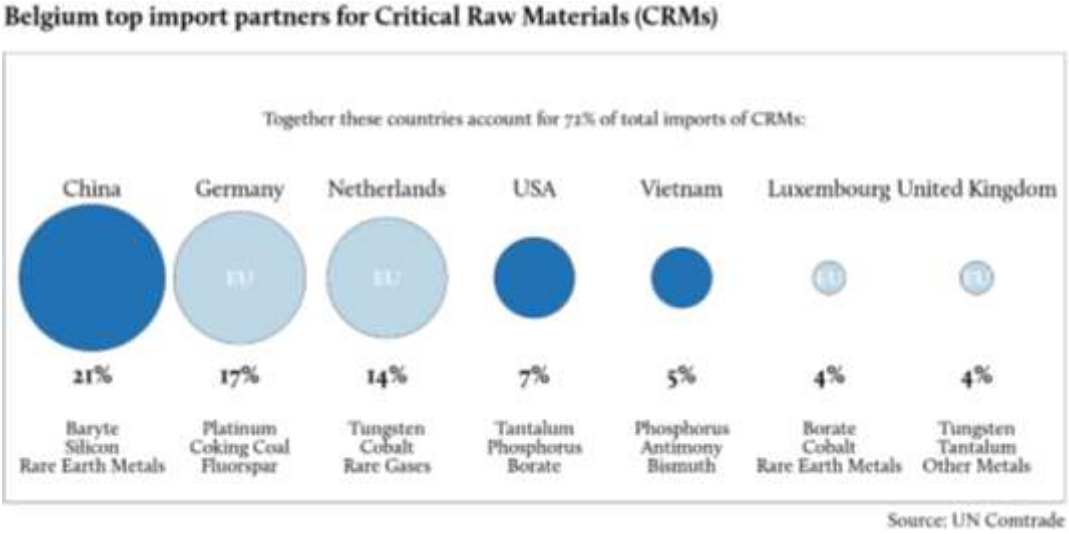


Figure 9. Belgium's import partners for critical raw materials as percentage of total CRM import[67]

Waste management

Flanders' Minister for Environment has made explicit links between the security of Flanders' raw material supply and the region's waste management qualities.[68] 71% of Flemish household waste goes towards material recovery. Parallel to this, almost ¾ of primary company waste gets re-used, recycled, composted or used as a secondary material or new material. This share of total waste is still increasing, and these waste flows will grow in importance if Flanders is to meet its own raw material needs.[69]

Flanders is a densely populated and prosperous region that invests heavily in selective waste collection. The Flemish government argues that a position as a global frontrunner in waste management offers enormous opportunities for recovering raw materials. Alongside this, Flanders has excellent academic knowledge, high-quality

[67] Data is obtained from UN Comtrade for 2018 using SITC HS6 Classifications. Percentage value is averaged percentage import per CRM per country. The size of the bubble is proportionate to the average market share for CRMs per import partner. Below the bubbles, the top three imported CRMs per country are listed. The graphic is constructed to compare EU and non-EU partners, here delimited by color. Belgium has been included here instead of Flanders due to availability of international trade data.
[68] "The Flanders' Materials Programme" (Mechelen: OVAM, 2013), https://eco.nomia.pt/contents/ficheirosinternos/vmp-eng-brochure-150ppi.pdf.
[69] Government of Flanders, "Vision 2050. A Long-Term Strategy for Flanders."

material and biotech research, and world-renowned companies that process complex waste, biomass, and material flows into new raw materials.[70]

The year 1995 saw the Flemish government's environmental multi-year plan (MINA-plan), which replaced existing waste management with a more holistic integration of waste management into future strategic environmental visions. However, household waste production still hit an all-time high in 2000, around 550kg, and has since plateaued.[71] The region's waste management agency, OVAM, then proposed Transition Management (TM) as a way to shift towards materials policy. Flanders started to innovate its TM process to include actors beyond those in traditional waste management governance, and creating a more sustainable materials management program.[72] The new policy trajectory was put into practice through a new transition platform called the **Flemish Transition Network for Sustainable Materials Management** (or Plan C) as a form of think tank and informal network in 2006.[73] This shift from simply managing waste towards life cycle thinking, culminated in a Flemish Decree by the end of 2011 on sustainable management of material cycles and waste materials, legally enshrining waste as a resource.[74]

Flanders' 2016-2022 plan for household waste and similar commercial and industrial waste set targets for 10-15% reductions in waste production. Belgium as a whole is effective in the recycling of plastic package waste, recycling 83% of plastic packaging waste in 2017 – well above the EU average (see Figure 10). In July 2018, a set of packaging measures was agreed upon to go into force in 2019, e.g., prohibiting disposable plastic bags and enforcing reusable cup use in events. These measures entered into force in 2019. The region also has a number of pilot projects to extend and improve plastics separation and collection, and it is working on an action plan for plastics for 2019-2024.[75]

[70] Government of Flanders.
[71] Angie Silva et al., "From Waste to Sustainable Materials Management: Three Case Studies of the Transition Journey," *Waste Management* 61 (March 1, 2017): 547–57, https://doi.org/10.1016/j.wasman.2016.11.038.
[72] E. Paredis, "Transition Management as a Form of Policy Innovation. A Casestudy of Plan C, a Process in Sustainable Materials Management in Flanders" (Centre for Sustainable Development–Ghent University,Flemish Policy Research Centre on Sustainable Development, 2011).
[73] Silva et al., "From Waste to Sustainable Materials Management," 5; "Circular Flanders: Together towards a Circular Economy. Kick-off Statement" (Circular Flanders, n.d.).
[74] Dominique Devos, "Flanders's New Approach to Waste Management: Setting the Scene in Europe," Lexology, September 10, 2012, https://www.lexology.com/library/detail.aspx?g=7aee975d-940d-4f1a-bdf0-a1bdbc15a350.
[75] Directorate-General for Environment, European Commission, "The EU Environmental Implementation Review 2019 - Country Report Belgium" (Brussels: European Commission, April 4, 2019), https://ec.europa.eu/environment/eir/country-reports/index_en.htm.

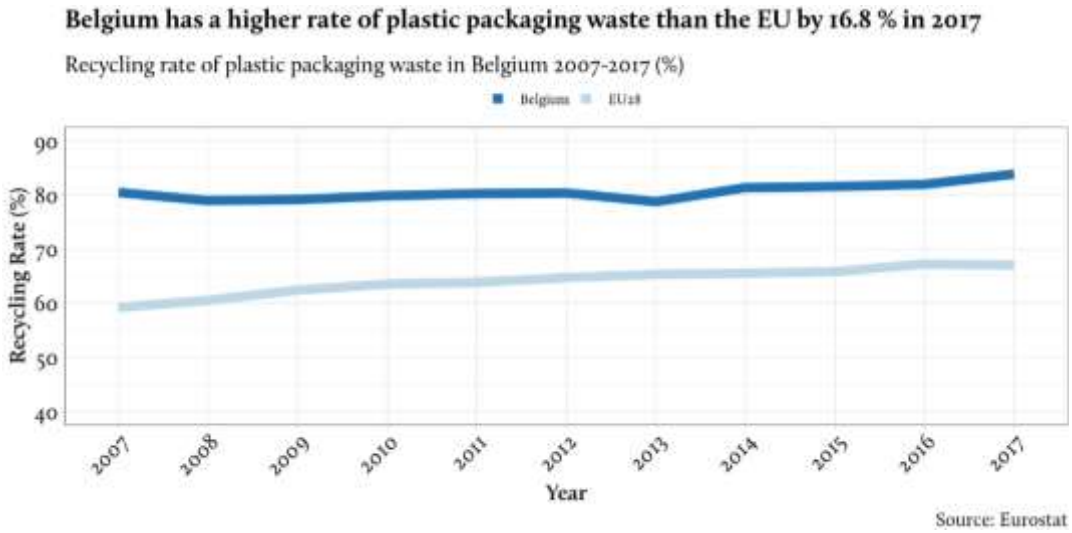


Figure 10. Recycling rate of plastic packaging waste in Belgium 2007-2017

Belgium has made remarkable gains in the recovery rate of construction and demolition waste, with a threefold increase between 2014 and 2016 (see

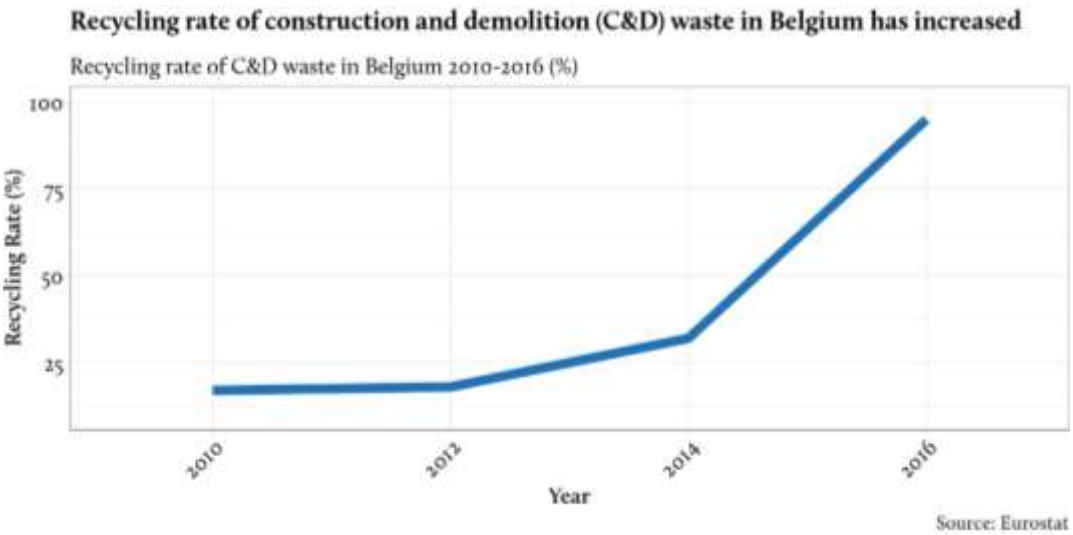


Figure 11). This means that Belgium has not only met the objectives set out by the EU **Waste Framework Directive 2008**, which sought to have 70% of construction and demolition waste recycled by 2020, four years early. But at 95% recycling rate in 2016, it is above the EU average of 89%. Belgium is in line with the ***Construction 2020*** **strategy** and **the Resource Efficiency Opportunities in the Building Sector** set out by the European Union. Improving resource efficiency through recycling is important within the construction and demolition sector, as based on volume, this sector is the largest waste stream in the EU.

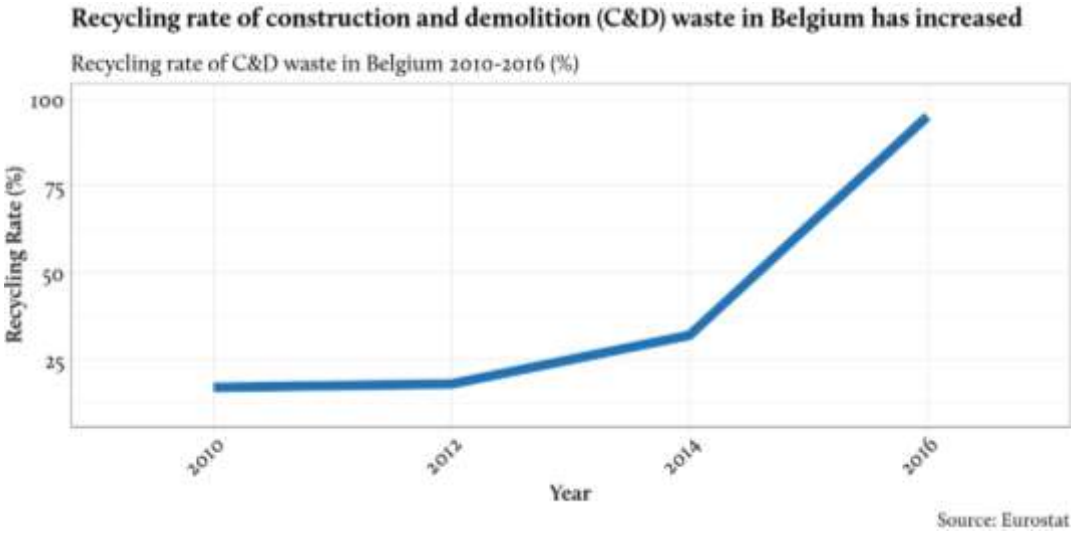


Figure 11. Recycling rate of construction and demolition waste in Belgium 2010-2016

Industrial policy

The Flemish government argues that material resource management is closely linked to other CE transition priorities like *Industry 4.0*.[76] Hence, Flanders based much of its policymaking around CE policy intended to produce potential economic gains on studies of Europe and the Netherlands. Respectively, the Ellen MacArthur Foundation's report in 2012 had a timeline until 2025, and TNO's 2013 study took 2020 as its horizon. These two approaches were in turn applied in Flanders, to give an overview of the economic opportunities that might be afforded by the CE in its industrial policy.[77]

Circular Flanders

In 2016, Belgium's federal ministries for Economy and Public Health and Environment set up a roadmap for the transition towards a CE.[78] CE is one of the Flemish Government's seven priority areas for transition articulated in the government policy document '*Vision 2050*'.[79] In February of 2017, the Flemish Government adopted the *Initial Memorandum on the priority for the transition, implementing the transition to the circular economy*, uniting the three pillars of the former Flemish Materials Programme (Plan C, Sustainable Materials Management (SuMMa), and Agenda 2020) under the name of Circular Flanders (*Vlaanderen Circulair*). It is the pivot of CE policy in Flanders, bringing together governments, knowledge institutions, the business

[76] Government of Flanders, "Vision 2050. A Long-Term Strategy for Flanders."
[77] Maarten Dubois and Maarten Christis, "Verkennende Analyse van Het Economisch Belang van Afvalbeheer, Recyclage En de Circulaire Economie Voor Vlaanderen" (Leuven: Steunpunt Duurzaam Materialenbeheer, June 14, 2014).
[78] "Ensemble, Faisons Tourner l'économie En Développant l'économie Circulaire En Belgique" (Ministre fédérale de l'Énergie, de l'Environnement et du Développement durable, October 2016), https://ec.europa.eu/environment/eir/pdf/report_be_en.pdf.
[79] Jiska Verhulst, "Policy in Flanders on Circular Economy," https://www.sim-flanders.be/sites/default/files/Documents/UserForum/user_forum_2017_ce_jiska_verhulst.pdf.

world, civil society, and the financial world, allowing these to join forces, resources, and expertise together.

The overarching CE targets for Flanders are among the top of the world in terms of the development of sustainable and advanced materials and innovative technologies that contribute to the CE. For example, the region aims to be known for exporting high-grade recycled raw materials by 2050.

One of the pillars of Flanders' 2016 CE strategy towards 2050 ('Circular Flanders') is the promotion of 'circular purchasing'.[80] With the goal to achieve structural integration of circular products and services, governments, companies, and other organizations are encouraged and assisted to participate by adapting their purchasing policies as such. Circular Flanders also focuses explicitly on circular business. While there are many different initiatives at macro and micro level, supported by subsidies and public-private knowledge communities, facilitating links between different sectors remains a challenge. A related challenge that is seen by governance actors is the difficulties in – and resultant lack of – monitoring progress.

3.4 Possibilities for cross-border cooperation for the Netherlands

Overall, governance structures in Flanders and the Netherlands are relatively similar, and while practical approaches to implementing circular material resource policies may differ, this opens up the possibility for cooperation, for example with regards to reducing the import and use of primary raw materials that concerns both actors equally.[81] Flanders has already built upon the Netherlands Environmental Assessment Agency's first large report in which the Agency lays out what would be needed for a monitoring framework for CE progress.[82] The Flemish approach building on to this is more recent and incorporates different levels of the economy in a way that is made more practical, but in essence it is not too different from this initial Dutch approach. Herein lies the potential for lessons for the Netherlands as well as for cooperation on the streamlining and joint further development of monitoring systems for this highly complex topic.

