

Austria on the path to a sustainable and circular society

The Austrian Circular Economy Strategy



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Vienna, 2022.

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Media owner, publisher, editor:

Federal Ministry Republic of Austria Climate Action, Environment, Energy, Mobility,
Innovation and Technology

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bmk.gv.at

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Layout: COPE Content Performance Group

Vienna, 2022

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1 The New Path - Circular Economies

The 21st century presents enormous ecological challenges to humanity. A rapidly growing global population, the rapid increase in the material prosperity level in the developing economies, and our subsistence strategy and way of life permanently increase the pressure on our planet. The “planetary limits” defined by science have already been exceeded many times and thus severely threaten our ecological livelihood.

A significant cause of this is the rapidly increasing consumption of natural resources. The global material footprint has more than doubled from 43 billion tonnes in 1990 to 92 billion tonnes in 2017. In this century in particular, the growth curve is pointing sharply up. The growth was 70% from 2000 to 2017. Without concerted measures, the global consumption of resources such as biomass, fossil fuels, metals and minerals is anticipated to grow to 190 billion tonnes¹ by 2060, and the annual waste volume is expected to rise by 70% by 2050².

The driver of this intense growth of consumption is, in addition to the population and economic growth, our linear subsistence strategy: raw materials are taken from nature (“take”) to produce products and goods of all types and to generate energy (“make”). Most of the resulting “by-products” and products after an often very short life (“use”) end up as waste and emissions in the air, water and soil in our ecosystems (“waste”).

The sharp rise in the use and consumption of resources thus causes considerable environmental pollution. The greenhouse gas emissions can be traced back to about 50%, of the loss of biodiversity and water stress, and to more than 90% of the generation and processing of resources.³ The production of steel, cement, plastics, paper and aluminium alone causes 36% of all global greenhouse emissions.

The reduction of resource consumption, waste and emissions therefore has a special importance within the context of sustainable development and Climate Protection. The realization requires a fundamental transformation: from the linear “take-make-use-waste” economy to a circular economy.

1 OECD (2018): Global Material Resources Outlook to 2060.

2 World Bank (2018): What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050.

3 European Commission (2020): A new action plan for the circular economy.

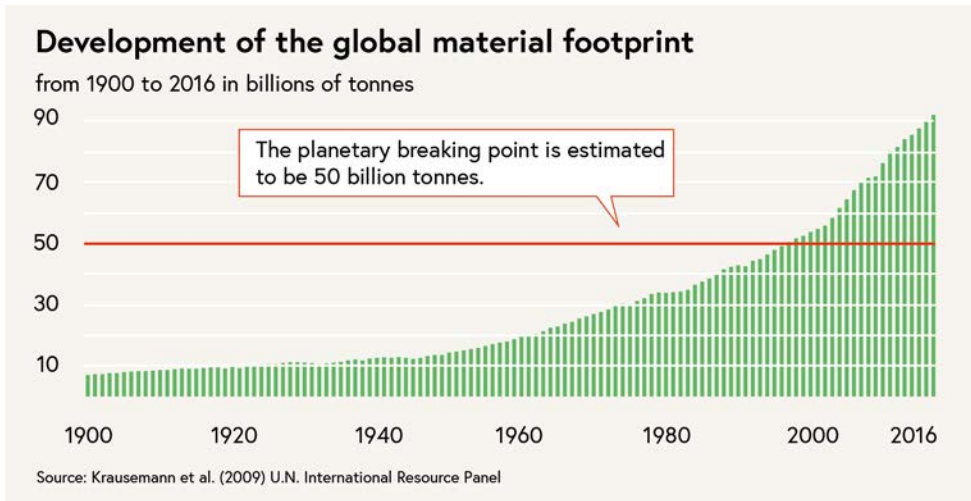


Figure 1: Development of the global material footprint from 1900 to 2016 in billions of tonnes. The planetary breaking point is estimated to be 50 billion tonnes. (foreignpolicy.com/2020/06/18/more-from-less-green-growth-environment-gdp)

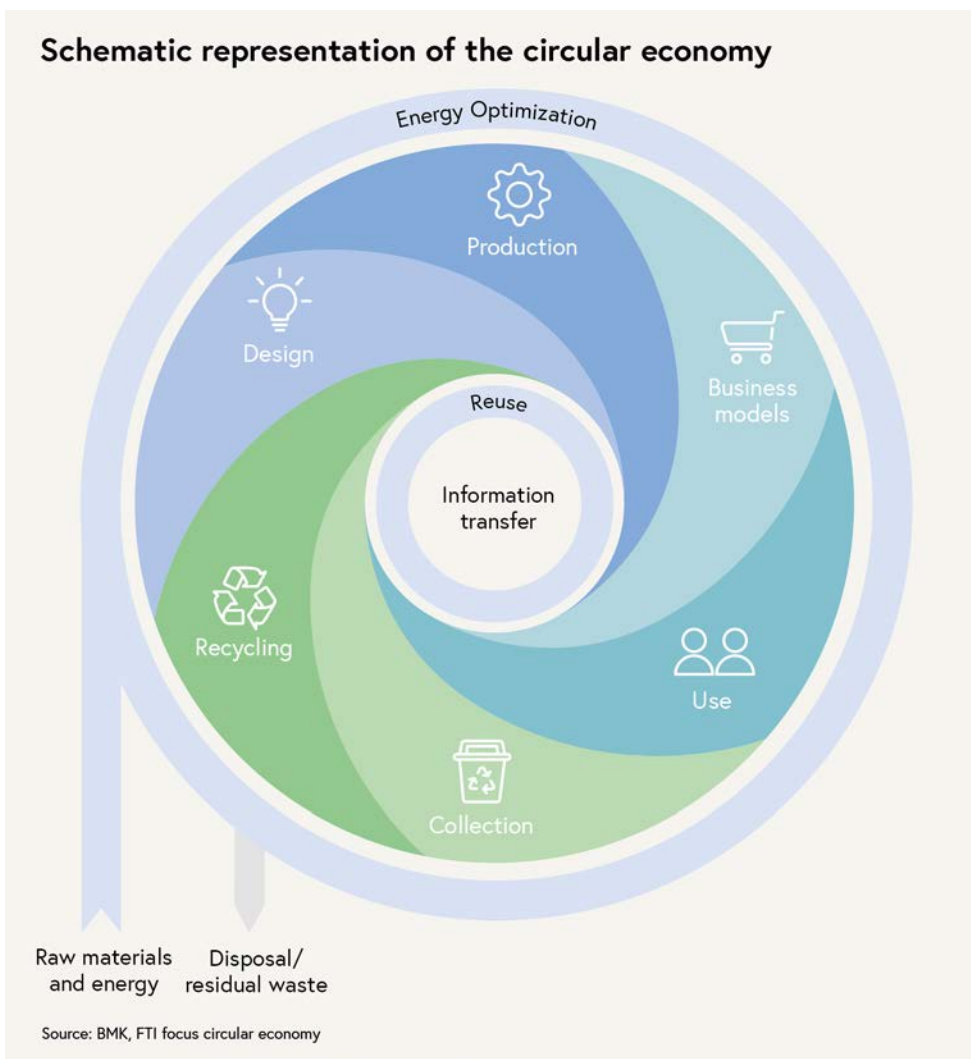


Figure 2: The value added chain

The circular economy is the main approach to rearranging the current linear social and economic system.

In a circularly oriented economy, raw materials are attained in an environmentally-friendly manner and the resulting goods are produced in a manner that spares resources and reduces waste. The life span of the products is extended and their use intensified. At the end of use, products and goods are returned to the product cycle to retain their value as long as possible.

Only if products can no longer be used in any other way are they collected as waste, recycled and used as secondary raw materials in the material cycle. Only the waste that is not suitable for recycling is used for energy or disposed of. Where new primary raw materials are required, the circular economy uses renewable, biogenic resources and sustainably attained, generally available raw materials. Technical and biological circuits are thus largely closed within the anthropogenic system.

The requirement for this is comprehensive circular product development, targeted toward long service life, regrowing raw materials, the most freedom from contaminants possible, reparability and the possibility of upgradeability. New service-oriented business models increase the intensity of use as well as repair, upgrading and further use.

The circular economy is a central building block for sustainable development. It enables the connection of economic success with environmental protection and social advancement. Through the reduced use of resources, avoiding contaminants and reducing waste and emissions, the ecological footprint is reduced overall. The circular economy thus helps to manage climate change, the loss of biodiversity and other ecological challenges.

The circular economy promotes economic innovation, the creation of new business models and consumption patterns and the resilience of the economy. On a social level, it reduces the health strain through hazardous materials in the environment, ensures quality of life and material prosperity and creates new and sensible workplaces. In Austria, a pilot study in 2021⁴ indicated that measures for the containment of the consumption of resources show synergies with Climate Protection and that additional positive employment effects may unfold.

In its review study⁵, and in its quantification study⁶, the OECD also predicted a positive employment effect through resource efficiency and a switch to a circular economy in the OECD countries. However, this could only occur to a full extent if a globally coordinated approach is chosen. According to the European Commission, the transition to a circular and raw-material efficient economy will create a triple win effect by 2030:

4 The Federal Environmental Agency (2021): Synergies between sustainable use of resources & Climate Protection.

5 OECD (2021): The jobs potential of a transition towards a resource efficient and circular economy.

6 OECD (2021): Labour market consequences of a transition to a circular economy: A review paper.

Negative environmental effects are avoided, the gross national product increased by 0.5% and an additional 700,000 new jobs created.⁷

The crises in recent years have also shown how much national economies are dependent on international raw material flows. This is even higher the greater the need for materials that cannot be covered by domestic sources is. The transition to a circular economy contributes considerably to the reduction of import dependency and thus to the crisis protection of the Austrian industrial locations, all while the regional creation of value through reuse and recycling activities increases.⁸

⁷ European Commission (2018): Impacts of Circular Economy Policies on the Labour Market.