The Benelux countries cooperate on the circular economy as a bloc. The **Benelux Union (BU)** is an intergovernmental body dedicated to advancing the prosperity and welfare of the region. In December 2016, the three countries signed the *Benelux Directive on the practical application of the circular economy*. The Directive encourages closer regional cooperation over the following four years (2017-2020) in order to accelerate the transition to a CE in the EU. Under this Directive, projects and collaboration include the introduction of a binding measure for the end-of-waste status

[80] "Circular Flanders: Together towards a Circular Economy. Kick-off Statement," 26.
[81] "Circular Economy Strategies and Roadmaps in Europe: Identifying Synergies and the Potential for Cooperation and Alliance Building – Study" (European Economic and Social Committee, April 15, 2019).
[82] Luc Alaerts et al., "Towards a Circular Economy Monitor for Flanders: A Conceptual Basis. Conclusions of Stakeholder Workshop June 27, 2018" (Summa Circular Economy Policy Research Centre, n.d.).

of paper for the BU waste and recycling sector,[83] as well as a study on the reparability of equipment, which may lead to the introduction of European reparability scores for products.[84]

The **European Regional Development Fund (ERDF)** cooperation program Interreg Flanders–The Netherlands, for example, provides funding for the GrassGood – Natural Green as Raw Material project.[85] GrassGood allows nature managers, companies, and knowledge institutions in the border region between Flanders and the Netherlands to give clippings left over from managing wet regions a second life as sustainable products.

Up until the end of 2019, the program Smart Flanders supported thirteen cities in their goal to become 'smart cities'.[86] For example, within this the project Green Light Flanders provided a network for digitization and sustainable LED lighting. Flanders is relatively far ahead in its approach of connecting cities with larger networks on CE-focused knowledge and industry, and this is an approach fit for mutual knowledge exchange with the Netherlands.

3.5 Conclusions and key takeaways

Flanders is very active in bringing together many different stakeholders in networks and through various (semi-)subsidized platforms. Yet in the meantime, its industrial waste continues to rise while its raw material dependency has not yet decreased. Given this context, there are two main things the Netherlands could take from an assessment of Flanders' policy approaches to circular material resource management. First, the fact that Flanders has been inspired by and has built upon the Netherlands Environmental Assessment Agency's report which laid out requirements for a monitoring framework for CE progress, means that there lies a great opportunity to jointly further this effort to monitor progress. Second, Flanders has a strong academic community that is highly involved in discussions on CE development through various inter-local-authority platforms and networks. This could potentially function as an example of how the academic and research communities contribute to progression in various areas of CE thinking and implementation.

[83] Benelux, "Benelux Position of the Waste Sector," September 25, 2019, http://www.benelux.int/nl/nieuws/circulaire-economie-benelux-en-recyclagesector-slaan-handen-elkaar/.
[84] Ellen Bracquené and et al., "Repairability Criteria for Energy Related Products: Study in the BeNeLux Context to Evaluate the Options to Extend the Product Life Time" (Brussels: Benelux - SG, KU Leuven, Vito, June 2018), http://www.benelux.int/nl/nieuws/benelux-studie-aanzet-tot-langere-levensduur-huishoudelijke-apparaten/.
[85] "Home," GrasGoed, accessed January 30, 2020, https://www.grasgoed.eu/en/.
[86] "National Reform Programme 2017," April 2017, https://ec.europa.eu/info/sites/info/files/2017-european-semester-national-reform-programme-belgique-en.pdf.

4. Country focus: France

Summary. France's CE approach has been inspired by the EU's to a great extent, with the country adopting its CE Roadmap in 2018 as a national transposition of the European Commission's CE package. France's CE understanding even reads as more comprehensive, putting a particularly strong emphasis on changing consumption behavior in transforming its whole society sustainably.

However, while there is much commitment towards a CE transition and the overall vision surpasses that of most other EU countries in breadth and goals, France sometimes lags behind its neighbors in terms of implementation and progress. Therefore, in terms of ensuring implementation and progress of the CE in its early stages, as well as achieving a whole-of-society transition of material resource use, the Netherlands and France could benefit greatly from cooperation, as well as from the development of aligned monitoring and evaluation mechanisms to trace CE progress.

4.1 Key terms

4.1.1 Circular economy

In the recent French context, a circular economy is commonly referred to as an economy in which consumption is moderated, products have a longer lifetime, and waste is limited and transformed into new resources.[87] This understanding acknowledges that a CE is more than just making progress in sorting waste but also involves sustainable consumption and the extension of products' life cycles. It is considered by now a vital part of the country's ecological and social transition as well as of resource management policies.[88]

4.1.2 Resource efficiency

The term resource efficiency is understood as the reduction of greenhouse gases, the need to secure supply of critical material and reduce import dependencies, as well as ensuring material efficiency by sustaining the job market for the French society.[89] This broad definition (as set forth by the objectives of the 2015 *Energy Transition for Green Growth Act*) also implies a wide policy scope, meaning that a varied and rather fragmented array of policies addresses resource efficiency to date. Industrial policy ties heavily into resource efficiency as well.

[87] "50 Measures for a 100% Circular Economy" (Ministry for an Ecological and Solidary Transition, June 2018), https://www.ecologique-solidaire.gouv.fr/sites/default/files/FREC%20anglais.pdf.
[88] "France – Roadmap for the Circular Economy," European Compost Network, July 26, 2018, https://www.compostnetwork.info/france-roadmap-for-the-circular-economy/.
[89] European Environment Agency, "More from Less — Material Resource Efficiency in Europe: Country Profile France," File (Copenhagen: European Environment Agency, May 2016), https://www.eea.europa.eu/publications/more-from-less/france-material-resource-efficiency.

4.2 Main stakeholders

4.2.1 Governance

- At national level, the **Ministry for Ecological and Inclusive Transition** (*Ministère de la Transition écologique et solidaire* – MTES) enforces environmental policies through five General Directorates respectively focusing on: energy and climate; infrastructures, transports, and sea; planning, housing and nature; prevention of technological risks; and civilian aviation. Alongside environmental policies, it also co-ordinates policies on transport and energy.[90] Within the Ministry for Ecological and Inclusive Transition, the **General Council for Environment and Sustainable Development** (*Conseil général de l'Environnement et du Développement durable* – CGEDD) advises the government on environmental matters and carries out case-by-case examinations and evaluations of the effects of certain environmental projects.
- The **Ministry of Economy and Finance** (*Ministère de l'Économie et des Finances* – MINEFI) **also** holds jurisdiction over specific environmental issues.
- At local level, **Regional Directorates for Environment, Land Planning and Housing** (*Directions régionales de l'environnement, de l'aménagement et du logement* – DREAL) are in charge of implementing environmental policies in each French region given that sub-national entities (regions, departments and municipalities) implement environmental policies at local level.[91]

4.2.2 Public-private and non-governmental stakeholders

- The **National Institute for Circular Economy** (*Institut national de l'économie circulaire* – INEC) is a multi-stakeholder organization promoting the CE and improving resource effciency in a collaborative process. Composed of public and private organizations, it forms a platform for developing a holistic CE vision.[92]
  - With support from the **French environment and energy management agency** (*Agence de l'environnement et de la maîtrise de l'énergie* – ADEME) and the MTES, the INEC established a national scheme to generate synergies between businesses (*Programme National de Synergies Inter-Entreprises* – PNSI), comprised of ten initiatives implemented in four French regions.[93]

[90] Jean-Pierre Boivin and Anthony Emorine, "Environmental Law and Practice in France: Overview," Thomson Reuters Practical Law, 2019, https://uk.practicallaw.thomsonreuters.com/w-010-5542?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1; "Environmental Performance Reviews: France 2016," Organisation for Economic Co-operation and Development (OECD), June 10, 2016, https://www.oecd.org/environment/country-reviews/oecd-environmental-performance-reviews-france-2016-9789264252714-en.htm.
[91] Boivin and Emorine, "Environmental Law and Practice in France: Overview."
[92] "National Institute for Circular Economy (INEC) | EREK - European Resource Efficiency Knowledge Center | Solutions for Saving Energy, Material, Water and Waste," European Reource Efficiency Knowledge Centre, accessed January 7, 2020, https://www.resourceefficient.eu/en/intermediary/national-institute-circular-economy-inec.
[93] Christelle Gnidehoue, "The Institut de l'économie Circulaire (French Circular Economy Institute) Serving Communities: 10 Initiatives Generating Synergies between Businesses - Economiecirculaire.Org, La Plateforme

- INEC has also often partnered with the **International Center for Resources and Innovation for Sustainable Development** (*Centre international de ressources et d'innovation pour le développement durable* – CIRIDD) which develops collaborative platforms to further dialogue and projects between parties in similar fields within CE through connections and word-of-mouth.[94] In partnership, INEC and CIRIDD have created the international CE collaboration platform **EconomieCirculaire.org**.

- The ***Association ORÉE*** is a non-profit organization bringing companies and local authorities together in order to enhance awareness on their environmental impacts and what can be done about them on a practical level. The association played an important role in the development on France's CE roadmap.[95]

4.3 Country overview and policy developments

Overall, there are many French initiatives and numerous calls to define and achieve what a CE entails. In this context, France aligns most of its CE (relevant) policies and legislation with the EU. However, the country's laws and economy appear not entirely equipped yet for a full CE transition, as a lagging implementation of concrete measures and legal mechanisms appears to demonstrate. Moreover, the French carbon footprint increased by 20% between 1995 and 2015, due to a greater reliance on imports (imported emissions are almost twice as high as the amount of domestic CO_2 emissions).[96] Nonetheless, the country actively commits to and engages in policy areas related to circular material resource management and efficiency, having for example played a vital role in promoting the 2016 *Paris Agreement* to limit global warming.[97]

Furthermore, and herein more original than other countries, France's CE policy emphasizes personal responsibility of both consumers and producers. France also early on combined various topics together into singly policy measures, rather than consistently separating areas such as climate protection and energy. It is in this context that awareness of circularity and the efficient use of resources has grown, and more concrete steps towards achieving circularity have been pushed since 2018.

Internationale de l'économie Circulaire," Economie Circulaire, May 29, 2017, https://www.economiecirculaire.org/articles/h/the-institut-de-l-economie-circulaire-french-circular-economy-institute-serving-communities-10-initiatives-generating-synergies-between-businesses.html.

[94] "Centre international de ressources," CIRIDD, accessed January 14, 2020, https://www.ciridd.org/centre-international-de-ressources.

[95] "Objectifs et Missions," ORÉE, accessed January 9, 2020, http://www.oree.org/objectifs-et-missions.html.

[96] Aline Robert, "France Is a 'Good Student with Bad Results' When It Comes to Climate Policy," EURACTIV, June 27, 2019, https://www.euractiv.com/section/energy-environment/news/france-is-a-good-student-with-bad-results-when-it-comes-to-climate-policy/.

[97] Government of France, "COP 21 | Press Release," Gouvernement.fr, accessed March 29, 2020, https://www.gouvernement.fr/en/cop21; Fiona Harvey, "France Launches Global Drive for Climate Deal," *The Guardian*, 2015, sec. Environment, https://www.theguardian.com/world/2015/oct/19/france-launches-global-drive-for-climate-deal.

France's circularity and material resource policy approaches can be traced back to economic and environmental considerations and policy evolutions occurring over the past two decades.

The **key drivers** of French circular material resource policies are the following:

Key drivers of French circular material resource policies
• Changing societal consumption behavior as a whole • Decoupling economic growth from raw material consumption • Catching up with EU & neighbors with regard to implementation • Securing the supply of critical raw materials and decreasing import dependencies • A society-wide demand for jobs and increased competitiveness of business

The next section outlines the key material resource policies in France while also providing an overview of the country's current state with regards to the CE.

4.3.1 Policy overview

Figure 12. Evolution of French Circular Economy policy

Raw materials and security of supply

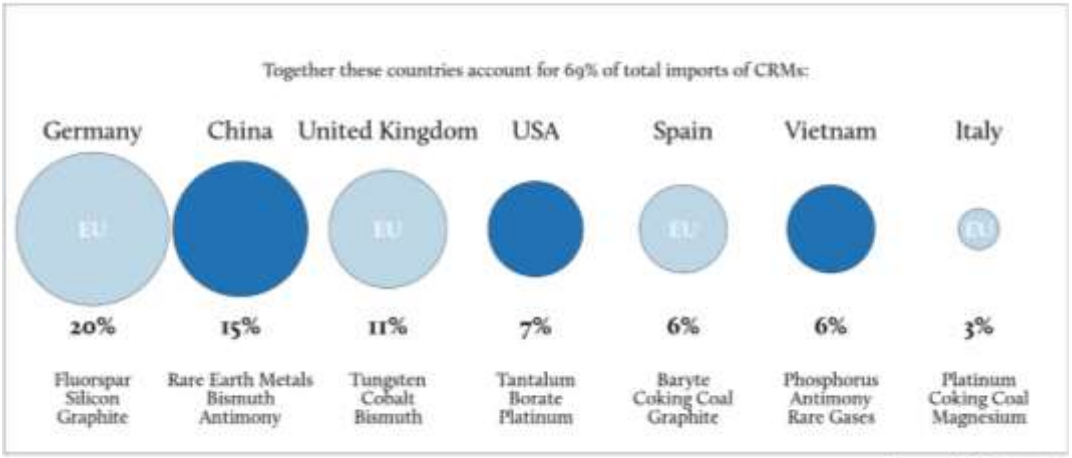
Material consumption per person has remained stable in France since 2008, accompanied by a strong increase in material productivity, meaning less raw materials produce the same economic output – a move in the right direction. Still, France's domestic material consumption remains too high for its goals, and above European average.[98] Therefore, the country **recognizes the need to further decouple its economic growth from raw material consumption**, as is reflected in its self-set targets in the 2015 *Energy Transition Act* to **increase its resource productivity** while reducing

[98] "RE and Circular Economy in Europe – Even More from Less An Overview of Policies, Approaches and Targets of France in 2018."

domestic material consumption per capita.[99] This awareness has also led to France's participation in projects such as the North Sea Resources Roundabout, which aims to facilitate the use of secondary raw materials and create a strong European secondary material market by removing transnational barriers.[100]

France has a further incentive to **remove transnational barriers between countries for the purpose of trade in critical raw materials**. Although France is a large exporter of, e.g., agricultural products, it is still heavily dependent on imports, predominantly for fuel, electronics, chemicals, and metal products, which mainly come from Germany, China, and Belgium.[101] France's trade in CRMs reflects its dependence on Germany and China (see Figure 13). France imports 1/5th of its CRMs from Germany. Meaning that although French-German CRM trade is likely to be constituted by CRMs mined in other parts of the world, Germany is a significant partner for France. One of the CRMs at the top of the list that gets imported from Germany is Silicon, key to the development of hardware associated with green energy. Strengthening this sector is a French priority – typically a producer of nuclear energy – and this is reflected in the 2019 *Energy and Climate Change Law*. Therefore, maintaining a **secure supply of CRMs will be vital for France to meet the 2019 policy goals**.

France top import partners for Critical Raw Materials (CRMs)



Source: UN Comtrade

Figure 13. France' import partners for critical raw materials as a percentage of total CRM imports[102]

[99] "10 Key Indicators for Monitoring the Circular Economy," March 2017, http://temis.documentation.developpement-durable.gouv.fr/docs/Temis/0086/Temis-0086452/22978_2017_ENG.pdf.
[100] "Circular Economy - International Green Deal with France, Flanders and the United Kingdom," The Parliament Magazine, accessed January 9, 2020, https://www.theparliamentmagazine.eu/whitepaper/suez/circular-economy-international-green-deal-france-flanders-and-united-kingdom.
[101] Trade Finance Global, "Exporting to France," *Trade Finance Global* (blog), accessed March 20, 2020, https://www.tradefinanceglobal.com/exports/france/.
[102] Data is obtained from UN Comtrade for 2018 using SITC HS6 Classifications. Percentage value is averaged percentage import per CRM per country. The size of the bubble is proportionate to the average market share for CRMs per import partner. Below the bubbles, the top three imported CRMs per country are listed. The graphic is constructed to compare EU and non-EU partners, here delimited by color.

Resource efficiency policies

To date, France does not have an explicit resource efficiency strategy, but it captures the concept in its broader CE approach, and it has been undertaking several initiatives in order to integrate this topic in all relevant sector policies. The **guiding principles are enshrined in the country's *Environmental Charter* from 2004**, consisting mainly of transposed EU Directives and directly effective EU Regulations on matters of sustainability.[103] It is the **cornerstone of most French material resource efficiency related policies**, including provisions on energy efficiency, security of supply, and waste management.