⁸ BMLRT (2021): Raw Materials Master Plan 2030.

2 The Austrian Circular Economy Strategy

The long-term goal of the Austrian federal government is to reform the Austrian economy and society into a comprehensive sustainable circular economy by 2050. Only in this way is it possible to realize the ecological goals of the federal government, above all climate neutrality by 2040, and, as anchored in the federal programme 2020-2024⁹, to position “Austria and Europe as leading industrial locations for high-quality, resource sparing and low CO₂ production.”

The Austrian circular economy strategy should drive this transformation forward and significantly accelerate it, so that Austria becomes one of the pioneering countries in this area. For this, the circular economy strategy develops an interdisciplinary approach, overlapping sectors and portfolios, that also addresses the federation, countries and communities as well as the citizens involved in economic operations.

In many areas, we are entering new territory with the comprehensive transformation and the required technical and social innovations, so a running evaluation, adaptation and flexible approach is required for the circular economy strategy. Long-term detailed action plans are not expedient due to the high change dynamics and complexity. The circular economy strategy sets forth orientation points: principles for action and goals (see 2.3 “Principles” and 2.4 “Goals”), central intervention areas (see chapter 3 “Shaping the transformation”) and transformation focal points (see chapter 4 “Starting points for the transformation”) on the basis of which concrete measures and activities can be derived.

Despite successes in some areas, Austria is still at the start of the journey like most countries. The transformation into a climate-neutral circular economy requires comprehensive changes, not only technological and economic changes, but also in the fundamental attitudes and behaviours of the entire society - an extensive paradigm shift. The circular economy strategy should initiate concrete steps on these many varied levels, that should significantly drive Austria forward even in this legislature period.

Together we can make this happen by Austrian industry contributing to the integral concept of the circular economy.

2.1 Conception and Context

The Austrian circular economy strategy was developed and led by the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (BMK)

9 Federal Government (2020): Out of Responsibility for Austria.

together with numerous actors from economics, science, administration and civil society. The creation of content was overseen by the Federal Environmental Agency and the ÖGUT. It started with an online survey with 405 participants, followed by a vision workshop and 14 in-depth interviews with selected early adopters from various sectors. Nine online workshops provided comprehensive input on the transformation focal points selected for Austria.¹⁰

The circular economy strategy is based on existing national strategies and programmes. Important bases for this are reports on resource use in Austria.¹¹ The bio-economic strategy¹² for the switch to renewable resources in the waste prevention programme, the federal waste management plan¹³ in the area of efficient use of resources and the secondary raw materials, the action plan for sustainable public procurement¹⁴ and the raw materials master plan 2030¹⁵, which also specially addresses supply reliability of mineral raw materials. are all closely linked.

There are important synergies with the energy research and innovation strategy¹⁶, the national energy and climate plan (NEKP)¹⁷ and the mobility master plan 2030¹⁸, because the circular economy is essential for achieving climate goals. That also applies to the biodiversity strategy¹⁹ and the microplastics action plan²⁰. In addition, the circular economy is an important cornerstone for the location strategy²¹ currently being developed and is based on the digital action plan²². A significant driver for the transformation is innovation, that should gain additional dynamics through the FTI strategy 2030 of the federal government²³ and the FTI Pact 2021-2023. Spatial planning, soil protection, building, infrastructure and traffic planning also play an important role that has a strong influence on the demand for resources.

In the future, the circular economy will be anchored as a central guiding principle in all relevant strategies and programmes just like Climate Protection and climate change and vice versa, using these for their implementation.

The Austrian circular economy strategy is commensurate with the international, in particular the European objectives, above all with the “UN Agenda 2030 for sustainable

10 Federal Environmental Agency (2021): Documentation of the themed workshops on the development of the Austrian circular economy strategy.

11 Most recently: BMK (2020): Resource use in Austria 2020.

12 BMNT, BMBWF, BMVIT (2019): Bioeconomy. A Strategy for Austria.

13 BMNT (2017): Federal waste management plan 2017.

14 BMK, BMJ, BMLRT, BMF (2021): National action plan for sustainable public procurement.

15 BMLRT (2021): Raw Materials Master Plan 2030.

16 BMVIT (2017): Energy Research Innovation Strategy.

17 BMNT (2019): Integrated national energy and climate plan for Austria.

18 BMK (2021): Mobility master plan 2030 for Austria.

19 BMK (2020): Biodiversity dialogue - Public consultation.

20 BMK (2022): Microplastics action plan.

21 bmaw.gv.at/Themen/Wirtschaftsstandort-Oesterreich/Standortpolitik/Standortstrategie

22 BMF (2022): Digital Action Plan Austria.

23 Federal Government of the Republic of Austria (2020): FTI-Strategy 2030.

development” with 17 sustainable development goals (SDG)²⁴. These objectives should be taken into consideration in the selection and design of the instruments and measures. This includes Goal 12 “Sustainable consumption and production structures”, Goal 9 “Industry, innovation and infrastructure”, Goal 11 “Sustainable cities and communities” and Goal 13 “Measures for Climate Protection”. Through broad participation of the citizens in the transformation process and a socially inclusive organization Goal 8 “Humane work and economic growth” and Goal 10 “Less inequality” should be ensured.

The Austrian circular economy strategy should significantly contribute to achieving the national (climate neutrality by 2040) and international climate goals laid out in the Paris Climate Agreement 2015²⁵ and which the EU is driving forward with the “Fit for 55” package.

The EU Commission presented the European Green Deal at the end of 2019, which contains an ambitious action package for a comprehensive sustainable transformation in Europe (see figure 3). This includes an ambitious timetable for realising a climate neutral circular economy to disassociate growth from the use of resources. The required transformation should be done with social fairness (“Just Transition”). The European industrial strategy should also support the transition to green and digital industry.²⁶

An important building block for providing the necessary financial resources for the transformation is the EU taxonomy regulation valid from 2022. It sets forth in detail what will be considered sustainable economic activity in the future: it contributes to reaching at least one of the six defined environmental goals and does not contradict any of these goals. One of these environmental goals is the “Transition to a circular economy”. Work is currently being done on the concretisation of the ambition level for this environmental goal.²⁷

24 UN (2015): Transforming our world: The 2030 Agenda for Sustainable Development.

25 UNFCCC (2015): Adoption of the Paris Agreement.

26 EC (2019): The European Green Deal.

27 EC (2020): Creation of a framework for making sustainable investment easier and to change the regulation.



Figure 3: The European Green Deal

The central EU strategy document and one of the most important building blocks of the European Green Deal is the action plan for the circular economy “For a clean and competitive Europe”, presented on March 11, 2020.²⁸ A significant cornerstone in the action plan is the initiative for a sustainable product policy with the goal of making sustainable and circular products the norm in the European internal market. With the report “Making sustainable products the norm”²⁹ the Commission presented a comprehensive action package for circular economy on March 30, 2022, as shown in figure 4. The focus is a proposal for an ecodesign regulation for sustainable products, a strategy for sustainable and recyclable textiles, new regulations to reinforce the rights of consumers, promotion of circular business models and the development of digital product passes. The action plan and the report are therefore also the central guiding documents for the Austrian circular economy strategy.

The central goal of the report is to make sustainable products the norm in the EU. For this, the EU Commission will propose legal provisions for a sustainable product

²⁸ EC (2020): A new action plan for the circular economy.

²⁹ EC (2022): Making sustainable products the norm.

Making sustainable products the norm in a more resilient Single Market

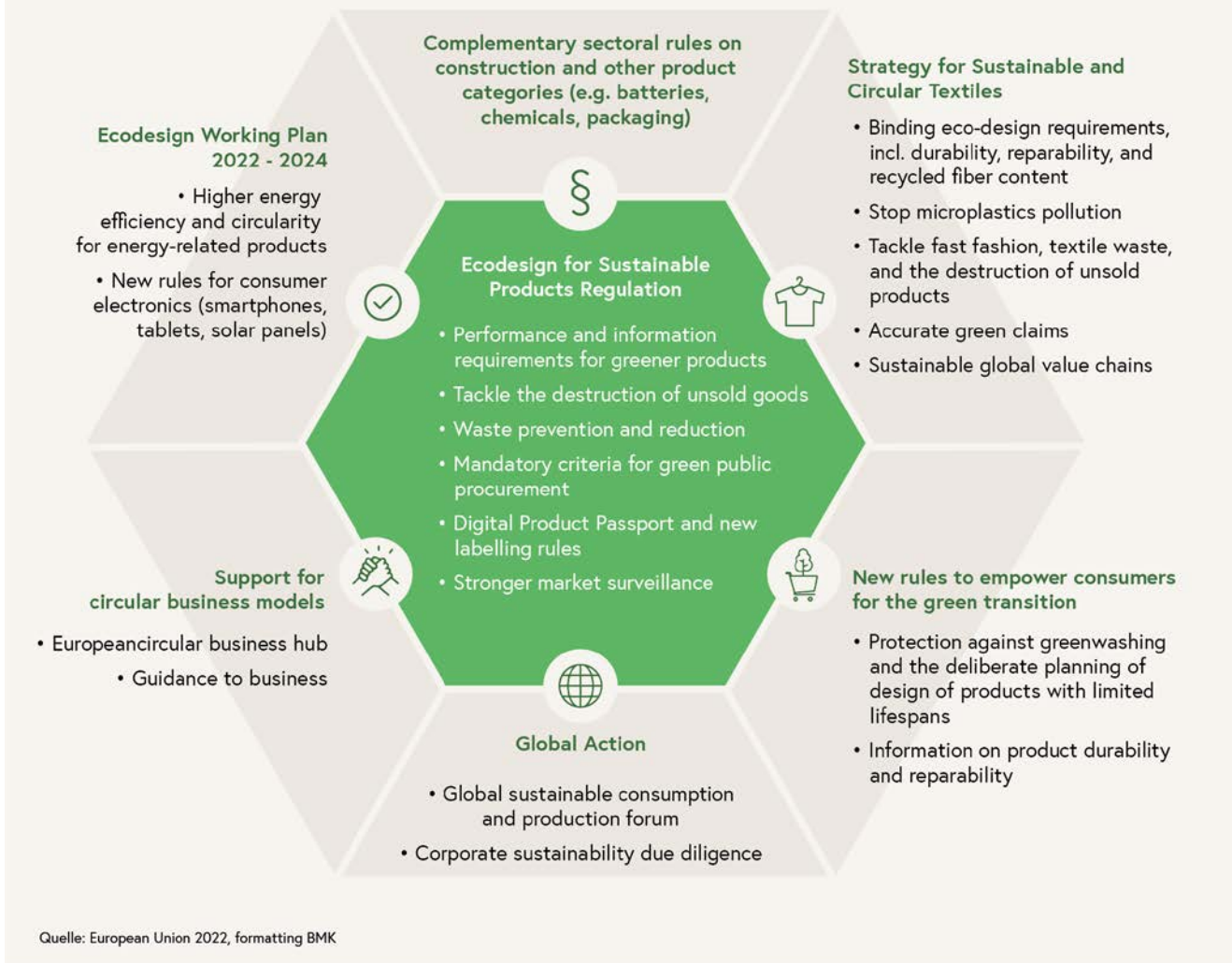


Figure 4: Initiatives of the circular economy package March 2022

policy to ensure that products on the market in the EU are designed so that they have a longer service life, can be more easily reused, repaired and recycled and contain the greatest possible amount of recycled materials instead of primary raw materials. The use of disposable products should be limited. In addition, one should proceed against premature obsolescence and the destruction of unsold long-life goods should be prohibited. A core point in this is the comprehensive revision of the ecodesign guideline.³⁰ In particular, a functioning market for high-quality secondary resources should be created. The Commission also wants to develop harmonized EU-wide regulations. This also includes minimization of the export of waste outside of the EU and fighting illegal waste shipments.

30 EC (2009): Ecodesign guideline. See also: Revision of the ecodesign guideline: ce-richtlinien.eu/ce-richtlinien/oekodesign-richtlinie

Another goal is the reinforcement of the position of the consumer and public clients. Through access to the reliable information on reparability and shelf life of products, they can make ecologically sustainable decisions and get a real “Right to Repair” while keeping business secrets and intellectual property rights.

The action plan focusses on industries in which the most resources are used and in which there is a high circularity potential: electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients.

2.2 Vision

The vision of the federal government is the reformation of the Austrian economy and society into a climate-neutral, sustainable circular economy by 2050. This enables sustainable development that ensures both the functioning of our ecosystem as well as the quality of life and material prosperity for us and future generations.

The greenhouse gas emissions are reduced to net zero and the use of raw materials, materials and energy and the volume of waste will be massively limited. The remaining demand for raw materials will be covered largely by biogenic raw materials and by high-quality sustainably acquired secondary raw materials from recycling and thus the anthropogenic materials circuits closed. Primary raw materials still required will be acquired sustainably, meaning sparing the ecosystems and regenerating them where necessary.

Products and services will be designed from the beginning to that value and benefits will be retained as long as possible so the demand for resources and the quantity of waste and emissions for production, sales, use and consumption are as low as possible and hazardous materials avoided.

For this, the current linear economic structures, behaviour patterns and material flows will be fundamentally changed. That is done using technical, social and systemic innovations, intelligent regulation, many incentives, gaining competency and above all the cooperation of the various stakeholders. All of this occurs within an international context, because the national economies, the supply chains and thus the raw material, material and product flows are closely interconnected. Legislation and regulation as well as incentives and support are all based on close European cooperation.

2.3 Principles

The transformation of the linear economy into a circular economy requires a radically different approach to our resources. So that this is successful, the Austrian circular economy strategy is oriented toward the principles of circular economy shown in figure 5 (R-principles).³¹ They are arranged according to importance to the circular economy. The priority is to design systems, business models, services and products as circularly as possible from the start (“circular by design”) to prevent or reduce resource consumption. Refuse, Rethink and Reduce (1. to 3.) generally require significant changes in the production and consumption patterns. Reuse to Repurpose (4. to 8.) aims to extend the duration of use at the highest value level possible. With Recycle and Recover (9. to 10.), materials should be returned to the material circuit as much as possible as secondary raw materials.

Even in a circular economy there cannot be an entirely closed system, in particular from a global perspective. Food and energy are inherently linear. The physical increase in entropy requires that things become waste at some time, even with careful use. Therefore, we will also need new raw materials in the future. Their sustainable acquisition must thus be as high a priority of the retention of our nature capital.

The following principles apply to raw material provision in the circular economy: The demand for raw material should be covered with sustainable secondary sources as a priority, then from sustainable renewable sources and only the rest from non-renewable sources. In this way priority is given to raw material sources that meet the high social, humane and ecological standards that apply in Austria.

The circular economy and raw materials principles are guides for the development of instruments and measures for the Austrian circular economy strategy.

31 PBL Netherlands Environmental Assessment Agency (2017): Circular Economy: Measuring innovation in product chains.

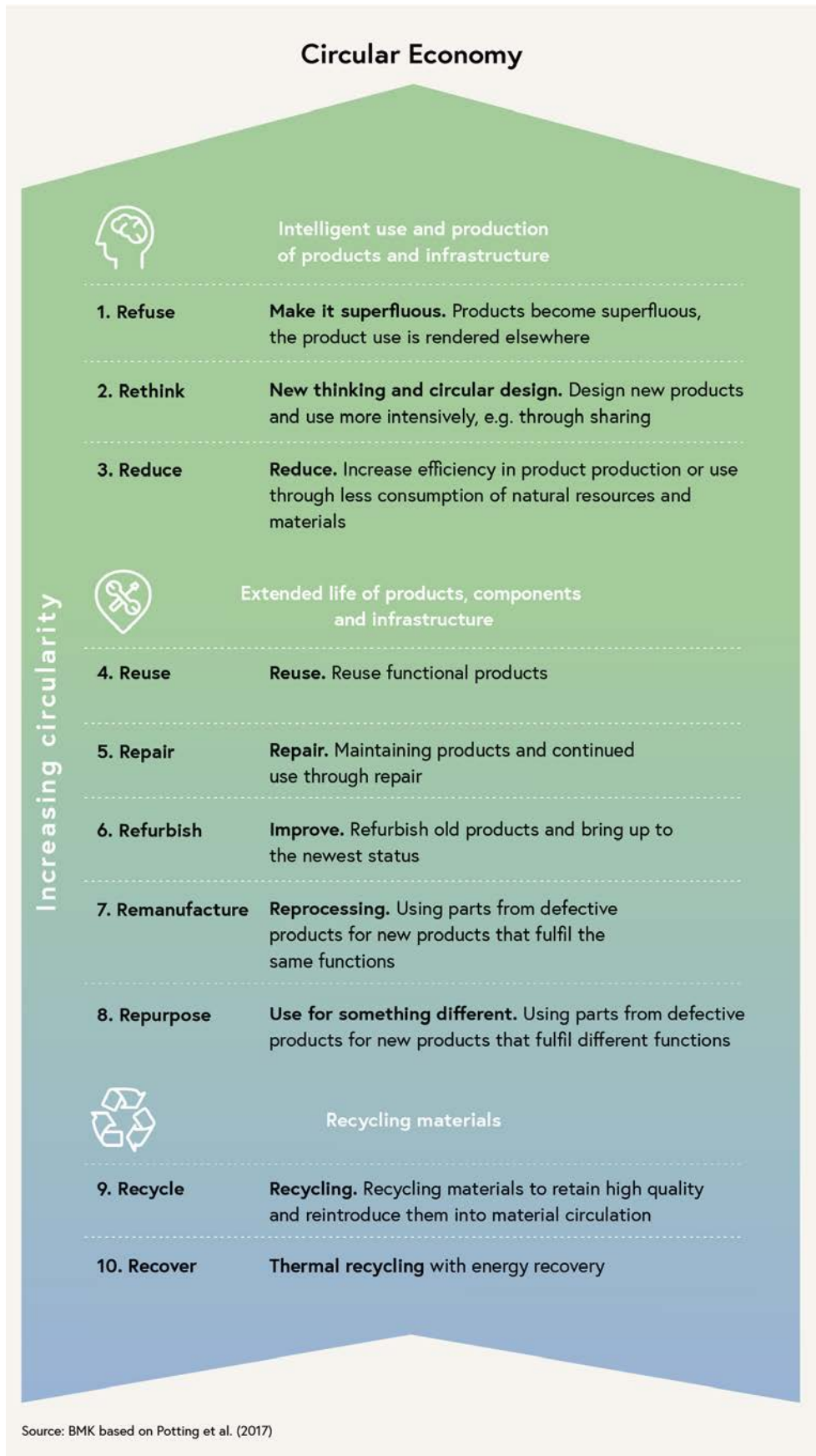


Figure 5: Principles of circular economy in Austria, the R-principles.