To complement this effort and assist the provisions' implementation, in 2007, the **Grenelle Environment Forum** established a new model of **participatory governance** (bringing together the central government, elected officials, businesses, unions, and non-governmental organizations). It has since been adopted by the country's annually recurring environmental conferences and institutionalized by the **National Ecological Transition Council** (*Conseil national de la transition écologique*).[104] Furthermore, in 2017, a number of major reforms entered into force regarding environmental permits, the assessment of projects, and public participation in order to facilitate action in the (up until then) too complex system.[105]

Waste management efforts

France's waste management is, in a comparative EU perspective, in less strong of a state. Each French citizen produces an annual average municipal waste well above the European average.[106] Furthermore, the government's self-set goal of recycling 100% of its plastic by 2025 appears to remain out of reach. As shown in Figure 14, rather than the European average of 41%, only 26.5% of French plastic packaging is recycled. Following policy initiatives and specific legislation, substantial progress has certainly been made in the quality of treatment and recycling facilities, but the use of landfills as well as the overall production of waste continue to remain too high.

[103] "France – Roadmap for the Circular Economy."
[104] "Environmental Performance Reviews: France 2016."
[105] European Commission, "The EU Environmental Implementation Review 2019 Country Report - FRANCE" (Brussels: European Commission, April 4, 2019), https://ec.europa.eu/environment/eir/country-reports/index_en.htm.
[106] "Environmental Performance Reviews: France 2016."

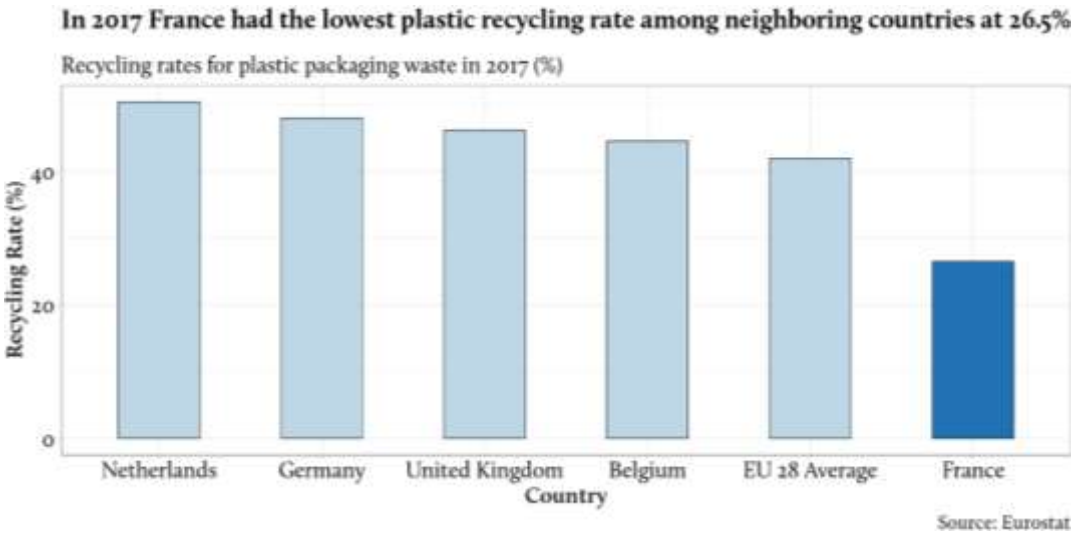


Figure 14. Plastic recycling rate use across Belgium, France, Germany, the Netherlands and the UK in 2017

Alongside the 2004 Environmental Charter, France has put a **national waste prevention plan** into place, comprised of targets such as the reduction of unsolicited junk mail or supermarket bags as well as decreasing the production of household and similar waste over a period of 5 years.[107] The **French Environment and Energy Management Agency** (*Agence de l'environnement et de la maîtrise de l'énergie* – ADEME) is tasked with implementing this plan, and it has led to campaigns such as the 'prevention week' which has also been adopted at European level by now.[108] The **Grenelle Environmental Forum** in 2007, apart from environmental targets, also defined guidelines of a modern national policy on waste management, comprised of a set of prevention and recycling objectives and measures, aligning with the European Commission's 2008 waste framework directive (*directive 2008/98/EC*), which ranks different forms of waste treatment.

Moreover, France already has an extensive **Extended Producer Responsibility (EPR)** scheme under which businesses can be held accountable for their products and any associated packaging.[109] The idea hereof is to improve the recycling of certain types of waste; to relieve local authorities entirely or partially of waste management costs and transfer funding from the taxpayer to the consumer; and to incorporate these extra costs of managing a product's waste once used in the sale price, in order to encourage manufacturers to take an eco-design approach. The overarching goal is to increase

[107] "Waste Management" (Sustainable Development Goals Knowledge Platform, 2019), https://sustainabledevelopment.un.org/content/documents/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/france/Waste_management.pdf.
[108] "Waste Management."
[109] "Les filières à Responsabilité élargie des producteurs (REP)," Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME), February 28, 2019, https://www.ademe.fr/expertises/dechets/elements-contexte/filieres-a-responsabilite-elargie-producteurs-rep; Marie Hervier-Collas and Agnès Heyberger, eds., *Les Filières à Responsabilité Élargie Du Producteur: Panorama, Édition 2017* (Saumur: Loire Impression, ADEME Éditions, 2017), https://www.ademe.fr/sites/default/files/assets/documents/rep-panorama-edition2017_8816.pdf.

reuse, recycling, and recovery rates and thereby advance France's resource efficiency. However, certain things might still stand in the way of this in practice, such as the fact that there is no national target for reducing plastic consumption in France.[110] Finally, in 2019, the French Senate approved an **anti-waste law** (*Loi Anti Gaspillage)*, setting out the stopping of waste, conservation of resources, mobilization of industries to develop new production methods, informing citizens about better consumption options, as well as the prohibition of the destruction of unsold products, which instead are to be reused or recycled.[111] These most recent prescriptions are specifically tailored to further a CE transition in France.

Industrial policy

France sees it to be necessary in order to improve material resource management, it needs to restructure production chains in order to "'close the loop' between collection, recycling and outlet capacities for materials to be recycled while allowing innovation, particularly through eco-design."[112] This is seen as an industrial challenge that requires increased recycling and innovative start-ups.

In recent years, the French government has also actively pursued more circular approaches to the materials needed for greener technologies through the use of government subsidies.[113] For example, already in 2012, laws to promote clean technology in the country's car industry were passed.[114] Moreover, France is among the leaders of the EU eco-innovation ranking, boasting major groups and public research bodies with regards to water, waste, and environmental engineering. Since 2004, the eco-job market has grown faster than the entire French economy.

Circular Economy Roadmap

Overall, France's efforts did not meet the targets or change consumer behavior to the extent intended in its initial material resource efficiency policies.[115] This ultimately contributed to the formulation of **a CE roadmap in 2018 and a concrete legal climate and energy package in 2019**, specifically intended to implement the country's goals (of becoming carbon neutral and a green economy) and setting priorities for 2028.[116] The 2018 CE roadmap calls for a **broad, whole-of-society effort** "to secure a successful energy/ecology transition and to conclude France's linear produce-consume-discard

[110] Robert, "France Is a 'Good Student with Bad Results' When It Comes to Climate Policy."
[111] Don-Alvin Adegeest, "France to Introduce Anti-Waste Law to Promote Circular Economy," Fashion United, April 10, 2019, https://fashionunited.uk/news/fashion/france-to-introduce-anti-waste-law-to-promote-circular-economy/2019100445598.
[112] "50 Measures for a 100% Circular Economy," 4.
[113] Brett Smith, "France: Environmental Issues, Policies and Clean Technology," AZO Cleantech, July 24, 2018, https://www.azocleantech.com/article.aspx?ArticleID=550.
[114] "Environmental Performance Reviews: France 2016."
[115] "Environmental Performance Reviews: France 2016."
[116] Beate Felix, "France Sets 2050 Carbon-Neutral Target with New Law," Reuters, June 27, 2019, https://www.reuters.com/article/us-france-energy/france-sets-2050-carbon-neutral-target-with-new-law-idUSKCN1TS30B.

model."[117] Overarching French CE targets outlined include the aim to improve production methods; enhance consumption and consumer behavior; bring waste recycling to a higher level; and ensure wide stakeholder involvement.[118]

This roadmap was subsequently underpinned in concrete legal terms in 2019 and aligns greatly with the EU's action plan for the Circular Economy (2015) and Circular Economy package (2018), embracing the notion of "**repair, reuse, recycle**."[119] This French legislation contains about 50 measures that provide (among others) new obligations on producer responsibility, tools to support companies in eco-design initiatives, and means to assist citizens in changing their consumption practices.[120] In fact, France is the first one to transpose European CE directives into national law in this area.[121] Concrete measures include the establishment of a repair label for household electronics, the reduction of the VAT rate for recycling, as well as penalties for the use of non-recycled plastic.[122]

4.4 Possibilities for cross-border cooperation for the Netherlands

France and the Netherlands are already working together on the CE transition, but the alignment of their respective roadmaps could accelerate cooperation on different levels (national and local policy, business and knowledge). Both national agendas are concerned with common themes which allow for cooperation, specifically with regards to the following sectors/areas: construction (infrastructure, building and renovation); textile; plastic recycling; and food and biomass.[123]

Apart from high-level cooperation, partnerships such as the recently formed one between the Association ORÉE and the Holland Circular Hotspot constitute an ideal example for further French-Dutch CE cooperation. Both already work together in a Partners in International Business (PIB) context on waste and bio-energy and are exploring the possibility to expand this to the fields of construction and renovation.[124]

Moreover, the TAIEX Environmental Implementation Review Peer to Peer (TAIEX-EIR P2P) initiative launched by the European Commission in 2017 could be an adequate starting point for cooperation. This is a tool designed to facilitate learning among environmental authorities in the Member States in which France participates already

[117] Paul A. Davies, "France Unveils Circular Economy Roadmap," Environment, Land & Resources, April 27, 2018, https://www.globalelr.com/2018/04/france-unveils-circular-economy-roadmap/; "Two Roadmaps towards an International Circular Economy," Blog Innovatie Attaché Parijs, April 26, 2018, https://nost-france.org/2018/04/26/two-roadmaps-towards-an-international-circular-economy/.
[118] Davies, "France Unveils Circular Economy Roadmap."
[119] "50 Measures for a 100% Circular Economy"; Alison Hird, "France Drafts New Chapter in the 'War on Waste,'" RFI, July 11, 2019, http://www.rfi.fr/en/france/20190710-france-waste-recycling-circular-economy-environment.
[120] Ministère de la Transition écologique et solidaire, "A French Act of Law against Waste and for a Circular Economy," European Circular Economy Stakeholder Platform, February 2020, https://circulareconomy.europa.eu/platform/en/main-language/french.
[121] "Circular Economy Update Report 2019," European Circular Economy Stakeholder Platform, September 2019, https://circulareconomy.europa.eu/platform/en/knowledge/circular-economy-update-report-2019.
[122] "Circular Economy Update Report 2019."
[123] "Two Roadmaps towards an International Circular Economy."
[124] "Two Roadmaps towards an International Circular Economy."

(e.g., in terms of information sharing on the CE, air, nature, and biodiversity and forests).[125]

4.5 Conclusions and key takeaways

There appears to be much commitment to a CE transition and advancing resource efficiency in France. However, with regard to meeting its targets and presenting real progress, the French occasionally lag behind European neighbors. In short, this means that while the preconditions for circular resource management are already in place, the challenge confronting France will be to (in the national as much as bilateral and multilateral context) utilize this basis and effectively ensure real progress.

At the same time, there are some areas in which France is doing more than its neighbors, especially in terms of incentivizing changes in consumption behavior. The Extended Producer Responsibility scheme makes it possible to hold businesses accountable for their products and any associated packaging issues. Alongside this, the country's recent anti-waste law builds on this by aiming for the prevention of waste and conservation of resources, through industry mobilization as well as by informing citizens. Additionally, France's policy to increase product warranty time is just another testament to the country's aim to transform consumption patterns as a whole. This acknowledgment of the need for a widespread, societal implementation of circular thinking is a relevant one for the Netherlands to consider as it moves forward.

[125] Commission, "The EU Environmental Implementation Review 2019 Country Report - FRANCE"; "TAIEX - Environmental Implementation Review - PEER 2 PEER," European Commission, accessed January 9, 2020, https://ec.europa.eu/environment/eir/p2p/index_en.htm.

5. Country focus: Germany

Summary. Germany has been working on the Circular Economy concept since 1995, albeit mainly in relation to waste management. Nowadays, the German government has broadened the scope of its CE approach and looks to resource efficiency, in particular through comprehensive materials flow management. The country's decision to abandon nuclear energy in 2011 in turn encouraged significant progress in the areas of climate protection and sustainable development, further driven by the need to stay competitive, modern and innovative through enhanced resilience. This early development in policy priorities helped pave the way for Germany's current approach to more sustainable and circular resource management. Cooperation between the Netherlands and Germany is already well-developed in areas relating to energy and material resource policies as the presence of joint projects shows. Room for collaboration remains on the issue of waste prevention (inherently linked to achieving full circularity) as well as broader cross-border projects related to resource efficiency within the EU.

5.1 Key terms

5.1.1 Circular economy

The circular economy is understood as "**the establishment of closed-loop material flows**" in which "all resources applied over the entire life cycle of a product fully re-enter the production process at the end of life of the product."[126] For a long time, Germany appeared to **use the concept of a CE predominantly through waste management** efforts but more recently it has been **aligned with a resource efficiency perspective**, specifically through **comprehensive materials flow management.**[127] The German resource-efficiency-focused *Programme II* (2016), for instance, outlines a commitment to strengthening producer responsibility, improving the collection and recycling of resource-relevant bulk waste streams, and achieving better recycling potential in organic and green waste.[128]

[126] "Circular Economy," *Ifeu GmbH* (blog), accessed December 18, 2019, https://www.ifeu.de/en/topics/resources/recycling-economy/.
[127] The concept of the CE has been present in the German context since the 1980s, when landfill shortages led to the realization of the need to develop a more sustainable use of natural and energy resources. Consequently, a modern waste management system was promoted and gradually implemented. "Abfallwirtschaft in Deutschland 2018," Bundesministeriums für Umwelt, Naturschutz und nukleare Sicherheit (BMU), January 3, 2018, https://www.bmu.de/PU469; "Waste Policy," Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU), accessed December 17, 2019, https://www.bmu.de/en/topics/water-waste-soil/waste-management/waste-policy/.
[128] "German Resource Efficiency Programme II - Programme for the Sustainable Use and Conservation of Natural Resources," Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, February 3, 2016, https://www.bmu.de/PU303-1.

5.1.2 Resource efficiency

The German government defines resource efficiency as the "**responsible and efficient use of natural resources", being "a key competence for sustainable societies.**"[129] As one of the first countries to do so, Germany adopted a **national resource efficiency program (*ProgRess)*** in February 2012 (subsequently regularly reviewed and updated), setting out targets, guiding principles, and approaches for the conservation of natural resources. Its overarching goal is to minimize negative environmental impacts while ensuring economic growth and enhancing productivity on a national and global level.

5.2 Main stakeholders

5.2.1 Governance

Several ministries and agencies are involved in the transition towards a circular economy:

- Questions relating specifically to resource efficiency, climate change, and waste management are handled primarily by the **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety** (*Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit* (BMU)), which systematically addresses circularity, material resource, and climate policies as a joint matter. It is a key player in terms of resource efficiency policies in particular, supported in this regard by the **German Federal Environment Agency (***Umweltbundesamt* (UBA)). Regarding eco-design, the UBA is involved in the investigation and promotion of environmentally sound production and consumption patterns.
- The main competence for energy policies and matters regarding the energy transition lies with the **Federal Ministry for Economic Affairs and Energy** *(Bundesministerium für Wirtschaft und Energie (BMWi)*).
- Also dealing with renewable energy and the energy transition is the **Federal Ministry of Education and Research (***Bundesministerium für Bildung und Forschung (BMBF)***)**. It is also involved in setting up the most recent CE initiative jointly with the private sector.

When it comes to new legislation and implementation thereof, several different levels of government play in:

- Legislation on areas related to the CE takes place largely on a **federal level**.
- For the concrete **implementation and coordination of legislation**, the **government tends to collaborate with the different states** (e.g., in the context of the energy

[129] "Resource Efficiency," Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU), accessed December 17, 2019, https://www.bmu.de/en/topics/economy-products-resources-tourism/resource-efficiency/.

transition).[130] While some states have devised regional strategies, they do have to align these with federally formulated plans and are not entirely autonomous.