2.4 Goals

The transformation into a circular economy means including resource flows in production, sales and consumption processes and thus massively reducing the use of materials and raw materials, as well as the volume of waste and the strain on the environment. The following strategic goals for the Austrian circular economy strategy are derived from this:

- the comprehensive reduction of resource consumption and use of resources (sparing resources)³²
- the avoidance of waste (Zero Waste)
- the avoidance of environmental pollution by hazardous materials (Zero Pollution)
- The reduction of greenhouse gas emissions (environmental protection)

To make these goals measurable, quantitative goals are set using the available indicators that describe the current ambition level.

A significant trend change is to be added by 2030. For this, the measures defined in the Austrian circular economy strategy provide a significant contribution and lay the basis for the reformation of the Austrian economy and society into a climate neutral, sustainable circular economy by 2050.

Goal 1: Reduction of resource consumption

- Material footprint³³ (MF) reduced to 7 tonnes per capita and year by 2050
- Domestic Material Consumption³⁴ (DMC) reduced to 14 tonnes per capita and year by 2030

Austria has a high resource consumption in European comparison. The material footprint (MF) in 2017 was around 290 million tonnes (Mt) and was about 33 tonnes per capita and the domestic material consumption (DMC) was 19 tonnes per capita in 2018.

32 This includes material resources in the lithosphere (natural resources) and biosphere (biomass), land surface, the environmental media soil, water and air to the entire ecosystems and their services to humanity.

33 Material footprint (MF, also Raw Material Consumption [RMC]: DMC plus raw material demand for the imported semi-finished and finished goods, minus the respective exports.

34 Domestic Material Consumption [DMC]: domestic extraction plus imports minus exports.

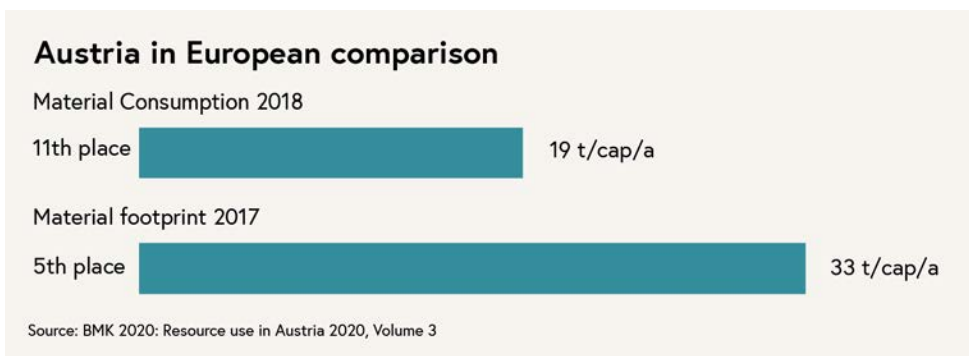


Figure 6: Resource consumption in Austria

The goal is to strongly reduce the consumption of primary raw materials. For quantification, the domestic material consumption (DMC) will be used in the short term due to the good data base as an indicator for the base goal 2030. The DMC should be reduced by 25% to 14 tonnes per capita and year by 2030.

The material footprint should be reduced to 7 tonnes per capita and year by 2050. This represents a reduction of the consumption-based raw material consumption of about 80% based on the current data.

In the report “Resource use in Austria 2020” there was a reference to research and literature on material consumption^{35, 36}, a value of 7 tonnes per capita and year was considered sustainable.

Goal 2: Increasing domestic resource productivity by 50% by 2030

The resource productivity, the economic performance in Euro (BIP) per tonne of material consumed (DMC) domestically has continually risen in the last 15 years by the disassociation of economic growth from resource consumption. Assuming that the economy will continue to grow on an average of 1.4% per year to 2030³⁷ and the resource consumption is reduced (pursuant to Goal 1 - DMC), the resource productivity should increase by 50% by 2030 compared to 2015, without the resource-intensive production processes abroad being reduced.

Goal 3: Increasing the circularity rate to 18% by 2030

The circularity rate³⁸ for Austria was 12% in 2020 according to Eurostat. By 2030, 18% of the material resources used in the economy should be acquired from the circular-oriented return and reuse of materials. The increase in the circularity rate should, on the one hand, be based on the reduction of the material use by around 20% and, on the other hand, based on the increase of recycling by about 10% compared to 2020.

35 Bringezu, S. (2015): Possible Target Corridor for Sustainable Use of Global Material Resources.

36 UN IRP (2014): Managing and Conserving the Natural Resource Base for Sustained Economic and Social Development.

37 BMK (2020): Resource use in Austria 2020: The economy has grown on average 1.4% per year, while resource consumption has dropped slightly, on average by -0.2% per year.

38 Use rate of recyclable materials (Circular Material Use Rate CMU)

Goal 4: Reduction of the material consumption in private households by 10% by 2030

Currently the volume of residential waste is used as the indicator for material use in private consumption, which is rising, as before (+ 8% from 2015 to 2019), more strongly than the population growth (+ 3%).³⁹ The goal is that consumers satisfy their needs with lower material consumption and the per capita volume of residential waste will fall to an equivalent degree (reference year 2020).

Resource use in Austria

The resource consumption in Austria stabilized in the years between 2010 and 2018, but at a very high level. The domestic material consumption (DMC)⁴⁰ was 167 million tonnes (Mt) per year in 2018 and 19 tonnes per capita and year, thus 5 tonnes over the European average. Over half was non-metallic mineral materials, above all construction materials (95 Mt/year), a fourth was biomass (38 Mt/year), 15% fossil fuels (24 Mt) and 5% metals (8 Mt).

The Austrian material footprint (MF) is still even significantly higher than the DMC. Even significantly higher than the DMC is the Austrian material footprint (MF)⁴¹. There were 33 tonnes per capita in 2017, thus far over the European average of 23 tonnes. The MF enables us to consider the entire quantity of raw materials that are used to cover the Austrian domestic consumption of goods of all types. With this consumption-based approach, the reduction effects for raw material consumption that occur when resource-intensive production steps are outsourced abroad can be represented.

Another indicator that describes resource consumption is the land utilization or the area use by construction activities. The land utilization has been falling since 2010 in a long-term trend, but is still at a very high level. Currently the annual growth of the land consumption is 42 km²/year. According to the government programme 2020-2024, the land consumption should be kept as low as possible and the annual growth should be reduced to 2.5 hectares per day or 9 km² per year by 2030.⁴² This target value was also included in the implementation package for the first Austrian soil protection strategy.⁴³

39 BMK (2021): The inventory of the waste economy in Austria. Status report 2021.

40 Domestic Material Consumption [DMC]: domestic extraction plus imports minus exports.

41 Material footprint = DMC plus raw material demand for the imported semi-finished and finished goods minus the respective exports.

42 umweltbundesamt.at/umweltthemen/boden/flaecheninanspruchnahme (queried on 15.3.2022)

43 info.bmlrt.gv.at/themen/regionen-raumentwicklung/raumentwicklung/oerok-tag

The resource productivity references the resource consumption on the value creation achieved (BIP/DMC). Between 2000 and 2018 the economic growth was able to be decoupled from the resource consumption. The Austrian resource productivity has increased from 1731 to 2211 Euro per tonne, because economic performance rose by 31% and the resource productivity rose by 28%, but the resource consumption remained nearly unchanged.

The circularity rate (Circular Material Use Rate [CMU]) was 12% in 2020 according to Eurostat, the EU average was 12.8%. This circularity rate means that 12% of the materials and resources used in the economy come from recycling.

Across the EU, Austria is one of the seven countries that have the highest volume of residential waste: 579 kg per capita in 2018. In the recycling rate of residential waste, Austria attains a value of about 58% and therefore lies significantly above the EU average of around 48%.

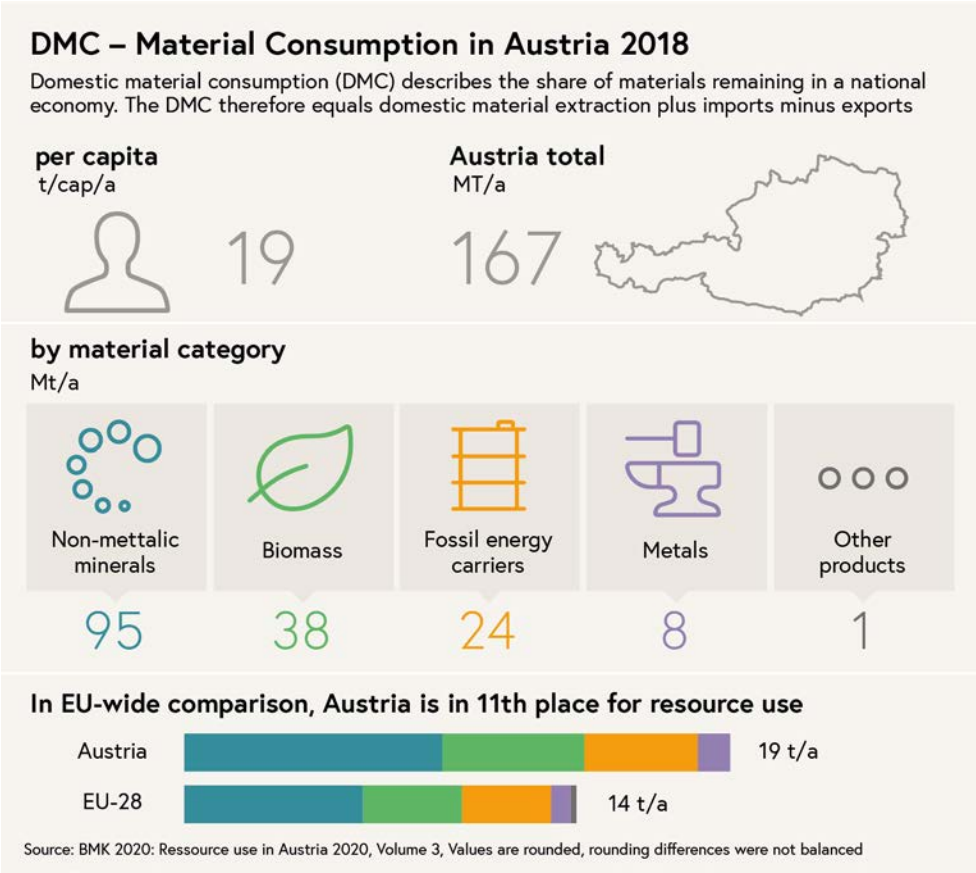


Figure 7: The Austrian material consumption 2018 (DMC) overall, by material categories and in European comparison.

Figure 8: Domestic resource productivity 2000-2018

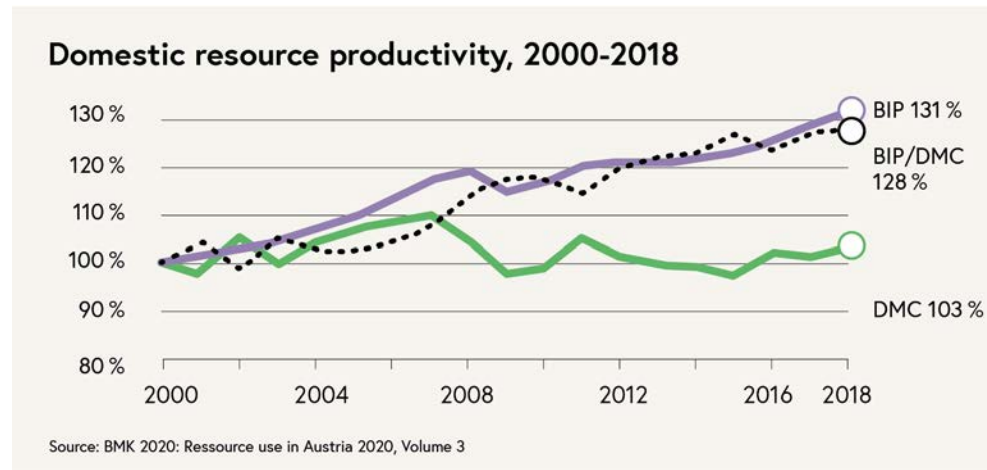
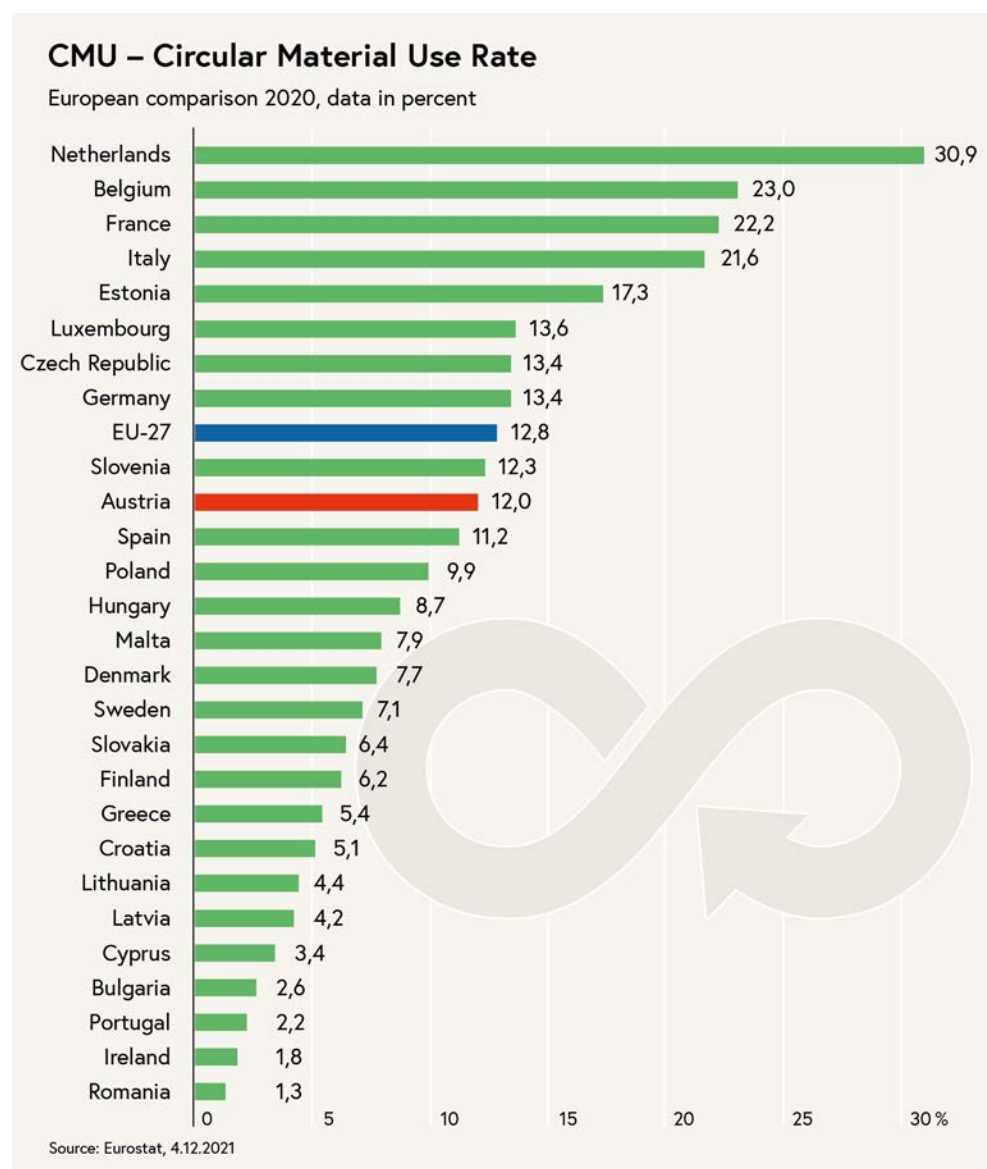


Figure 9: Circular Material Use Rate [CMU] in a European comparison, indicated in percent.



Municipal waste generated

European comparison 2018, kilogrammes per capita and year



Figure 10: Volume of residential waste 2018 in a European comparison, in kilogrammes per capita and year.

2.5 Instruments and Measures

The task of politics and administration is to promote the implementation of the circular economy through suitable instruments and measures. The planned interventions should create the framework conditions to

- establish and spread circular, sustainable design as a new design and development concept (“circular by design”);
- to enable circular innovations, both technical as well as social and systemic;
- to initiate and reinforce new circular business and organisational models;
- to increase the duration and intensity of use of products, components and infrastructure and to ensure reuse and recycling at the highest possible level and the value creation chain;

- to change the market so that circular products and services are economically competitive and not more expensive for consumers as conventional ones;
- to promote material and energy efficient manufacturing processes and production systems that are free from hazardous and interfering materials;
- to close material loops and increase the use of secondary raw materials;
- to enable a broad transition to regenerative raw materials to make carbon-based products climate-neutral, and to enable the decarbonisation of the energy-intensive industries and to use the possibilities of Carbon Capture and Utilization (CCU) in the medium-term.

For this, six central approaches were developed for the Austrian circular economy strategy, which are presented in Chapter 3 “Shaping the transformation”:

11. Legal and regulatory framework conditions
12. Smart market incentives
13. Financing and Funding
14. Research, technology development and innovation (FTI)
15. Digitalisation
16. Information, knowledge and cooperation

Based on the specification of the EU action plan on circular economy, seven transformation focal points were determined, for which the specific goals, measures and instruments were developed (see Chapter 4 “Starting points for the transformation”). They take into account the current situation and the specific requirements in the relevant focal area.

2.6 Monitoring and Governance

The successful management of the implementation of the Austrian circular economy strategy requires suitable governance that includes all relevant areas and is positioned at the various levels: from urban and rural space on a local level up to the European Union. Suitable public governance structures and processes for politics and administration should be rapidly developed and implemented. The necessary cooperation of all regional authorities must be secured through appropriate task assignment.

In addition, the important public governance of the transformation process must be combined with a network governance. In this, the many social actors active in the circular economy must be connected to pool strengths. For this, the various interests and priorities must be taken into consideration and the consensus enabled in respective processes⁴⁴⁴⁵ (see also “Promoting cooperation” in chapter 3).

44 Cramer, J. (2020): How Network Governance Powers the Circular Economy.

45 EC (2001): European Governance - A White Paper

A suitable monitoring system must be developed and implemented as a central tool for governance. This includes:

- Determination of the evaluation and monitoring process (procedure, parties involved, time frame, resources) and its embedding in a suitable management loop for the implementation of the circular economy strategy.
- Regular monitoring of the consumption-based material flows. The report “Resource use in Austria” should be integrated here.
- Comprehensive evaluation of the circular economy strategy every five years. A progress report will be created every two years on the implementation of the circular economy strategy.