- **Public entities such as the *Deutsche Städtetag* represent communities' and cities' interests**, in order to ensure a balance between abstract, national policies and their implementation on a local level.[131]

5.2.2 Public-private and non-governmental stakeholders

- The **German Recycling Technologies and Waste Management Partnership e.V. (RETech)** supports German companies developing sustainable environmental technologies and know-how to apply and diffuse these internationally.[132] The Partnership is a focal point for public and private organizations, businesses, and institutions in Germany and abroad. It is also an important partner for ministries.[133]
- The **Circular Economy Initiative Deutschland (CEID)** is a 2018 initiative funded by the Federal Ministry of Education and Research along with a number of companies. It brings together economic, scientific, and societal stakeholders. Its goal is to develop of a CE roadmap for Germany by setting out ideas for practical implementation of such a transition, serving as a basis for policy recommendations.[134]
- The **VDI Centre for Resource Efficiency** is a center for competence, applying both business and science, pooling know-how from theory and practice. It was launched in 2009 as a cooperative project of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the VDI Association of German Engineers.[135]
- Notable non-governmental stakeholders are the ***Institut für Energie- und Umweltforschung (IFEU)*** and ***Naturschutzbund Deutschland (NABU)***, institutes concerned with matters relating to climate, sustainability, and the CE transition.[136]
- Relatively few stakeholders go **beyond a topic-specific**, fragmented approach and link relevant areas (e.g., climate, energy, and waste) in line with a wider circularity of material resources approach. Examples include the Industrial Resource Strategies think tank, the Collaborating Centre on Sustainable Consumption and Production (CSCP) and the *Wirtschaft macht Klimaschutz* dialogue forum.[137]

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[130] "Our Energy Transition for an Energy Supply That Is Secure, Clean, and Affordable," Federal Ministry for Economic Affairs and Energy, accessed December 17, 2019, https://www.bmwi.de/Redaktion/EN/Dossier/energy-transition.html.
[131] "Who Is Who Der Energiewende in Deutschland" (Auswärtiges Amt, July 2015), https://www.auswaertiges-amt.de/blob/216910/7a1be4e46851e6912959e89bc9cd90ee/energiewendewhoiswho-data.pdf.
[132] This Partnership was put in place by the Federal Environment Ministry in relation to its 2007 *Export Initiative Recycling and Efficiency Technologies* and finally established in late 2011.
[133] "German RETech Partnership," Bundesministerium für Umwelt, Naturschutz (BMU) und nukleare Sicherheit, accessed December 17, 2019, https://www.bmu.de/en/topics/water-waste-soil/waste-management/german-retech-partnership/.
[134] "About the Circular Economy Initiative Germany," Circular Economy Initiative Deutschland, accessed December 17, 2019, https://www.circular-economy-initiative.de/english.
[135] Zentrum Ressourceneffizienz, "About Us," Zentrum Ressourceneffizienz, accessed February 22, 2020, https://www.resource-germany.com/about-us/?L=0.
[136] "Institute," *Ifeu GmbH* (blog), accessed December 19, 2019, https://www.ifeu.de/en/institut/.
[137] T. Weber and M. (Ed.) Stuchtey, "Pathways towards a German Circular Economy – Lessons from European Strategies (Preliminary Study)" (Munich: acatech – National Academy of Science and Engineering, 2019).

- As for specifically **business stakeholders**, the bioplastics, paper, and cardboard industries consider themselves most relevant to the forthcoming of a circular economy. This understanding results from the fact that Germany has relatively high rate of paper packaging and recycling. These industries embrace plans for increased circularity in material resource management as a new business opportunity in the field of recycling. Moreover, the biotechnology and chemicals industry has shown interest developing new products from agricultural waste and forest resources.[138]

5.3 Country overview and policy developments

Over the past decades, Germany has made significant progress in the areas of energy transition, climate protection, and sustainable development. This has been driven by Germany's turn away from nuclear energy and movement towards a comprehensive approach to resource efficiency, e.g., in the form of more efficient energy use and production. This was followed by internationally driven awareness raising activities concerning sustainable development and emission neutrality that led to the integration of industrial and environmental policy considerations.

Tying into this paradigm shift, waste management and recycling efforts were stepped up. In recent years, in line with increased international CE awareness, German actors acknowledged the need to consider eco-design to fully transform the country's economy. This approach has brought Germany to the forefront within the EU, but also globally, when it comes to recycling and sustainable technology innovation (predominantly in the areas of energy efficiency, sustainable water management, and sustainable mobility). Although Germany has no explicit CE strategy in the way that the EU and a number of other NL (near-)neighboring countries interpret it, its elaborate and comprehensive policies concerning efficiency in the use and management of material resources can be considered a close match, and Germany is increasingly bringing relevant concepts and policies together to resemble a broader CE approach.

In a nutshell, Germany's key drivers for developing circular resource policies are:

Key drivers of Flemish circular material resource policies

- Ensuring economic growth and competitiveness
- Enhancing resilience and stability through increased resource efficiency
- Making strides in environmental preservation and clean energy
- Boosting national modernization and innovation
- Assuming responsibility in global circular governance

The following section provides an overview of the most important material resource policies adopted by Germany to achieve circularity.

[138] Sina Leipold and Anna Petit-Boix, "The Circular Economy and the Bio-Based Sector: Perspectives of European and German Stakeholders," *Journal of Cleaner Production* 201 (November 10, 2018): 1125–37, https://doi.org/10.1016/j.jclepro.2018.08.019.

5.3.1 Policy overview

Figure 15. Evolution of German policies towards circular governance

Raw materials

The German government aims to reduce pressure on domestic resources and ensure the solidity of external flows. Some raw materials are sourced domestically in Germany, mainly those used in the country's building sector and for some of its industry.[139] However, Germany depends on imports for many other raw materials, such as energy commodities, metals, and other materials used in the industrial sector. Particularly in the car industry, one of its most important sectors, Germany is heavily dependent on imported mineral resources and products / derivatives, and this is set to remain the case if electric mobility is to be pushed forward.

Germany is currently still dependent on critical raw material imports. The continued importance of the manufacturing and construction sectors means that maintaining a stable supply of CRMs remains vital for the Germany economy, and any fluctuations in the global market for these CRMs could have an adverse effect on economic growth.[140] Germany's largest import partners are China and the USA, accounting for 10% and 9% of total CRM imports respectively (see Figure 16).[141] Unlike other countries of analysis in this study, Germany imports the larger share of critical raw materials from outside of Europe. China captures the largest foreign CRM market share in Germany with 19%, while all other external trade partners capture a much smaller market share (less than 10%). Germany is therefore directly reliant on the global market for imports of critical raw materials.

[139] "Raw Materials – Indispensable for Germany's Industrial Future" (Federal Ministry for Economic Affairs and Energy), accessed December 22, 2019, https://www.bmwi.de/Redaktion/EN/Dossier/raw-materials-and-resources.html.
[140] Federal Ministry of Economics and Technology, "The German Government's Raw Materials Strategy," 2010, 28.
[141] Federal Ministry of Economics and Technology.

Figure 16. Germany's import partners for critical raw materials as a percentage of total CRM imports[142]

Despite its CRM import dependencies, Germany is not overly reliant on a single import partner; and the top six import partners constitute only half of its market share. Because the German market for imports of CRMs is diffuse, the country may be relatively protected from threats to security of supply. Nonetheless, taking into account the economic importance of CRMs for the German economy, developing a circular economy framework that can facilitate secondary resource use (i.e., recycling) or maintain high levels of resource efficiency will be significant to safeguard security of supply for critical raw materials and Germany's economic growth.

However, there much remains to be done in this regard for Germany to become more self-sufficient in its raw materials.[143] There are two main ways in which the government is approaching this challenge. One is further diversifying their import market for CRMs- increasing the number of international trade partnerships to secure supply. The other approach is by stimulating innovations in technology that move forward the recycling of raw materials.[144] To illustrate the latter, Figure 16 presents how, compared to the EU average and the other countries in question, Germany is far ahead in patents related to sustainable products, processes, and services.[145]

[142] Data is obtained from UN Comtrade for 2018 using SITC HS6 Classifications. Percentage value is averaged percentage import per CRM per country. The size of the bubble is proportionate to the average market share for CRMs per import partner. Below the bubbles, the top three imported CRMs per country are listed. The graphic is constructed to compare EU and Non-EU partners, here delimited by color.
[143] "German Resource Efficiency Programme II - Programme for the Sustainable Use and Conservation of Natural Resources."
[144] "Raw Materials – Indispensable for Germany's Industrial Future."
[145] "Circular Economy Index: Germany Is Number One," 29/05/2018, Recycling International, May 29, 2018, https://recyclinginternational.com/business/circular-economy-index-germany-is-number-one/15414/.

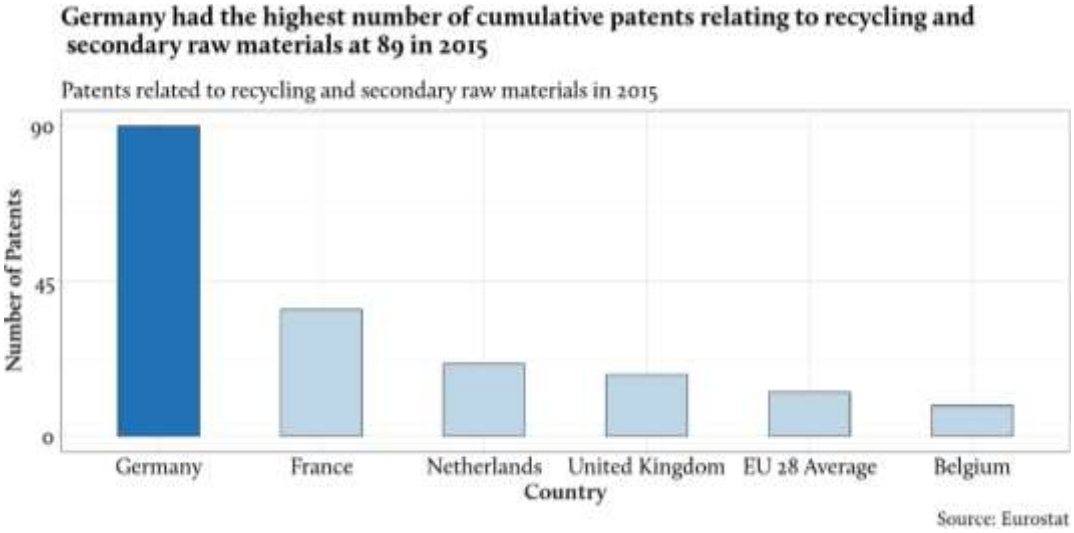

Figure 17. Patents relating to recycling and secondary raw materials across Belgium, France, Germany, the Netherlands, and the United Kingdom in 2015

Waste management

Waste collection and separation into various waste streams of paper, glass, plastic, and household organic waste, define the German waste management system. This system's goal is to minimize waste generation while maximizing recycling, while ensuring sustainable and conscious disposal of the remaining waste.[146] At the heart of Germany's national waste management approach, which has led to sophisticated recycling systems and remarkable recycling rates, lies a specific waste hierarchy with corresponding steps relating to waste prevention, reuse, recycling, and other elements, such as energy recovery and waste disposal. Consequently, Germany has reduced its waste production and reached higher recycling rates than its neighbors (see Figure 18).[147] Also qualitatively, with 30% of total waste going to waste-to-energy plants and approximately 5% to landfills, Germany's recycling rate has been described as the best in the world, not just in the EU.[148] Nonetheless, Germany continues to produce too much waste upstream: for example, plastic packaging reached a record high in 2017.[149]

[146] Karin Lehmphul, "Waste Management," Text, Umweltbundesamt, January 20, 2014, https://www.umweltbundesamt.de/en/topics/waste-resources/waste-management.
[147] Sibylle Wilke, "Abfallaufkommen," Text, Umweltbundesamt, July 19, 2013, https://www.umweltbundesamt.de/daten/ressourcen-abfall/abfallaufkommen; "Circular Economy Index"; "Germany Recycles More than Any Other Country," World Economic Forum, December 18, 2017, https://www.weforum.org/agenda/2017/12/germany-recycles-more-than-any-other-country/.
[148] "Circular Economy Index"; "Germany Recycles More than Any Other Country."
[149] "Germany Produces Record Amount of Packaging Waste," Deutsche Welle, November 18, 2019, https://www.dw.com/en/germany-produces-record-amount-of-packaging-waste/a-51293541.

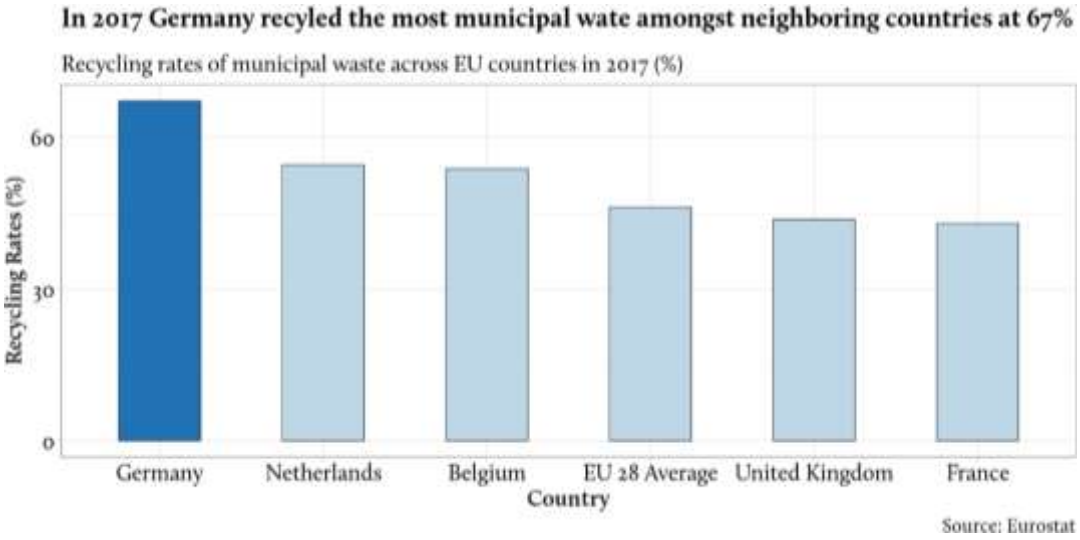

Figure 18. Recycling rate of municipal waste across Belgium, France, Germany, the Netherlands and the United Kingdom in 2017

The policy underlying Germany's waste management approach is the *Act Reorganizing the Law on Closed Cycle Management and Waste ('Kreislaufwirtschaftsgesetz'* – KrWG), adopted in 2012.[150] It constitutes the legal basis and guiding principles for the establishment of a CE, most of which concerns material resource management and waste management and reduction, as well as related producer responsibilities. Gradually, this has led to concrete regulation of producer responsibility for vehicles, electric and electronic devices, batteries, and oil.[151] This has brought about more efficient waste management and recycling methods such as separated collection and sorting of waste, thermal treatment including energy recovery, mechanical-biological treatment, and fermentation processes for biowaste.[152]

Resource efficiency and industrial policy

In 2012, Germany was one of the first countries to adopt a comprehensive material resource strategy via its so-called ***ProgRess*** program. Its overarching goal is to "make the extraction and use of natural resources more sustainable and meet our responsibility to future generations by helping to secure the natural foundations of life for the long term."[153] Since then, Germany focuses greatly on the **decoupling of economic growth from resource use** whilst strengthening Germany's **economic competitiveness**, thereby **integrating industrial and environmental policy considerations**. Particularly salient in driving the German resource efficiency approach is also the realistic possibility for the country to reduce its raw material consumption by almost 60% (compared to 2010 levels) and its greenhouse gas emissions in 2050 by

[150] "Cycle Management," Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU), accessed December 17, 2019, https://www.bmu.de/en/topics/water-waste-soil/waste-management/waste-policy/cycle-management/.
[151] "Waste Policy."
[152] "German RETech Partnership."
[153] "German Resource Efficiency Programme (ProgRess) – an Overview," Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit, accessed March 16, 2020, https://www.bmu.de/en/topics/economy-products-resources-tourism/resource-efficiency/overview-of-german-resource-efficiency-programme-progress/.

95% (compared to 1990 levels).[154] The German climate protection law from 2016 underpins these efforts by committing the country legally to achieve full climate neutrality by 2050.

Alongside the government's climate protection law, Germany's material resource efficiency policies also relate to the country's energy transition efforts, driven by the country's aim to enhance energy efficiency and to modernize, innovate, and digitize its electricity and heat sectors.[155] All of this constitutes a more sustainable societal and economic model, and the energy transition intrinsically relates to material resources and circularity in this context.

Germany's **updated *ProgRess II* policy from 2016** promotes the joint analysis of energy and material efficiency to identify synergies and avoid conflicts, with economic considerations at the heart of the resource efficiency strategy promoted therein.[156] This has also led to the adoption of the **first industrial sustainability strategy in 2017,** aiming to specifically address several SDGs, including clean energy, sustainable economic growth, production consumption, and innovation.[157] The **GreenTech Made in Germany** initiative relates closely to this, focusing on environmental technologies and digitization for the medium-sized industry in order to develop a greener and more resource efficient economy, in light of increasingly scarce resources. In 2016, the green tech market in Germany was worth €347 billion, attesting to the country's advanced position in this sector.[158] In 2019, Germany adopted a **'modern' industrial policy comprising environmental protection and digitalization**.[159] However, this policy focuses on some individual links in value chains – such as the promotion of battery cells – but **not on the entire ecosystem**.[160] With *ProgRess II* as background context for this, we can interpret this take as a comprehensive CE approach, given its extensive provisions on the efficient use of resources.

Eco design and the circular economy

The EU *Ecodesign Directive* (2009/125/EC) aiming to "mitigate the environmental impact of energy-related products over their entire lifetime" was formally implemented in Germany as the ***Energy-related Products Act* in 2011**.[161] Subsequent takes on the

[154] Laura Schoen, "Klimaneutral leben im Alltag," Text, Umweltbundesamt, September 20, 2019, https://www.umweltbundesamt.de/themen/klimaneutral-leben-im-alltag.
[155] Gero Rueter, "Deutschland Beschließt Klimagesetz," Deutsche Welle, September 23, 2016, https://www.dw.com/de/deutschland-beschlie%C3%9Ft-klimagesetz/a-19569906.
[156] "German Resource Efficiency Programme (ProgRess II)," Ellen MacArthur Foundation, accessed February 20, 2020, https://www.ellenmacarthurfoundation.org/case-studies/german-resource-efficiency-programme-progress-ii.
[157] "Nachhaltigkeit in Der Wirtschaft," BMWi, accessed January 7, 2020, https://www.bmwi.de/Redaktion/DE/Textsammlungen/Wirtschaft/leitprinzip-nachhaltigkeit.html.
[158] "Environmental Technology in Germany," Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, accessed March 16, 2020, https://www.greentech-made-in-germany.de/en/environmental-technology-in-germany/.
[159] "A Modern Industrial Policy," BMWi, accessed January 7, 2020, https://www.bmwi.de/Redaktion/EN/Dossier/modern-industry-policy.html.
[160] PEter Bofinger, "Industrial Policy: Is There a Paradigm Shift in Germany and What Does This Imply for Europe?," May 27, 2019, https://www.socialeurope.eu/industrial-policy-in-germany.
[161] Weber and Stuchtey, "Pathways towards a German Circular Economy – Lessons from European Strategies (Preliminary Study)."

concept of eco design go beyond a focus on energy only, and are more encompassing in their scope and relate closely to resource management policies. In 2018, the *National Programme for Sustainable Consumption* was adopted, shifting **towards a perspective that systematically considers eco design and products' life cycles**.[162] The German Federal Environment Agency also commissioned the project 'EcoDesign Circle' in 2018, which concerns promotion of eco design in Germany, **keeping materials in circulation and preventing them from becoming waste in the first place**.[163]

5.4 Possibilities for cross-border cooperation for the Netherlands

Germany and the Netherlands already cooperate in many areas related to CE policies, partially within platforms that provide the potential for extension. Given their already strong economic interdependence in the border regions, and with the largest joint trade volume within the EU, coupled with shared ambitious sustainability targets, an enhanced Dutch–German resource management cooperation provides much potential. Particularly regarding energy policies, both countries collaborate extensively, particularly in the Dutch–German Rhine border region.[164] There are also joint efforts in the generation of offshore wind energy in the North Sea.[165] In this regional context, if Germany were to join the existing North Sea Resources Roundabout partnership between the United Kingdom, Flanders, France, the European Commission, and the Netherlands, which seeks to enhance cross-border trade and use recycled materials, further cooperation benefits for material resource management could be achieved.[166]

In 2019, the German Partnership for Sustainable Textiles and the Dutch Agreement on Sustainable Garments and Textile signed a cooperation agreement with the goal of supporting companies in implementing due diligence by harmonizing sustainability requirements.[167] Moreover, via the *European region* (EUREGIO) initiative, Dutch–German cross-border cooperation and progress in areas such as economy, sustainability, and energy are promoted and could be expanded to include more CE-focused projects.[168] Similarly, the EU's subsidy program INTERREG supporting cross-border cooperation within Europe made approximately €440 million available for the Dutch–German region for the period between 2014 and 2020.[169] These platforms within

[162] European Commission, "Germany," Text, Eco-innovation Action Plan, August 25, 2016, https://ec.europa.eu/environment/ecoap/germany_en.
[163] "UBA Supports Design for a Circular Economy," Text, Umweltbundesamt (UBA), October 25, 2018, https://www.umweltbundesamt.de/en/topics/uba-supports-design-for-a-circular-economy.
[164] Jan Frederik Braun, "Energy R&D Made in Germany: Strategic Lessons for the Netherlands" (The Hague Centre for Strategic Studies, March 20, 2019), https://hcss.nl/report/energy-rd-made-germany-strategic-lessons-netherlands.
[165] Bernd Radowitz, "Germany and Netherlands Mull Cross-Border Offshore Wind Farms," Recharge, July 10, 2019, https://www.rechargenews.com/wind/germany-and-netherlands-mull-cross-border-offshore-wind-farms/2-1-684012.
[166] "A Circular Economy in the Netherlands by 2050" (Dutch Government, n.d.), https://www.government.nl › documents › 17037+Circulaire+Economie_EN.
[167] "German Partnership for Sustainable Textiles & Dutch Agreement on Sustainable Garments & Textile Sign Cooperation Agreement to Support Co's in Implementing Due Diligence," Business & Human Rights Resource Centre, January 30, 2018, https://www.business-humanrights.org/en/german-partnership-for-sustainable-textiles-dutch-agreement-on-sustainable-garments-textile-sign-cooperation-agreement-to-support-cos-in-implementing-due-diligence.
[168] "About Euregio," euregio, accessed January 3, 2020, https://www.euregio.eu/en/about-euregio.
[169] "Start," INTERREG, accessed January 3, 2020, https://www.deutschland-nederland.eu/en/.

the EU framework continue to offer optimal spaces for further collaboration and the alignment of national strategies and leadership internationally.

Furthermore, the Holland Circular Hotspot provides an important platform for Dutch–German CE cooperation, being dedicated to furthering international collaboration on the CE between companies and knowledge institutes that operate in the waste and recycling sectors and/or are otherwise concerned with CE transition.[170] Germany joining in here could be a vital step in order to enhance knowledge exchange and develop aligned CE strategies as well as cross-border implementation thereof. The online platform *Het Versnellingshuis: Nederland circulair!* for CE entrepreneurs linked to the Holland Circular Hotspot has similarities to the German VDI Centre for Resource Efficiency which provides further room for collaboration.[171]

5.5 Conclusions and key takeaways

In summary, the comprehensive German material resources approach puts the country at the forefront of circular thinking. Having been traditionally predominantly focused on waste management and the energy transition which has put the country at the forefront of resource efficient thinking and approaches, there is still room for Germany to make progress in terms of innovation in products' life-cycle-wide sustainability, as well as turning waste and raw materials into resources. Moreover, Germany can use the approach to further its inclusion of other sectors connected to the circular economy and link those policy areas with its already sophisticated resource management approach.

As shown in the previous section, the Netherlands and Germany have a number of similar initiatives and already collaborate effectively on quite some topics concerning material resource use and management. The Holland Circular Hotspot (including the aforementioned virtual platform *Het Versnellingshuis: Nederland circulair!*) and the German VDI Centre for Resource Efficiency are well-suited to work together on enhancing circularity in particular.[172] Another area where the Netherlands could both collaborate with Germany and improve its own practices lies in waste prevention given that it inherently links to improving countries' circular economies. Germany's emphasis on producer responsibilities as a way to motivate circular, resource-efficient practices provides another learning area for development in the Netherlands. Finally, the two countries could work together to design whole-of-society approaches to transitioning their handling of material resources.

[170] "International Network," *Holland Circular Hotspot* (blog), https://hollandcircularhotspot.nl/en/network/, January 3, 2020.
[171] "Nederland Circulair: Circulair Ondernemen," Nederland circulair! Versnellingshuis, accessed March 29, 2020, https://www.circulairondernemen.nl/about-us.
[172] "Nederland Circulair: Circulair Ondernemen."

6. Country focus: United Kingdom

Summary. In the UK, there has been a strong focus on waste management which is slowly being supplemented by economic considerations that emphasize resource efficiency and productivity. This is gradually leading towards a more comprehensive CE mindset, driven among others by the UK's need for competitiveness in light of Brexit. A national CE strategy was adopted recently in 2018, but to this day remains a strategy rather than a concrete policy. While fragmented CE approaches among the country's different administrations seem to hamper consistent CE progress across the entire UK, some regional CE strategies even surpass the EU's Green Deal and present a role model for the UK's other administrations and other countries such as the Netherlands.

6.1 Key terms

6.1.1 Circular economy

The UK government describes circular economy as "moving away from (the) current linear economy (make-use-dispose) towards one where our products, and the materials they contain, are valued differently; creating a more robust economy in the process."[173] It emerges as a systems approach, meaning that "keeping resources in productive use is not just a matter for individual firms on the one hand, or consumers on the other, but part of the whole economic system."[174] These definitions reflect a gradually changing CE understanding in the UK that was long dominated by a rather exclusive focus on waste management. A more comprehensive mindset, including broader resource efficiency and productivity is however emerging, not least driven by the UK's Brexit, which requires the country to stay competitive its policies are no longer guided by EU law.[175] England's strategy *Our waste. Our resources* also speaks on UK-wide policies, and it makes it clear that there is no clear line to be drawn between CE and resource efficiency in the UK, stating that "preserve material resources by minimizing waste, promoting resource efficiency and moving towards a circular economy in England."[176]

6.1.2 Resource efficiency

The 2013 *Waste Prevention Program for England* understands resource efficiency as a process by which "fewer resources are used to produce more, making the most of these

[173] Duncan Baker-Brown, *The Re-Use Atlas: A Designer's Guide Towards the Circular Economy* (Routledge, 2019).
[174] Julie Hill, "Chapter 13: Circular Economy and the Policy Landscape in the UK," in *Taking Stock of Industrial Ecology* (Guildford, UK: Springer Open, 2016), 256–74.
[175] Louis Dawson, "'Our Waste, Our Resources; A Strategy for England'– Switching to a Circular Economy through the Use of Extended Producer Responsibility," *Environmental Law Review* 21, no. 3 (September 1, 2019): 210–18, https://doi.org/10.1177/1461452919851943; Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England" (UK Government, December 18, 2018), https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england.
[176] Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."

resources by keeping them in use for as long as possible [...]".[177] Efforts at achieving greater resource efficiency in the UK are driven by three main factors: productivity/competitiveness, resource security, and climate change.[178] Resource efficiency is associated directly with overall economic security as well as environmental issues in the UK context, including resource availability, water use, and the country's ecological footprint. It was driven by the realization that the current market is incredibly prone to inadequately indicating the environmental impact of the raw material extraction, with a lack of information on resources risks potentially affecting UK businesses, along with restricting behavioral barriers that improve resource use.[179]

6.2 Main stakeholders

6.2.1 Governance

- In the UK, the **Department for Environment, Food and Rural Affairs (DEFRA)** is responsible for environmental protection and sustainable development. In 2018, it published England's resource and waste strategy,[180] which envisions to invoke the **"polluter pays" principle**, therefore extending manufacturers responsibility in recycling and reducing packaging.[181] Although so far only a strategy, in 2019 the government launched a nation-wide follow-up discussion about potential policy reforms of the waste management and recycling system.[182]
- The **Department for Business, Energy and Industrial Strategy (BEIS)** is a 2016 merger of the former Department for Business, Innovation and Skills and the Department of Energy and Climate Change. It is responsible for business and industrial strategy, science, research and innovation, energy and clean growth, as well as climate change policy. The BEIS was the governmental driver in the development of the national Bioeconomy Strategy to 2030 and works with key stakeholders from the industry in developing solutions for a sustainable economy.[183]
- The national **British Standards Institution (BSI)** developed a **voluntary framework for implementing the principles of the CE in organizations**. While not binding, it

[177] The Waste Prevention Team, "Prevention Is Better than Cure: The Role of Waste Prevention in Moving to a More Resource Efficient Economy" (HM Government, December 2013), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/265022/pb14091-waste-prevention-20131211.pdf.
[178] Environment Agency, "More from Less —Material Resource Efficiency in Europe: Country Profile France."
[179] "Resource Security Action Plan: Making the Most of Valuable Materials" (DEFRA, March 2012), http://www.defra.gov.uk/environment/economy/.
[180] Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."
[181] Dawson, "'Our Waste, Our Resources; A Strategy for England'– Switching to a Circular Economy through the Use of Extended Producer Responsibility"; UK Government, "Government Sets out Plans to Overhaul Waste System," GOV.UK, 2019, https://www.gov.uk/government/news/government-sets-out-plans-to-overhaul-waste-system.
[182] UK Government, "Government Sets out Plans to Overhaul Waste System."
[183] Industry UK Government, "Growing the Bioeconomy- A National Bioeconomy Strategy to 2030," 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/761856/181205_BEIS_Growing_the_Bioeconomy__Web_SP_.pdf.

provides practical tips for organizations to re-think their resource management, bringing financial, environmental, and social benefits.[184]

6.2.2 Public-private and non-governmental stakeholders

- In 2018, the UK government released its first-ever national *Bioeconomy Strategy*, which was developed in close cooperation with key industry representatives.[185]
- The **Waste and Resources Action Programme (WRAP)** is a British registered charity that receives funding from the Department for Environment, Food and Rural Affairs, the Welsh and Northern Ireland governments, as well as from the EU. The organization helps businesses, individuals, and local communities in building up a circular economy through waste reduction, developing sustainable products, improved resource efficiency.[186]
- The **Green Investment Group** constitutes one of the largest teams of dedicated green infrastructure investors in Europe which invests within businesses to reduce onsite energy demand and produce onsite power while replacing standard energy sources with long-term power purchase agreements.
- Funded by the DEFRA, International Synergies set up the **National Industrial Symbiosis Programme (NISP)** with the goal to operationalize waste material from across the nation through regional and local structures.[187]
- The UK's renowned **Ellen MacArthur Foundation** has a strong international reputation in inspiring a generation to re-think, re-design, and build a new platform centered around the CE, in working with businesses, governments and cities. The independent think tank **Green Alliance** also engages with political leadership, sustainable businesses, and NGOs to accelerate political action and create transformative, green policy. It set up the **Circular Economy Task Force**, a forum for policy-, innovation-, and business-based thinking about resources.

6.3 Country overview and policy developments

Across the United Kingdom, there has been a primary focus on energy transition as well as waste management. Only recently, awareness shifted from these areas to a more comprehensive circular resource management approach.[188] Among the regional approaches in implementing such policies, Scotland and Wales are most advanced, even surpassing the EU CE strategy in terms of targets and initial implementation plans.

[184] British Standards Institution, "BS 8001 Circular Economy | BSI," 2020, https://www.bsigroup.com/en-GB/standards/benefits-of-using-standards/becoming-more-sustainable-with-standards/BS8001-Circular-Economy/.
[185] UK Government, "Growing the Bioeconomy- A National Bioeconomy Strategy to 2030."
[186] "WRAP - Circular Economy & Resource Efficiency Experts," accessed March 24, 2020, https://www.wrap.org.uk/.
[187] "National Industrial Symbiosis Programme - International Synergies," International Synergies, accessed January 13, 2020, https://www.international-synergies.com/projects/national-industrial-symbiosis-programme/.
[188] Dawson, "'Our Waste, Our Resources; A Strategy for England'– Switching to a Circular Economy through the Use of Extended Producer Responsibility."