Very important for the monitoring is the development of suitable indicators for the measurement of circularity of economy and society, which is still in its infancy even internationally. This should therefore be a priority and promoted in close international coordination. An orientation point for this is the “EU monitoring framework for the circular economy”⁴⁶ and its further development (see figure 10).

The next steps:

- A central indicator for the circular economy is the consumption-based material footprint (MF). The method required to determine this, and above all the international data base, should be developed as a priority.
- An impact monitoring of the measures must be developed and implemented for the transformation focal points.
- In recent years, the statistical entropy in science has been established as an indicator for the evaluation of material systems.⁴⁷ The entropy indicator should be methodically further developed and its applicability for the circular economy tested. There is a current need for development of operationalisation and data demand. An international research cooperative should be sought for this.

46 EC (2018): Monitoring framework for the circular economy.

47 Rechberger, H.; Brunner, P.H. (2002): A new, entropy based method to support waste and resource management decisions.

Circular economy monitoring framework

1. EU self-sufficiency for raw materials

The share of a selection of key materials' (including critical raw materials) used in the EU that are produced within the EU

2. Green public procurement

The share of major public procurements in the EU that include environmental requirements

3 a-c. Waste generation

Generation of municipal waste per capita; total waste generation (excluding major mineral waste) per GDP unit and in relation to domestic, material consumption

4. Food waste

Amount of food waste generated

5 a-b. Overall recycling rates

Recycling rate of municipal waste and of all waste except major mineral waste

6 a-f. Recycling rates for specific waste streams

Recycling rate of overall packaging waste, plastic packaging, wood packaging, waste electrical and electronic equipment, recycled biowaste per capita and recovery rate of construction and demolition waste

7 a-b. Contribution of recycled materials to raw materials demand

Secondary raw materials' share of overall materials demand - for specific materials and for the whole economy

8. Trade in recyclable raw materials

Imports and exports of selected recyclable raw materials



9 a-c. Private investments, jobs and gross value added

Private investments, number of persons employed and gross value added in the circular economy sectors

10. Patents

Number of patents related to waste management and recycling

Source: European Commission 2018

Figure 11: EU monitoring framework for the circular economy

3 Shaping the transformation

In order to realise the circular economy in Austria, good framework conditions must be created for a comprehensive and accelerated transformation of economy and society. Currently, a number of hindrances still exist that make sustainable circular products and services the exception and not the norm. Some of these can be addressed and removed through suitable measures and instruments, in cooperation with the federation, regions, communities and social partners as well as civil society and science.

Others require a concentrated procedure on a European or international level, where Austria is also active. Because our country is strongly dependent on international raw material flows and supply chains, many companies act internationally and are export-oriented. Therefore, nationally and internationally, at least equal market conditions ("level playing field") must be created for circular and sustainable products and services, perhaps through the internalisation of environmental costs for import products. Central to this are the initiatives at the EU level within the framework of the Green Deal and the EU action plan for the circular economy. Austria actively supports this, bringing in Austrian interests, promotes rapid implementation.

So that the transformation to the circular economy in Austria is successful and the implementation is accelerated, it is necessary to be active simultaneously in many sectors and to implement a smart mix of various instruments and measures. Subsequently, the central intervention areas of the Austrian circular economy strategy spanning sectors and industries are presented:

1. Legal and regulatory framework conditions
2. Smart market incentives
3. Financing and Funding
4. Research, technology development and innovation (FTI)
5. Digitalisation
6. Information, knowledge and cooperation

With this, in broad cooperation with the numerous actors, the most attractive framework conditions possible must be created for the circular economy. The "next steps" for the individual topics define concrete, short-term activities to advance in the intervention areas.

3.1 Legal and regulatory framework conditions

The creation of the legal and regulatory framework conditions is of central importance for the stimulation of the circular economy.⁴⁸ Therefore, on the one hand, existing regulatory obstacles must be identified and, where possible and expedient, removed or at least reduced.

On the other hand, European and national legislation that supports the transformation to the circular economy as much as possible should be developed.⁴⁹ This includes that in the future the legal requirements are gradually increased with regard to the circularity and sustainability of products and services (such as life span, reparability, reuse, recyclability, secondary raw material use, waste prevention). In this way it is possible that not only a select group of forerunners but the majority of the companies who develop circular innovations, recreate their value added chains and use circular resources, materials and technologies.

In order to increase the commitment and speed of the transformation into a circular economy overall, goals, principles and tasks should be anchored in the medium term into a circular economy law analogous to the Climate Protection law.

Removing legal obstacles

Current legislation relevant to the economy is often based implicitly on our current linear economic system and do not sufficiently take into account the requirements of a comprehensive circular economy. Potential obstacles are found in many legal areas. For example, the current accounting regulations for writing off the regular procurement of new products. Anti-trust regulations that are important for competition must be taken into consideration in the cooperation between companies for the use of residual material and waste just as much as various stipulations on material requirements in various industries.⁵⁰ Such legal hurdles are to be identified, analysed and removed if possible. Particular attention must be paid to legal hurdles in the value-added chains of the transformation focal points.

48 This was also confirmed in the expert survey and in the stakeholder workshops within the framework of the development of the circular economy strategy. See also: Federal Environmental Agency (2021): Foundation document - Development of a circular economy strategy.

49 An example of this is the proposal of the EU Commission (12-2020) on the modernization of the EU directive for batteries and old batteries; ec.europa.eu/commission/presscorner/detail/de/ip_20_2312

50 econsense, Accenture, Wuppertal-Institut (2021): Germany's Transition to a Circular Economy - How to Unlock the Potential of Cross-Industry Collaboration.

The next steps:

- Identification of potential barriers for the circular economy in the existing legal framework, demonstrating target conflicts between regulatory goals and development of organisational proposals in cooperation with politicians, authorities and companies.

Creating experimental spaces

So that innovations are not unnecessarily hindered and delayed, physical (e.g. localities, test facilities), despite limiting existing regulations, and also logistical free an experimentation spaces are needed for the testing of innovative solutions and the use of new technologies. Relevant provisions allow authorities and oversight organs to legally enable circular initiatives.

The next steps:

- Identification and creation of necessary legal framework conditions that enable real testing of circular innovations and solutions within a defined framework (“regulatory sandboxes”).

Further develop waste legislation

Much that has previously been disposed of as waste (e.g. residual materials from production, demolition materials, returned products) should increasingly be used as secondary sources of raw materials. When classified as “waste”, goods and materials are subject to the waste legislation, whereby qualitative requirements are also associated with regard to a high-quality reutilization. We must therefore make the secondary raw material flows more attractive nationally and internationally.

Through the increased use of dipping ordinances, easier access to secondary raw materials should be created.

An undesired accumulation of hazardous materials in products made of secondary materials should be avoided and the exit from hazardous substances such as that in the waste legislation and international specifications such as REACH or in the Stockholm and Basel conventions must be guaranteed.

Smart ways for handling this potential conflict of objectives between wide reaching waste avoidance and minimizing hazardous materials must be identified. In the transition to the circular economy, a good balance between utilization (= resource conservation) and removal (= minimising hazardous materials) must be found.

The next steps:

- Set criteria for the end-of-waste
- Further development of waste legislation to promote the use of secondary raw materials, nationally and across Europe. Strengthening the reinforcement of the circular economy, perhaps within the framework of the planned review of the waste framework guideline.
- Development of a decision-making tool with which in individual cases one can evaluate whether recycling or disposal is the better option.

Forming a legal framework for the “Sharing Economy”

Using products instead of owning them can reduce the number of products manufactured, the demand for raw materials and environmental strain. Provision of products “as a service” in a “Sharing Economy” is a core concept of the circular economy, which can bring forth new business models and thus strengthen the Austrian economy, in particular in the area of SMEs.

This applies both to the B2C (Business to Consumer) and to the B2B (Business to Business) sectors, where products are no longer purchased, but provided, maintained and prepared by the manufacturers and after the end of the service life, are taken back (such as chemical leasing, light as service, contracting models). Transparent cost structures are important conditions for the success and high acceptance of new (circular) leasing and rental models.

The current legislation is still hardly aligned with such business models. This leads at least to the insecurity about the use of relevant legal provisions (e.g. liability law) and inhibits implementation.

The next steps:

- Evaluation and, if necessary, revision of relevant legal provisions with regard to the establishment of the “Sharing Economy”.
- Evaluation of previous experience and positive and negative effects in sharing models.

Develop norms and standards for the circular economy

So that system solutions are scalable and function on the larger scale, we need defined standards for materials, processes, methods and data that are compatible with the circular economy. They enable the connection of many actors in complex value added chains and reduce technical challenges. Accepted standards allow for the circularity to be assessed and externally certified if necessary. By being included in laws and regulations, standards and norms can be made legally binding.

In February 2022, the EU Commission presented the new “Standard strategy”⁵¹: “The ambitions of the EU with regard to climate-neutral, resilient and circular oriented economy cannot be realised without European standards. A globally important role in standardisation activities and the leadership in international fora and institutions are of decisive importance for the EU, so that they can continue to establish standards on a global level. By setting global standards, the EU exports its values and EU companies gain an important edge.”

The international standards organisation ISO set up the Technical Working Group TC 323 “to develop framework conditions, guidelines, supportive instruments and requirements for the implementation of the activities of all organisations involved”⁵², in which Austria is also represented.