In a nutshell, the UK's key drivers towards material resource circularity are the following:

Key drivers of the UK's circular material resource policies

- 'More from less': both in terms of security of material resources supply and the environment
- Increasing productivity and competitiveness
- Increased pressure on the UK to progress in the wake of Brexit, as the UK will no longer be regulated by the EU's circularity policies

The following section presents a brief overview of the current situation in the country and outlines the UK's policies towards material resource circularity.

6.3.1 Policy overview

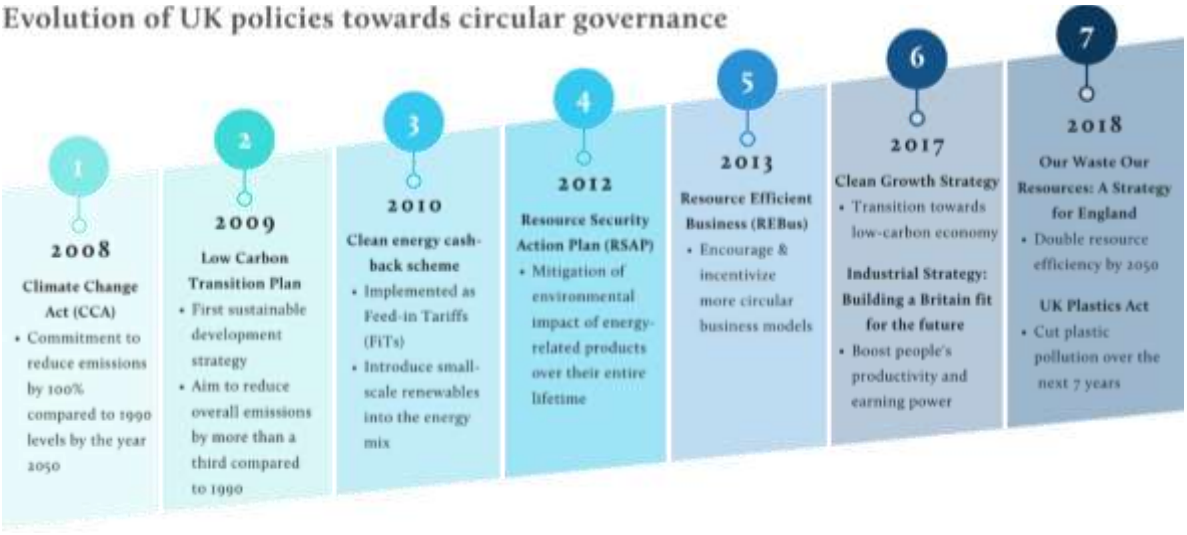

Figure 19. Evolution of UK circular economy policies

Raw materials and security of supply

The UK Climate Change act 0f 2008 was amended in 2019 to set the target of achieving net zero carbon emissions by 2050.[189] The 2017 *Clean Growth Strategy,* the 2017 strategy document *Building a Britain fit for the future,* and the 2018 Circular Economy *Strategy for England* outline the UK's plans on how to achieve such a low carbon economy, and how to **support long-term efficiency and double resource efficiency by 2050**.[190] These documents build on the foundations set in the UK's *25 Year Environmental Plan*.[191] And while the UK is still far from reaching its long-term goals, its resource

[189] UK Government, "Leading on Clean Growth – The Government Response to the Committee on Climate Change's 2019 Progress Report to Parliament – Reducing UK Emissions – October 2019," 2019, 126.
[190] Department for Business, Energy & Industrial Strategy, "Industrial Strategy: Building a Britain Fit for the Future" (UK Government, 2017), https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future; UK Department for Business, Energy and Industrial Strategy, "Clean Growth Strategy," 2017, 167; Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."
[191] Department for Business, Energy & Industrial Strategy (2017), "Industrial Strategy: Building a Britain Fit for the Future."

efficiency is steadily improving and has increased again between 2017 and 2018. Indeed, Figure 19 below shows that apart from the Netherlands, the UK boasts the highest resource productivity compared to the other countries discussed in this report.

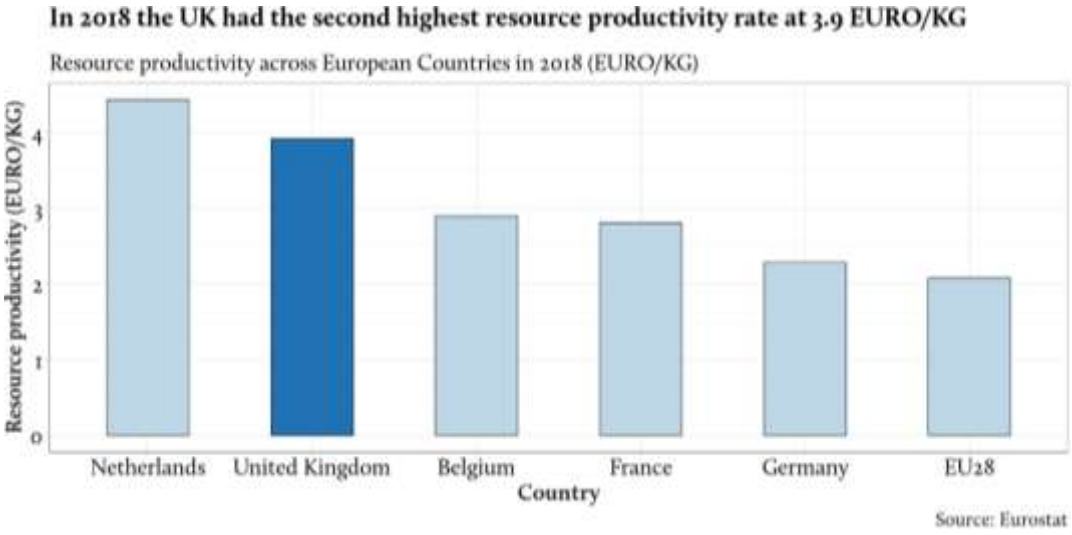

Figure 20. Resource productivity across European Countries in 2018

Apart from its successes in resource productivity, the UK has made substantial efforts to **knit together circular economy pillars and unite waste management and resource efficiency**, as described in the *From Waste to Resource Productivity* report from the Government Office for Science.[192] These **steps to move towards a unified circular economy strategy** can more effectively move the UK towards full circularity of material resources.

Improving resource efficiency as a key component of the UK's circular economy package has been a close collaboration between the UK government, not-for-profit and private sectors, involving efforts from charities such as the Ellen MacArthur Foundation and private consultant firms such as McKinsey & Company. Furthermore, British companies have made gains in the resource productivity of raw materials. British company Rolls-Royce has made gains in recycling materials in the production of engines, to the extent that almost a half-used aero engine can be reused safely.[193] Such advances in the automotive sector can have a significant impact for the UK as the manufacturing sector accounts for roughly 10% of British GDP, including also the fields of aerospace, electronics, and chemical manufacturing.[194] Indeed, the UK has one of the world's largest aerospace industry in the world,[195] responsible for manufacturing both

[192] UK government, Government Office for Science, Department for Environment, Food & Rural Affairs, "From Waste to Resource Productivity" (UK Government, December 14, 2017), https://www.gov.uk/government/publications/from-waste-to-resource-productivity.
[193] Cambridge Institute for Sustainable Leadership, "Resource Productivity and the Circular Economy: the opportunities for the UK economy"
[194] Department for Business Innovation & Skill, "Manufacturing in the UK: An Economic Analysis of the Sector," 2010, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/31785/10-1333-manufacturing-in-the-UK-an-economic-analysis-of-the-sector.pdf.
[195] Export.gov, "United Kingdom - Aerospace," 2019, https://www.export.gov/apex/article2?id=United-Kingdom-Aerospace.

civil and military aircrafts and the associated components for which a number of critical raw materials (CRMs) are needed.

Of the United Kingdom's top trading partners for CRMs, there is a roughly equal split between European and non-European import destinations, as seen in Figure 21. The UK's top import partner by percentage average of import dependency for total CRMs is Germany, which accounts for 19% of total CRM imports. Followed by China at 13% of total CRM imports. For the UK, flows in CRMs coming from Europe represents an added risk to security of supply as a result of the uncertainty surrounding Brexit. There is ambiguity surrounding the conditions that will govern trade relationships between the UK and the rest of Europe. The British import market for critical raw materials may re-orient to CRM producing countries directly. Increased integration to the global market could lead to deteriorations in security of supply linked to geopolitical tensions. Further, if the European re-export of CRMs is constituted by CRMs processed by Germany, the Netherlands or Poland, then the flow of value-added CRM products is threatened by Brexit uncertainty. So, the UK sees several potential threats to the security of supply for raw and value-added CRMs in the near future. As a result, making strides in resource efficiency within the British economy that can protect economic growth is vital in the face of potential threats to CRM security of supply.

United Kingdom top import partners for Critical Raw Materials (CRMs)

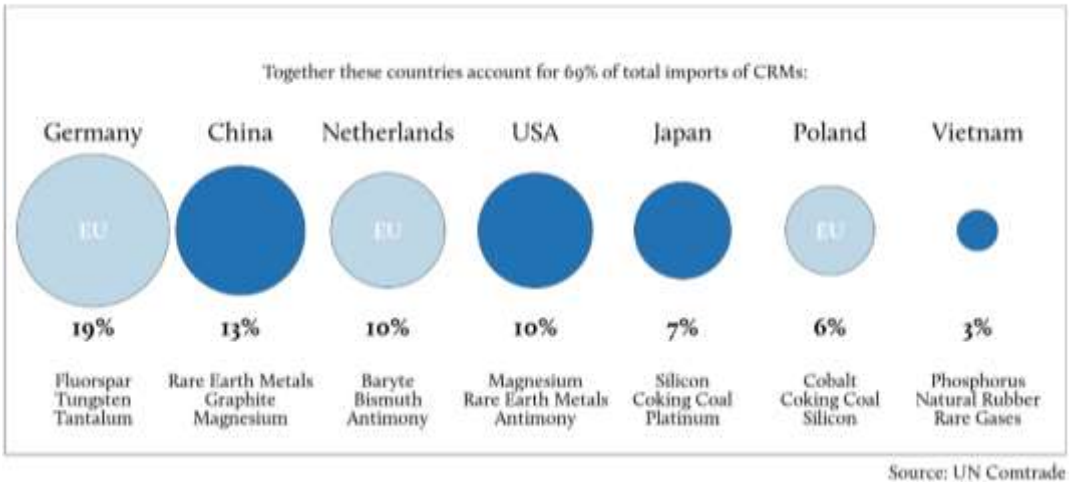

Figure 21. The United Kingdom's import partners for critical raw materials as a percentage of total CRM imports[196]

Waste management

The waste management system in the UK has both strengths and weaknesses. In general, waste generation in the UK has increased despite improvements in its

[196] Data is obtained from UN Comtrade for 2018 using SITC HS6 Classifications. Percentage value is averaged percentage import per CRM per country. The size of the bubble is proportionate to the average market share for CRMs per import partner. Below the bubbles, the top three imported CRMs per country are listed. The graph is constructed to compare EU and non-EU partners, here delimited by color. Where there is disparity between SITC and EU reports, the following classifications were used; Germanium, Gallium, Hafnium, and Vanadium appear in the categorization as Other Metals. Helium is included as Rare Gases. Fluorspar is included as acid grade, which accounts for 65% of the market.

household recycling rates. At regional level, Wales substantially outperforms England, Scotland, and Northern Ireland in terms of its waste management, raising the UK's overall performance. In 2016, the UK generated 4.3% more waste than in 2014,[197] The UK's total recycling rate has improved since 2014, but is practically nullified by the also increased landfill rate.[198] Between 2010 and 2018, the household recycling rate increased to 45%, as shown by Figure 22, but it was still unable to meet the EU target of reaching 50% by 2020.[199] However, for recycling rates of all waste, which includes household waste, the United Kingdom at the latest recorded figures was on par with the EU average at 58% vs 57% recycling rate[200]. Furthermore, the UK surpassed material-level recycling rates laid out by the EU for all categories in 2017.[201]

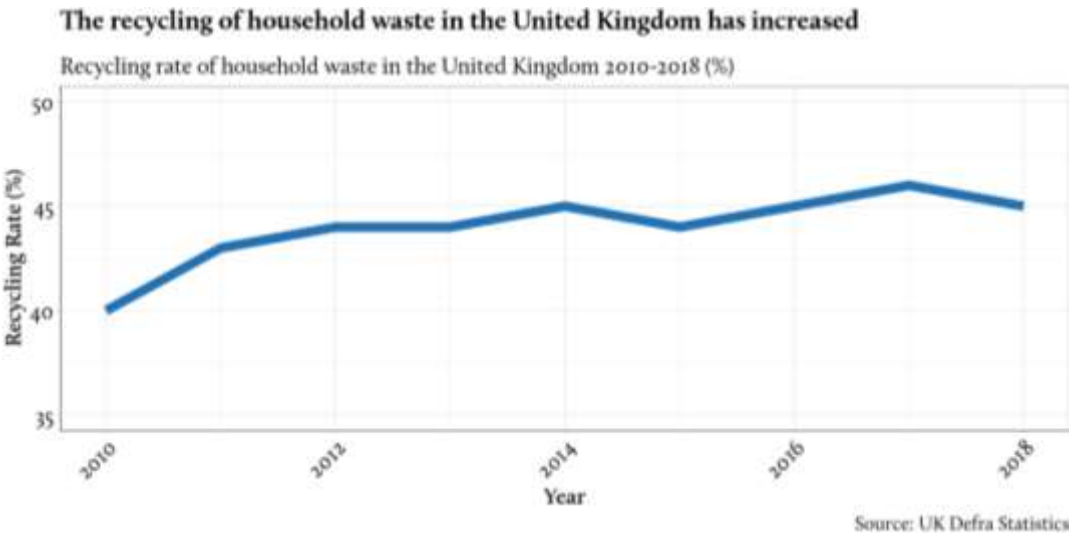

Figure 22. Recycling rate of household waste in the United Kingdom 2010-2018

The UK-wide policies have built on the EU's concept of a waste hierarchy. Since the UK still relies on municipal waste being directed to landfills, the Committee on Climate Change aims to eliminate all biodegradable waste by 2030. Using the UK's widely understood concept of the 3 Rs – reduce, re-use, and recycle – the *Waste and Resource Action Programme* (WRAP) seeks to build on this foundation by "re-inventing at the design stage, re-thinking a product's use phase and re-defining its end of life."[202] The program strives to provide a whole-of-life-cycle approach to certain industries, namely food and drink, clothing and textiles, and electrical and electronics. Furthermore, the *UK Plastics Pact* from 2018 has set targets for 100% of plastics to be reusable, recyclable, or compostable, with preliminarily 70% to be effectively recycled by 2025.

[197] Department for Environment, Food & Rural Affairs, "UK Statistics on Waste" (DEFRA, March 7, 2019), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf.
[198] Department for Environment, Food & Rural Affairs, "UK Statistics on Waste."
[199] Department for Environment, Food & Rural Affairs, "UK Statistics on Waste."
[200] Eurostat
[201] Department for Environment, Food & Rural Affairs, "UK Statistics on Waste"
[202] "Resource Revolution: Creating the Future" (Waste and Resource Action Programme, 2015).

Integrated Business Models as part of industrial policy

The UK government is encouraging **business models** that can not only be designed with less materials to achieve greater circularity, but also support services models that **facilitate the redistribution of materials**.[203] To incentivize business to adopt such measures, WRAP has been leading a project named Resource Efficient Business (REBus) since 2013 that calculated that the UK economy could save £75 billion by 2030 if there was a widespread adoption of resource-efficient business models.[204]

The UK is striving to **influence business to become more efficient in how natural resources are transformed into products**. The most significant actions are being led by WRAP invoking **Extended Producer Responsibility**, whereby the producer is responsible to pay the "full net cost of managing packaging waste at end of life," focusing mostly on plastics and biodegradable waste.[205] This has been adopted across the four UK administrations and translated into concrete initiatives (although implementation strategies between them can differ).[206]

Moreover, in a collective approach between government, industry, and the research community, the UK has set out a national *Bioeconomy Strategy to 2030*, that aims for "using renewable biological resources to replace fossil resources in innovative products, processes and services."[207] The goal is to remove the UK's dependence on fossil fuels and to create new economic sectors in agri-food, energy production, chemicals and health.[208]

Towards a circular economy

In 2012, the UK government decided to place emphasis on the recovery of used materials rather than sourcing new ones, resulting in the *Resource Security Action Plan* (RSAP). In **England and Northern Ireland, the CE is predominantly focused on resource efficiency and waste management, e.g., through influencing consumer behavior** on product durability and reparability, achieving great value from re-use and recycling and product durability through design and customer information. **Wales approaches the CE via the implementation of an extensive recycling scheme** whereby the separation of recovered materials from their original sources is a key strategy to reduce its footprint.

[203] Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."
[204] "Reports and Tools – REBus," REBus, 2015, http://www.rebus.eu.com/resources/reports-and-tools/.
[205] UK Government, "Government Sets out Plans to Overhaul Waste System."
[206] Wales' installed annual % targets for the reduction of different types of waste; household, industrial or commercial in order to achieve the target of 0 (non-recyclable) waste by 2050. These targets have been complemented by rigorous recycling policies set by the Welsh government, resulting in it recycling more than 50% of its waste. Scotland is also proactive, yet lacks the stringent annual targets to waste, only setting one additional target to the CCC's of a 15% reduction from 2011 levels by 2025. Their proactivity is directed in by Zero Waste Scotland in providing investment in the recycling and reprocessing of plastics, textiles and electrical and electronic equipment. England and Northern Ireland have no additional waste prevention targets to that laid out by the CCC.
[207] UK Government, "Growing the Bioeconomy- A National Bioeconomy Strategy to 2030."
[208] UK Government.

On a regional level (England, Wales, Scotland, and Northern Ireland) CE and related waste management policies differ significantly.[209] Scotland features a comprehensive strategy surrounding the CE since 2016 (*Making Things Last: a circular economy strategy for Scotland*),[210] Wales commits to research and waste minimization, England's recycling strategy's focus is also clear from its policy document *Our waste. Our resources*,[211] and Northern Ireland has no formal strategy, although some local authorities do and are lobbying for national uptake.[212]

England's waste and resource management strategy from December 2018, while explicitly developed as a further implementation plan following the UK's *25 Year Environmental Plan*, also includes a chapter on the intention to make the whole of the UK a world leader in resource management and waste prevention and disposal practices.[213] The strategy was developed with the knowledge that the UK is leaving the EU and has been heavily influenced by EU environmental and resource management laws. Although this strategy explores many policy options, it has been criticized for lacking detail on how to implement these options.[214]

6.4 Possibilities for cross-border cooperation for the Netherlands

Although the UK and the Netherlands are major trading partners, there is still room for more collaboration in relation to material resource efficiency policies and other concerns related to the development of a CE. There is, however, one example of existing cooperation which can already pave the way for tighter CE integration, namely the **North Sea Resources Roundabout**. This public-private partnership signed between the UK, Flanders, France, the European Commission, and the Netherlands aims to "facilitate the use and cross-border trade and recycled materials."[215]

Another point of existing cooperation is the EU-funded REBus project, which aims to enables companies more profitable, resilient, and have more resource efficient business models (REBMs).[216] This business-focused approach could provide fertile ground for mutual knowledge exchange amongst both.[217]

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[209] Environment Agency, "More from Less —Material Resource Efficiency in Europe: Country Profile France."
[210] Scottish Government, "Making Things Last: A Circular Economy Strategy for Scotland," 2016, 43.
[211] Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."
[212] The Parliamentary Office of Science and Technology, "Designing a Circular Economy," September 2016, http://researchbriefings.files.parliament.uk/documents/POST-PN-0536/POST-PN-0536.pdf; Kate Dickinson, "Northern Ireland Region Signs up for Pioneering Zero Waste Circular Economy Strategy," *Resource Magazine*, February 1, 2018, https://resource.co/article/northern-ireland-region-signs-pioneering-zero-waste-circular-economy-strategy-12379; Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England."
[213] Department for Environment, Food & Rural Affairs and Environment Agency, "Our Waste, Our Resources: A Strategy for England"; Department for Environment, Food & Rural Affairs, "A Green Future: Our 25 Year Plan to Improve the Environment" (UK Government, January 11, 2018), https://www.gov.uk/government/publications/25-year-environment-plan.
[214] Dawson, "'Our Waste, Our Resources; A Strategy for England'– Switching to a Circular Economy through the Use of Extended Producer Responsibility."
[215] "A Circular Economy in the Netherlands by 2050."
[216] "About REBus," 2015, http://www.rebus.eu.com/about-rebus/.
[217] "About REBus."

A barrier to implementing the CE in the Netherlands has been regulations that are too focused on the damaging effects of waste and emissions, while not devoting enough attention to the value of raw materials. The Dutch could cooperate with the UK's National Industrial Symbiosis Program (NISP) and Resource Efficient Scotland, not only to increase project- and program-level collaborations in this field, but also to stimulate the re-thinking of bilateral trade flows between the two nations. Despite these opportunities however, the situation for cooperation between the UK and the Netherlands remains very uncertain for the time post-Brexit.

6.5 Conclusions and key takeaways

In conclusion, the focus of the CE in the UK remains still quite rooted in waste management. However, as the country moves towards a more whole-of-system way of thinking, the four UK administrations are taking on more comprehensive CE approaches and increasingly including material resource and circular business models into consideration. Both Wales and Scotland are going beyond EU targets, subsidizing companies with business models that place regenerative design and resource reuse at their core. In addition, the *British Bioeconomy Strategy* and its actors provide a relevant knowledge hub for an industry-inclusive energy transition.

The Netherlands can gain some inspiration from these regional strategies and learn about the different ways the private sector can be incentivized to adopt and adapt to the CE model. The Netherlands can also learn from the UK's approach to stimulating circular business models, for example with the Extended Producer Responsibility scheme. Stimulating business will be an especially relevant topic to broach once Brexit has largely set in and new types of relations might be forged between businesses in the two countries. The UK's focus on facilitating whole-of-system business models that are more resource efficient remains a notion the Netherlands could pick up and work with.

Moreover, while the Netherlands wields limited influence on the international playing field regarding the CE, it can learn from the strategies of leading UK stakeholders such as the UK's Ellen MacArthur Foundation and Green Alliance, which are particularly renowned for raising awareness globally about the CE and translating it into political action. The way in which they use publicity to turn the CE concept, and the principle of sustainability in general, into a mainstream topic, could serve as an example for the Netherlands. Therein, strong private sector involvement in CE can be encouraged that not only leads to economic gains in the form of net profits and job creation but also to normative change on behalf of the private sector outside the (immediate) realm of national government policy.

7. Conclusions

This report's goal was to explore both the EU's and the Netherlands' (near-) neighboring countries' (Flanders, France, Germany, and the UK) stances and approaches towards circular material resource management. This allows for a comparative assessment alongside the Dutch approach, as well as an assessment for the EU context of CE policy developments. A set of exploratory questions was set out in the introduction to gain insight into these countries, which will be circled back to and answered here.

The following questions were posed in the introduction and will be addressed and answered in this chapter

- How are the terms 'resource efficiency' and 'circular economy' used in the discussed countries/regions? Are there differences to be identified in comparison with the Netherlands, and why? Can other relevant terms be identified in these countries?
- Which material resource policies are being put forward in neighboring countries?
- What are the driving forces in neighboring countries to pursue certain material resource policies?
- What are the most important stakeholders in the neighboring countries regarding the CE?
- Insight into the economic structure of these countries; which economic sectors are important from the perspective of a resource-efficient CE?
- Where are the possibilities for cross-border cooperation for the Netherlands?
- What are key takeaways for the Netherlands at the level of policy strategies and approaches?

7.1 Understanding of resource efficiency, circular economy, and key policy drivers

The first research goal was to understand how the terms 'resource efficiency' and 'circular economy' are used in the examined countries and whether differences could be identified with the Netherlands and why. This relates closely to the second research question concerning what the key drivers towards material resources approaches and policies have been.

Overall, it appears that all examined actors have by now reached a comprehensive understanding of the CE that is relatively in line with the EU, understanding it as an economic model that takes into consideration products' life cycles. This goes beyond waste management or other fragmented environmental policies towards a more comprehensive approach to material resources management that in some countries leads to the intention to change the whole of society's thinking about the use and re-use of material resources.

All actors' key drivers for pursuing material resource policies include – on a general level – economic, security of supply, and often related environmental considerations. However, different emphases appear amongst the actors' understandings of the CE, which can also be traced back to national motivations to pursue the CE in different ways at a policy level as well as in the way in which the CE has been applied, implemented and used. In Germany, for instance, the CE had traditionally been

associated with waste management, which is why particular importance is devoted to material flows and production processes and the country's current approach is more material resource focused than, for example, the UK which builds resource strategies more upon environmental legislation. In France, by contrast, a heavy focus is placed on consumption, given that its core goal is to transform societal thinking and behavior towards more circularity and sustainability. In the UK, in turn, the role of resource productivity on the part of both consumers and industries – such as environmentally sound management of waste and trade of recyclables – is also underscored, stressing economic considerations as another key CE driver. Both the UK and France have incorporated the term 'circular economy' only upon inspiration from the EU, closely aligning their definition and understanding therewith. Flanders recognizes the CE as a fragmented and wide policy field, thereby acknowledging the need to involve different sectors. The Netherlands takes into account several of its neighbors' respective emphases in its definition, meaning that – at least on paper – it understands the CE the most comprehensively and in a way that is closest aligned to the EU's understanding. The different national understandings of the CE are depicted below in Table 3, highlighting the countries' specific focus areas and relating them to their key drivers for pursuing CE policies.

Actor/Country	Understanding of the Circular Economy	Key drivers of Circular Economy policies
EU	An economic model focused on an (almost) *closed loop* which aims to retain the *highest utility and value* of products, components, and materials extending their *life cycles* and keeping them within the economy wherever possible	• Ensuring and boosting economic growth and competitiveness • Protecting economy against scarcity of resources and volatile prices • Maintaining secure and sustainable access to raw materials (limited stock of raw materials coupled with dependence on imports thereof) • Protecting the environment through the development of more efficient ways of producing and consuming • Positioning as global/supranational leader in CE governance
Flanders	A *wide policy field* and an economic model with closed off circuits (to greatest extent possible) of (raw) materials, energy, water, space and food	• Ensuring economic growth and competitiveness opportunities afforded by the CE • Positioning as leader in CE research & innovative technologies • Structural integration of circular products into the whole society (businesses, government, services etc.)
France	An economy in which *consumption* is moderated, products lifecycles are extended, waste is limited and transformed into new resources	• Decoupling economic growth from raw material consumption • Catching up with European neighbors regarding renewable energies, waste management, emissions and the CE (failure to meet self-set targets so far & corresponding external pressure) • Complying with and transposing of EU environmental law and CE thinking into national approaches • Changing consumption behavior in the long run (societal rethinking)
Germany	The establishment of closed-loop *material flows* in which all resources applied over the entire life cycle of a product fully re-enter the *production process* at the end of life of the product	• Ensuring economic growth, resilience and stability (RE) • Going beyond waste management • Assuming responsibility in global environmental governance • Enhancing national modernization and innovation
United Kingdom	A holistic process of keeping resources in *productive use* as a matter for individual *firms*, *consumers* on the other, but also for the whole economic system	• Transitioning to a resource-efficient low-carbon economy • Shielding the economic sector from environmental impacts and dependencies • Aligning with EU targets, policies and thinking
Netherlands	An economy which deals with *resources* in a smart way, meaning to use and *consume* as little as possible, maximize raw materials' *reuse* and develop more durable, sustainably generated *products*	• Increased resource efficiency in order to reduce need for raw materials and thereby decrease dependencies • Decrease emissions by lowering the use of fossil fuels, both for environmental and for security of supply reasons • Frontrunner position in innovative and circular methods of design

Table 3. Different National Understandings of the Circular Economy

7.2 Circular economy

The Netherlands was early among its (near-)European neighbors in adopting an explicit and comprehensive CE strategy in 2016, putting it at the forefront in terms of CE policy development following the EU's *Circular Economy Action Plan* in 2015. Germany has not adopted a strategy explicitly on CE, but it has certainly outlined the same types of ambitions for a circular approach to material resources in its *ProgRess II* policy from 2016. Flanders followed in 2017 with *Circular Flanders*, and France in 2018 with a *Circular Economy Roadmap* that transposes the EC's *Circular Economy Package* introduced in the same year into a national strategy. Meanwhile, various country policies now directly touch upon the CE, with the closest so far being regional UK policies such as the Scottish strategy on CE and England's strategic document on waste and resource management from the end of 2018. While the UK officially still lacks a national CE policy, England's strategy also considers CE goals for the UK as a whole, thereby providing a starting point for a more comprehensive approach. In 2019, the EU adopted a *Green Deal*, addressing (among other issues) the circular transition underpinned by an *Investment Plan* and a *Climate Law* (adopted in 2020).

Figure 23 below outlines the CE policy development in the Netherlands, its (near-) neighboring countries and the EU, depicting existing CE policy strategies and those closest to a comprehensive approach (shown as more transparent in the visual).

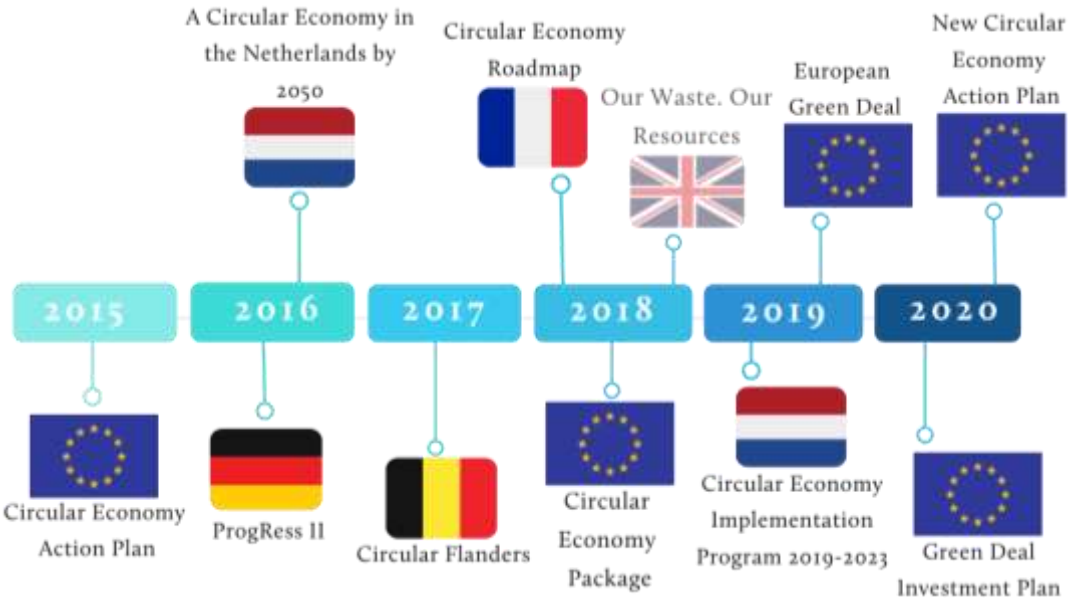

Figure 23. Circular Economy policy strategies throughout the EU, the Netherlands and neighboring countries

7.3 Stakeholders regarding the circular economy

Another aim of this report was to identify important stakeholders regarding the CE in the EU and the Netherlands' (near-)neighboring countries. Relevant stakeholders in the CE transition can generally be split into two groups: 1) governance and policy makers; and 2) research and implementation partners. In terms of CE governance and policy

making, the majority of the countries researched have mandated their Ministries of Environment or Ecology to take on the lead policy responsibility. Specific elements or themes within the CE transition such as energy- and industrial policy and financing, are typically led by Ministries of Economy and Finance. Innovation actions, in turn, are the responsibility of Ministries of Education and Research. In all countries, CE research and implementation is carried out by public-private partnerships and/or other integrated for-profit and not-for-profit platforms and interest groups. To this end, all countries studied have some higher-level circular economy initiative, task force or institute, connecting relevant business and trade, research and academia, and civil society networks. Many non-governmental initiatives work closely with public agencies to ensure concrete action plans are optimally aligned with broader CE policy targets and goals.

The main governance and policymaking actors are listed below in Figure 24, alongside a number of examples from the various countries' research and implementation actors. This division makes it clearer what type of stakeholders and partnerships are more relevant in each country.