In the product sector, environmental product declarations [EPD] based on the respective ISO standards should be used as the foundation for sustainable product design, the product documentation and marketing as well as in the granting of environmental certifications.

For the implementation of the circular economy in companies, existing standards such as the EMAS regulation, the ISO management system standards (in particular the series of ISO 14000) and industry specific “Professional Waste Company Plus” should be more strongly used and the introduction of environmental management systems forced. In the periodic revision of these standards, the circular economy should explicitly be included, perhaps in the accompanying guidance documents.

In the design of standards, certifications and quality seals, it should be taken into account that they can also use innovative small companies with circular products and services and not disadvantage SMEs compared to larger companies, which can often easier fulfil the required formal specifications.

Standards and technical regulations define the state of the art of technology and are often used as guidelines and specifications in tendering. Currently many of them do not take into account circular solutions. Some regulations and standards make these more difficult or are hindrances. This must be remedied wherever possible.

The next steps:

- Promotion of standardisation of the circular economy on national and international levels and using the framework conditions for organisation.
- Identification of present standards and technical rules in all segments that prevent circular solutions and relevant revision.

51 EC (2022): An EU Strategy on Standardisation. Setting global standards in support of a resilient, green and digital EU single market.

52 iso.org/committee/7203984

- Use of the standardisation to create uniform quality standards cross-industry for resources and materials.
- Recommendations for the implementation of the circular economy within the framework of the EMAS regulation and other management system standards.

Co-design the Ecodesign legal framework.

In the report “Make sustainable products the norm”, a legal initiative for sustainable product policy was announced. In the centre there is a proposal for an ecodesign regulation for sustainable products⁵³, with which the existing ecodesign framework will be expanded. On the one hand, the new framework should cover the broadest spectrum of products and, on the other hand, the requirements will be extended. The regulation will form the framework for the establishment of ecodesign requirements for certain product categories that will significantly improve the energy and resource efficiency and other aspects of ecological sustainability.

This includes minimum requirements for the product design, so that products become longer serving, repairable and easier to recycle. In addition, the recyclable materials should be easier to recover, hazardous materials minimized and the share of secondary materials in the product increased. Additional ecodesign requirements are related to environmental effects of products over the entire life cycle including its CO₂ footprint and their environmental footprint as well as avoiding and reduction of waste.

The next steps:

- Austria supports the legislative initiatives on sustainable product policy, which was presented by the Commission in 2022 and, with other like-minded member states, will advocate that the future regulation supports the transformation to the circular economy with ambitious specifications.

Increase the use of secondary raw materials

The demand for primary raw materials is strongly limited by the circular economy. The remaining demand will be covered in the future in as many sectors as possible by sustainably provisioned, renewable raw materials, as set forth in the Austrian bioeconomy strategy.

Parallel to this, secondary raw materials increasingly gain in importance. They contribute to minimising supply risks, saving on primary storage sites and improving the emission balance of raw material production. Particularly in the area of strategically important raw materials, the recycling potential must be fully exhausted as a contribution to supply reliability, as extensively shown in the raw materials master plan.

⁵³ EC (2022): Proposal for establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC.

Supply and demand for secondary raw materials should be increased through suitable regulations and requirements and a well-thought-out interplay of collection, treatment, recovery and disposal of impurities be ensured. This includes the expansion of the quality standards for secondary raw materials and their provisioning processes, collection and recycling offers and a prohibition on dumping.

The improvement of the available data on future availability of secondary raw materials from local waste streams, biogenic residual materials and mining remains through obligatory reporting and provision of information is central.

The next steps:

- Creation of quality criteria for secondary raw materials and their provisioning processes as well as clear requirements (e.g. obligatory recycled quantities in the products) and regulations on their use.
- Establishment of goal agreements for the amount of renewable or secondary raw materials in new products within the framework of industry agreements. If this cannot be achieved at sufficient speed, these can also be legally stipulated under consideration of the respective European regulations.
- Improvement of the data situation on the future availability of secondary raw materials from local mining remains, biogenic residual materials and waste streams, as well as increased use of the information on the potential of secondary raw materials from electronic data management (EDM).
- Creation of guidelines for circular raw material management.

Expand consumer rights

Consumers can increase the demand for circular, sustainable products and services through their consumption behaviour. For an informed purchasing decision, it is important that information about the products, their contents and characteristics and about the ecological and social conditions along the entire supply chain is made available that is transparent, with guaranteed quality and legally binding, such as through digital product passes (see 3.5 “Digitalisation”). In the purchasing decision for circular products, the respective further development of quality seals can also help, which adds to the value of the Austrian environmental seal and the EU Ecolabel.

After acquisition, as long a use phase as possible should be facilitated to reduce consumption and waste quantities. Long service life must be a central design criterion and countermeasures must be taken against premature obsolescence of products. Important criteria for this are: the ability to easily make repairs, the ease of replacement of wearable parts and the long-term provision of replacement parts, but also retrofitting and upgrading. So that consumers can rely on this in their purchasing decisions, relevant legal measures are required. Accordingly, the circular economy package from March 2022

includes a proposal for the support of consumers during the green transformation⁵⁴ as well as an initiative for the promotion of repair of consumer goods.

The next steps:

- Develop, coordinate and implement foundations and stipulations for digital product information systems.
- Analyse the existing directives for the Austrian environmental seal with regard to increased integration of aspects of the circular economy and relevant revision. Include the knowledge in the criteria of the EU Ecolabel.
- Austria supports the initiatives on the EU level and nationally, to strengthen the rights of the consumer with regard to a long service life of products, be it a right to repair, extended warranty periods, the long-term provision of replacement parts or software updates for IT products.
- Austria cooperates in the EU-wide establishment of reliable minimum standards for environmental certification of products and services.
- Austria supports the development of European regulations that obligate companies to maintain human rights and environmental standards in their global supply chains (supply chain act) and the development of global regulations within the framework of the binding UN treaty on business and human rights.
- Austria supports the obligatory sustainability reporting (Corporate Sustainability Reporting Directive) to publish information and key figures in the areas of environmental, social welfare and governance (ESG).
- Austria supports the development of binding regulations for advertising statements on the environmental properties of products and services ("green claims") to prevent "greenwashing".

54 EC (2022): Proposal for a directive of the European Parliament and Council on amending the directives 2005/29/EC and 2011/83/EU regarding the support of the consumer for the ecological transformation through better protection from unfair practices and better information.

3.2 Smart market incentives

The current market requirements often make it difficult for sustainable companies to offer their circular products and services in an economically competitive manner. Above all, because the ecological and social costs of a linear product that arise are not or insufficiently included in its price, and thus the purchasing or investment decisions are only taken into consideration in a limited way. Conversely, responsible companies bear the often increased costs for an environmentally-friendly products, so their products are more expensive by comparison.

Smart market incentives can counteract these biased market conditions. This includes targeted pricing signals, such as that triggered by the CO₂ pricing. This can be achieved through a design of the tax and contribution system that favours relevant aspects of the circular economy. This also includes the increased demand for circular products through respective procurement processes both from the public side and also from companies.

An additional market incentive is expanding the responsibility of the manufacturer for the environmental impact of a product on the entire life cycle, in particular the downstream phases of sales, use/sales and processing/disposal. With this “expanded producer responsibility” (EPR), the external costs of waste management are economically internalised and thus more economically relevant and action-determining for the manufacturer.

Using fiscal instruments

The targeted use of taxes and duties should create economic incentives to promote the desired actions in terms of the circular economy and to dismantle undesired linear practices. The resource consumption must be addressed analogous to the greenhouse gas emissions in Climate Protection. Their negative environmental effects are currently still hardly factored in, especially in the international supply chains. Another possibility is tax benefits, such as for circular sustainable or for repair and recycling or for sustainable, biogenic regional products⁵⁵. In the creation of tax measures, it has to be taken into consideration that these must be as easy as possible to implement and their expected steering effects justify the expense.

As in Climate Protection, there are subventions that detrimental to the circular economy. These promote the use of new products and raw materials or the disposal of used products and thus create negative market incentives. They must be removed or replaced by alternatives that promote the circular economy.

55 E.g. PEFC-certified wood.

The next steps:

- Identification of market incentives for the promotion of the circular economy, in particular through the analysis of the effects of the existing system of taxes, duties and subventions and the possibilities for restructuring.
- Review of the transferability of fiscal measures from Climate Protection to the circular economy.
- Use of the design possibilities within the framework of the EU value added tax directive (e.g. for the relief of repair services or second-hand products).
- Identification and where possible removal of subsidies that work against the transformation to a circular economy.

Expanding circular procurement

Public procurement is a strategic instrument for achieving environmental policy goals due to its purchasing power⁵⁶ and its diversity. It can significantly strengthen the demand for sustainable and circular products. For this it needs clear specifications, courage, creativity and the cooperation with innovative companies.

In Austria, the federal tendering law (BVergG 2018) has a standard that environmental justice of the service must be carefully considered in the procurement procedure. In the governmental programme 2020-2024, the federal government undertook using procurement law as an important instrument to battle climate change. The EU commission also plans to further expand the environment-oriented procurement to accelerate the transformation into a circular economy. With the "action plan for sustainable public procurement (naBe)", in Austria there is a tried and tested instrument for its implementation available that will also be further expanded.

As an information and service point for sustainable public procurement, the naBe platform⁵⁷ is available in the Bundesbeschaffung GmbH (BBG) (federal procurement company), that prepares and further develops the subject for procurers and pushes it forward in close cooperation with the BBG.