	EU	Flanders	France	Germany	United Kingdom
Governance & policy	• Overarching institutions such as European Commission, Parliament, Economic and Social Committee • European Circular Economy Stakeholder Platform	• Ministry of Environment • Ministry of Economy and Innovation • OVAM Public Waste Agency of Flanders • Circular Flanders • Department of Economy, Science and Innovation	• Ministry for Ecological and Inclusive Transition • Ministry of Economy and Finance	• Federal Ministry for the Environment, Nature Conservation and Nuclear Safety • German Federal Environment Agency • Public entities e.g. the Deutsche Städtetag for communities' and cities' interests	• Department for Environment, Food and Rural Affairs • Department for Business, Energy and Industrial Strategy • British Standards Institution
Research & implementation	• European Environmental Agency • European Innovation Partnership on raw materials • Sustainable Procurement Resource Centre • LIFE Program • Circular Economy Stakeholder Platform	• Circular Economy Policy Research Center • VITO • Transitienetwerk Middenveld • The Shift	• General Council for Environment and Sustainable Development • Regional Directorates for Environment, Land Planning and Housing • French environment and energy management agency • National Institute Circular Economy • Association ORÉE	• German Mineral Resources Agency • Circular Economy Initiative Deutschland • German Recycling Technologies and Waste Management Partnership • VDI Centre for Resource Efficiency • Collaborating Centre on Sustainable Consumption and Production	• Waste and Resources Action Programme • Ellen MacArthur Foundation • Green Investment Group • Green Alliance • National Industrial Symbiosis Programme • Circular Economy Task Force

Figure 24. Relevant circular economy stakeholders in EU and the Netherlands' neighboring countries (not exhaustive)

7.4 Possibilities for cross-border cooperation for the Netherlands

There are several opportunities for cross-border cooperation for the Netherlands with its (near-) country neighbors. Many of these could build on and profit from existing EU initiatives, projects, and/or funds concerned with the CE in some way. As a starting point, the Netherlands could strive for further alignment with its neighbors around the European Commission's CE monitoring framework in order to ensure common standards and baselines for evaluating the CE (transition) and achieve better implementation results.

With **Flanders**, the framework of the Benelux Union provides a prosperous platform for cooperation, having committed to promote the CE jointly in 2016 and already including initiatives on the end-of-waste status of paper and the reparability of equipment. These initiatives may already even lead to the introduction of European reparability scores for products.

For **France**, fertile ground for cooperation stems from common areas of interest with regards to the CE transition, namely the areas of construction, textiles, plastic recycling and food and biomass. In the setting of the *Partners International Business* (PIB), both countries could expand their already existing cooperation on waste and bioenergy to the fields of construction and renovation.

A strong tradition of cooperation and close working relationship forms the foundation of Dutch-**German** CE opportunities. Facing similar challenges in transforming their economies, such as having **to provide organizations and businesses with more incentives** as well as to **reform their existing regulations and legislation in order to reduce inherent barriers to a CE**, the **alignment of standards** as well as **information exchange** and mutual learning in this regard constitute vital opportunities for both countries.

Lastly, with the **United Kingdom**, the Netherlands will have to work within an entirely new post-Brexit frame, presenting an opportunity for both governments to press for a **CE focus within businesses** embedded in UK-Dutch trade. The UK experience with its **transition to renewable energy sources** could also further assist the Netherlands in transforming its energy mix away from fossil fuels and address its renewables debt, in accordance with one of its main drivers for the CE transition.

7.5 Key takeaways

To conclude, this exploratory report aimed to identify a number of areas the Netherlands could learn from its (near-) neighbors at both policy strategy and implementation levels – leading to the identification of the following key observations and opportunities.

The Netherlands' national policy approach aligns quite well with the requirements of a CE as identified by the European Commission. However, more can be done to optimize its application efforts moving forward. Germany's longstanding progress in managing material resource flows fits most of the (narrow) CE definition, and the country is thereby relatively ahead of the curve in terms of implementation, despite the fact that on paper it appears not yet committed to an explicit national CE strategy. Meanwhile, France has a strategy that is very promising given its whole-of-society approach, but still lags behind in implementation in certain areas, such as waste management. The UK, in turn, left the EU in 2020. Given the lack of a UK-wide CE policy and the country's need for a material resource policy that can compete with that of the EU and its Member States, this could pave the way for a more ambitious and comprehensive national CE approach moving forward. Certainly, the UK's recent approach to business responsibility in this context looks promising. Flanders is ahead in managing – rather

than simply burning – much of its waste; and has set relatively ambitious targets for reducing household waste creation. However, the industry side of its CE strategy is only variably successful, with many innovative initiatives not yet leading to a jump in industry circularity.

There are four key topics that the EU and its country neighbors are successfully exploring that could further inspire the Netherlands to improve its current circularity strategy:

First, the Netherlands could further **expand cooperation** with the other countries addressed in this study in order to position itself as an international player when it comes to the CE. In this regard, practical commitments at local, national and international level could benefit from mutual knowledge exchange, innovation, awareness raising activities, and political action. **Existing EU platforms and initiatives provide vital resources** for joint projects and knowledge exchange and should be made use of.

Second, France and the UK have made strides in addressing the production side of CE through national schemes tackling **producer responsibility** – and in France to an extent also through consumer responsibility. Such initiatives, introducing a 'polluter pays' principle that should be applied to resource use in products and services, make it possible to hold businesses accountable for their products and treats any associated packaging issues as cornerstones to making societies and economies more circular. In particular, the French approach of increasing product warranty time, mobilizing industries and informing citizens about waste prevention and resource conservation (French 2019 anti-waste law), could serve as a role model of how countries can begin to transform consumption patterns as a whole.

Third, a number of UK (especially Wales and Scotland) initiatives could serve as inspiration for the Netherlands on how to **further incentivize the private sector** to prioritize regenerative design and resource reuse in their **business models**, while France's producer responsibility framework could form a complementary baseline for further development of responsible producer and consumer behavior in a CE.

Fourth, the Netherlands should continue to **align its CE strategy** with other countries. The former has a far-reaching and comprehensive strategy and policy framework that can serve as a model, while the latter can inspire the Netherlands to improve on its practical implementation. In this context, all countries addressed in this report (including the Netherlands) would benefit from a **common monitoring and evaluation mechanism** in order to track and compare progress and remaining obstacles in the quest towards achieving circular use of material resources.

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Annex

1. European Union treaties regarding raw materials[218]

Despite the fact that the European Coal and Steel Community (1951-2002) and Euratom (1957-present) constituted a shared agreement on raw materials, non-energy mineral resources have not been the focus of EU policies and consequently not part of the legal framework of the EU for a long time. The *Raw Materials Initiative* (2008) is the first integrated European strategy on the secure supply of raw materials, including minerals.

The categories and areas of competences of the Union and the Member States are defined in the first articles of the *Treaty on the Functioning of the European Union* (TFEU) and the *Treaty on the European Union* (TEU), the two fundamental documents of the EU, most recently modified by the Treaty of Lisbon (2009).[219]

The principles expressed in the *Raw Materials Initiative* are now incorporated in several pieces of secondary EU legislation accepted or amended in the last five years, for example the *Concessions Directive*, *Public Procurement Directive*, *Utilities Procurement Directive,* and the *Environmental Impact Assessment* (EIA) *Directive*.

The TFEU defines a set of important principles and provisions that directly or indirectly affect the functioning of the Non-Energy Extractive Industry (NEEI) and have strong effects on permissions in the sector.

The **exclusive competences** of the EU relevant to raw materials are the establishment of the competition rules necessary for the functioning of the internal market (Article 3(1)(b)) and the conclusion of an international agreement (Article 3(2)), which is necessary to enable the Union to exercise its internal competence, at least in as far as its conclusion might affect common rules.

Shared competences (Article 4) of relevance are other parts of the internal market legislation (Article 4(2)(a)), as well as the **environment, agriculture and common safety concerns in public health matters**.

Among other activities of the Member States, industry, administrative cooperation, and civil protection are competences that can be supported, coordinated, or supplemented by actions of the EU with its competence but, in general, these fields – which also include mineral resource management, permitting, and mining legislation – are in **full competence** of the Member States.

Research and technological development are fields where the EU has competence to carry out activities, in particular to define and implement programs. However, this should not result in Member States being prevented from exercising their competences (Article 4(3)).

[218] European Commission, "The European Union Treaties with Regard to Raw Materials" (EU Science Hub/Raw Materials Information System, November 14, 2019), https://rmis.jrc.ec.europa.eu/?page=the-european-union-treaties-with-regard-to-raw-materials-3b2859.
[219] "Treaties Currently in Force," EUR-Lex, accessed March 28, 2020, https://eur-lex.europa.eu/collection/eu-law/treaties/treaties-force.html.

In Title II, the TFEU establishes **generally applicable provisions** for defining and implementing its policies and activities, which are reflected in separate EU secondary legislative items: internal market, environmental, nature protection, and health and safety legislation.

Another **set of basic principles** are defined in Part III, Title I of the TFEU, necessary for the functioning of the **internal market**: **free movement of goods** (Article 32), **freedom of establishment** (Article 49), **freedom to provide services** (Article 56), and **free movement of capital and payments** among Member States as well as between Member States and third countries (Article 63), in accordance with the provisions of the Treaties.

Under the common rules of competition (Title VII), Articles 101, 102, 106, and 107 set provisions for the competition rules defined as exclusive competences of the EU. These articles are debated frequently and form the legal grounds for cases at the European Court of Justice (ECJ). As important rules for the functioning of the EU internal market, these provisions have effects on the permitting of mineral development projects.

Article 101 (TFEU) prohibits cartels and other agreements between undertakings, decisions by associations of undertakings, and concerted practices that may restrict or disrupt competition. This principle shall be considered in relation with the sector in question because of the limited availability of economically viable (or feasible) mineral deposits, especially of high-value minerals such as metallic ores.

Article 102 prohibits any abuse by one or more undertakings with a dominant market position within the EU's internal market. In principle, it needs to be considered in tendering, permitting, and trade talks, and authorities must prevent any firm from achieving a monopolistic position.

Article 106(1) defines the requirements of Member States when granting special and exclusive rights. The focus of this article is to maintain national impartiality and support the provisions of Articles 101–109 in granting special or exclusive rights to undertakings or public undertakings in cases falling under procurement processes. Exclusivity of rights to perform exploration and extraction activities is of specific importance for minerals; therefore, this paragraph is highly relevant.

Article 107 lays out provisions on state aid. Article 107(1) restricts state aid because it distorts competition. The complexity of Articles 107 and **108** is reflected in the fact that this topic is governed by a specific regulation concerning what aid may be compatible with the regulations of the TFEU.[220] Some NEEI projects fall into this category.[221]

Article 107(3) lays out state aid that may be considered compatible with the internal market (i.e., exceptions to the prohibitions). This includes aid that would promote economic development in areas with abnormally low living standards or high unemployment, or in cases where such aid would promote the execution of "an important project of common European interest." A mineral development project that "strongly contributes to the

[220] "Regulation No 651/2014 of 17 June 2014 Declaring Certain Categories of Aid Compatible with the Internal Market in Application of Arts. 107 and 108 of the Treaty" (n.d.).
[221] Cases T210/02 and C487/06P, British Aggregates Association versus the European Commission.

security of supply" may be interpreted, based on the concepts of the *Raw Materials Initiative*, as "an important project of common European interest."

The approximation (or harmonization between Member States) of laws, regulations, and administrative actions is a strong and general principle laid down in Article 114 of the TFEU. It is referred to in numerous internal market directives, such as in the *Public Procurement, Concessions, Transparency* and *Market Surveillance Directives*. In addition, the approximation of laws is also a strong requirement in the fields of health, safety, environment protection, and consumer protection.

Title X (Social Policy) includes, inter alia, provisions related to occupational safety and health (OSH).

The **environmental policy** framework is defined in **Title XX of the TFEU**. Article 191(1) is the only provision that mentions natural resource efficiency as a main policy area in relation to the environment. The "prudent and rational utilization of natural resources" provides a basis for the concepts of resource efficiency and decoupling of resource use from environmental impacts.

Article 191(2) contains the main principles of environmental protection – such as the precautionary principle, the polluter pays principle, and the principle of remedy the pollution at source – which are important requirements reflected in the Environmental Impact Assessment (EIA) Directive.[222] The EIA Directive is one of the major instruments in the permitting of new installations and activities.

Article 191(3) establishes that, when preparing its policy on the environment, the EU shall balance environmental and socio-economic objectives and evaluate a no-action alternative. This is aligned with the sustainable development approach that lies at the heart of the *Raw Materials* Initiative's second pillar (fostering a sustainable supply of raw materials from European sources).

Article 193(3) defines the priority objectives of the environmental policy, which are set out in general framework programs. The current framework program targets the more efficient internalization of the external effects of mineral resource extraction.[223] This secures the improvement of the statement of different environmental media (soil, underground and surface waters, and air), while influencing the fiscal conditions of mineral development projects and promoting more investment in abatement technologies.

The Civil protection title (XXIII) includes policies that relate to the *Environmental Liability, Extractive Waste* and the *Water Framework Directives* and are directly applicable to the permitting of mineral projects (Article 196). Risk prevention and elaboration of effective systems for preventing and protecting against natural or man-made accidents are the main requirements of this article. Transboundary effects of accidents are to be considered in relation to other Member States or third parties.

[222] EIA Directive (85/337/EEC).
[223] "Living Well, within the Limits of Our Planet. Decision No 1386/2013" (n.d.).

2. Critical raw material imports into the European Union in 2018[224]

Raw material	Sources of EU supply	Percentage of market share
Antimony	China	50%
	Vietnam	19%
	Tajikistan	19%
	Thailand	5%
	Myanmar	3%
	South Korea	2%
	Turkey	1%
	USA	1%
Baryte	China	68%
	Morocco	20%
	Turkey	8%
	Norway	2%
Bismuth	China	50%
	Thailand	17%
	Laos	13%
	Vietnam	7%
	South Korea	4%
	Japan	3%
	USA	3%
	Turkey	2%
	Mexico	1%
Borate	Turkey	70%
	USA	18%
	China	6%
Cobalt	China	67%
	South Korea	14%
	USA	12%
	Australia	4%
	Morocco	3%

[224] The percentage of market share was calculated using data from UN Comtrade, updating the EU Commission Report to the latest available data (2018). European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions on the 2017 List of Critical Raw Materials for the EU," September 13, 2017, https://ec.europa.eu/transparency/regdoc/rep/1/2017/EN/COM-2017-490-F1-EN-MAIN-PART-1.PDF.

Fluorspar	Mexico	39%
	China	19%
	South Africa	19%
	Vietnam	17%
	Morocco	2%
	Canada	2%
Graphite	China	45%
	Brazil	18%
	Mozambique	8%
	Madagascar	5%
	Japan	4%
	Ukraine	4%
	USA	4%
	Russia	2%
	Canada	1%
	Sri Lanka	1%
Magnesium	China	88%
	USA	4%
	Israel	3%
	Serbia	2%
	Switzerland	1%
Natural Rubber	Indonesia	31%
	Thailand	21%
	Cote d'Ivoire	19%
	Malaysia	13%
	Vietnam	7%
	Nigeria	2%
	Liberia	1%
	Cameroon	1%
Other Metals	Russia	34%
	China	27%
	USA	19%
	Brazil	14%
	Japan	1%
	Ukraine	1%

Phosphorus	Kazakhstan	72%
	Vietnam	22%
	China	3%
Platinum	South Africa	38%
	Russia	22%
	USA	19%
	Switzerland	12%
	Japan	6%
Rare Earth Metals	China	86%
	USA	9%
	Hong Kong	5%
Rare Gases	Norway	19%
	Brazil	18%
	China	15%
	Kazakhstan	10%
	Qatar	7%
	USA	5%
	Algeria	3%
	Australia	3%
	Bosnia Herzegovina	3%
	Vietnam	3%
	Russia	3%
	Japan	2%
	South Africa	2%
	United Arab Emirates	1%
	Canada	1%
Silicon	Japan	36%
	USA	25%
	Singapore	15%
	South Korea	6%
	China	4%
	Norway	4%
	Australia	1%
Tantalum	USA	31%
	China	25%

	Hong Kong	15%
	Thailand	11%
	Japan	5%
	Kazakhstan	3%
	Russia	2%
	South Korea	1%
	Kyrgyzstan	1%
	India	1%
Tungsten	Myanmar	55%
	China	36%
	USA	6%
	Hong Kong	1%