Sustainability and innovation are important aspects and go hand in hand with product design. In addition to the consideration of ecological and social criteria, innovation is also included as a social policy procurement criterion in the federal procurement law. The BBG has set up its own service point for "innovation-promoting public procurement".

In the medium-term, those goods will be identified in whose procurement a second-hand purchase or repair should become the norm instead of new purchase. A deviation from this principle will have to be explicitly justified.

56 Currently around 18% of the BIP according to ANKÖ (2019) Economic factor public procurement

57 BMK (2021): The naBe action plan.

The next steps:

- The most complete data capture possible and evaluation of the quantitative development (such as purchase volumes in relation to total volumes, total, sector-specific) of the sustainable and innovative public procurement.
- Circularity-oriented evaluation and expansion of the naBe criteria⁵⁸ in cooperation with comparable regional initiatives such as Ökokauf Vienna, NÖ timetable sustainable procurement and the eco-procurement service (ÖBS) of the Vorarlberg municipal association.
- Forced implementation of the action plan for sustainable public procurement (naBe) in the federation and if possible in all regional authorities, in particular in construction and infrastructure projects, residential construction and textiles.
- Explicit anchoring of the sustainability principle critical to the circular economy in an amendment to the federal procurement law.
- Prioritising recycling materials and establishment of due diligence in the procurement of raw materials.
- Initiation and support of initiatives for sustainable, circular procurement by companies.
- Expansion of the offering of information and further education in the procurement sector in cooperation with training providers (e.g. administrative academy, WIFI/WKO, vocational development institute Vienna/bfi).
- Strengthening the dialogue with innovative companies to increase the offering of circular products and services.

Establish extended producer responsibility

An important instrument for setting prices and market incentives for sustainable, circular products is the “Extended Producer Responsibility” [EPR]. In practice, EPR means that the manufacturer takes responsibility for the collection or return of used goods according to the causal principle “polluter pays” and for the sorting, processing, recycling and disposal of products. This type of responsibility can be purely financial or organisational in nature.⁵⁹ Waste thus becomes a cost factor.

In practice, EPR is often administered by the manufacturers together. The companies establish their own organisations, “Producer Responsibility Organization” [PRO]. In Austria, the ARA AG is a PRO that finances the proper collection, sorting and recycling of used packaging from the licensing fees of its customers.

EPR schemes currently exist in the EU for packaging, electrical and electronics devices, lamps, batteries and accumulators, vehicles and tyres, and in some member states, including Austria, also for additional product groups.

58 BMK (2021): The naBe action plan.

59 EC – DG Environment (2014): Development of Guidance on Extended Producer Responsibility (EPR).

EPR guidelines were developed and implemented in a very heterogeneous manner in Europe. The goal is now harmonized EU-wide (minimum) criteria to guarantee seamless functioning of the internal market.

The EU circular economy package offers the chance to further develop EPR with regard to ecologically more sensible steering incentives. This includes binding minimum requirements for EPR systems and the expansion to new product areas. The central focus of this is that the fees for products are variable (fee modulation) according to their shelf lives and ability to be repaired, reusability and ability to be recycled as well as the presence of hazardous materials. Such a fee modulation is also standardised in the EU waste framework guideline.⁶⁰ This “EPR with ecomodulation” will be an important incentive for circular product design, above all if fees and tariffs are differentiated on the level of individual products and companies. With undifferentiated collective systems, otherwise ecological forerunners pay for the waste of the stragglers.⁶¹

The next steps:

- Testing the possibilities to strengthen, create and expand the extended product responsibility (EPR), in particular the variable fee structure, new elements (e.g. limitation of content materials, recycling specifications, information obligations and new types of products and waste.
- Austria supports a harmonization of the EPR criteria on the EU level (“general minimum requirements”).

3.3 Financing and Funding

The restructuring into a circular economy requires large sums of money. The financial support of projects and initiatives for the circular economy from public and private sources is therefore an important lever to accelerate the transformation.

For this, the well-established public funding measures and instruments that are targeted to the future needs of the circular economy. A significant funding area is the support of research, technological development and innovation illustrated in section 3.4.

In addition to the funding measures, it is important to also secure private investment means for circular business ideas. The commercial banks should be included as active partners in the financing of circular products. For this, the knowledge of the concepts and the specific requirements in the circular economy both in the financial

60 Eunomia (2020): Study to Support Preparation of the Commission’s Guidance for Extended Producer Responsibility Schemes.

61 Ecopreneur.eu (2017): Improvement of Extended Producer Responsibility (EPR) crucial for circular economy.

sector and in the companies should be expanded and the processes adapted (e.g. risk analysis, due diligence).

Using funds for the circular economy

The environmental funding from the federation can be used as a reliable funding instrument for the implementation of measures in climate and environmental protection. The national environmental funding pursuant to the environmental funding law (UFG) currently does not offer all of the starting points for funding necessary for the circular economy. Their focus is on the funding of commercial environmentally relevant investments and thus connected services. The circular economy must also be forced beyond companies to include all of the products involved in the entire life cycle. For this, additional funding offers are needed for companies, communes and private people.

Within the framework of the EU Recovery and Resilience Facility (RRF), Austria applied for financial means, from which for the period 2021 to 2026 the following funding foci for the circular economy will be financed:

- Waste avoidance and resource conservation by extending the life of electrical and electronic devices (repair bonus)
- Collection quotas for plastic beverage packaging and increase the offering multi-use containers in retail food sales as well as in empty container return and measures to increase the investment in multi-use quota for beverage containers
- Establish and retrofit sorting facilities for plastic packaging

In addition, with the Green Deal, the EU provides additional large amounts for financing the ecological and socially sustainable restructuring of economy and society. A good part of this should be used for the transformation into a circular economy. These resources must be acquired for Austrian actors.

The federal states too provide comprehensive funding in the environmental and economic sectors, which range beyond the previous funding focal points and can be used in the future for the circular economy.

For investment funding in infrastructure and facilities one must make sure that there is no undesired lock-in effect. For example, the expansion of recycling capacity can lead to a high demand of the products that can be recycled there, which can lead to strains on repair, reuse and continued use.

The next steps:

- Development and implementation of a separate funding area for the circular economy in the environmental funding law. Expansion to non-facility related investments (including product design, consultation programmes, building awareness, etc.). No limitation of companies as funding recipients.

- Integration of the funding offers regarding the circular economy from the Recovery and Resilience Facility (RRF) or possible subsequent instruments in the circular economy funding area.
- Alignment of the funding offers of the federation and states.
- Integration of specifications for the circular economy into other relevant funding (e.g. circular construction in residential construction funding).
- European analysis, such as resources from the European structure and investment fund for circular investments of Austrian companies and public services can be used to a greater extent.

Balance market distortions

The lack of internalisation of environmental costs is currently a disadvantage to circular sustainable products and services. Until the market can be changed accordingly, market imbalances can be at least partially balanced out by targeted funding and, thus, the transformation can be accelerated. This also includes the national repair bonus, a direct subsidy for private persons to make repairs more competitive with new purchasing and creating new demand. In the future, sensible additional areas should be included. One must ensure that these funds are accessible for all market participants and does not hinder the desired change to the market, therefore with increasing competitiveness circular products and business models are successively downgraded.

The next steps:

- Identification of funding options for bridging economic disadvantages in the market for circular products and business models.

Strengthening socio-economic businesses in the circular economy

Austria is moving in to the peak field of the EU in the area of reuse of goods. Socio-economic businesses (SOBs) contribute very significantly to connecting reuse with employment market integration, low-threshold qualification and subsidised employment of disadvantaged people. In the EU action plan on the circular economy, the pioneering role of the social economy will be highlighted in the transformation and acquisition and qualification of Green Jobs.

The socio-economic businesses are currently primarily funded by the AMS. The AMS focus is not on the stabilization of the circular business sectors of the SOB, however, so that funding and transit places are often reduced in the short term. This again makes stable and long-term cooperation of the SOB with communes and private enterprises difficult.

The next steps:

- Analysis of the current financing situation of socio-economic businesses and the need for funding.
- Development of suitable funding models to expand business fields in the circular economy in socio-economic businesses.

Expand private financing

The restructuring into a circular economic system requires comprehensive investment in all areas. Many times, their characteristics differ from those in previous linear business models and products. They can have a different risk profile, a different cost-benefit balance, different depreciation terms, higher capital requirements and longer return on investment times.

Currently there is a lack of knowledge and experience to be able to properly assess these aspects, both by the companies and in the finance sector and by investors. This makes it hard in particular for smaller enterprises and start-ups to design their investment plans so that they appear as good candidates for financing by banks.

ESG criteria⁶² are becoming increasingly important for investments but the current focus is on Climate Protection topics, the circular economy is still getting little consideration. The mobilisation of private investment means and financing by the commercial banks should therefore be expanded for circular projects.

The next steps:

- Broad involvement of the commercial banks in the financing of circular oriented projects of their commercial customers (information, advise on investment plans, loans, etc.).
- Establishment of a working group “Circular Economy and Finance Economy” to expand the knowledge of financial products and risk management in light of the circular economy with the financial service providers.
- Support of private investment in sustainable, circular commercial activities according to the EU Sustainable Finance Plan.
- Trialling impact investment for circular projects.
- Expansion of the Green Finance Initiatives to the circular economy.

62 Environmental, social and governance

3.4 Research, technology development and innovation (FTI)

The fundamental transformation of the economic system for circular economy can only succeed through systemic and holistic research and development. This requires radical new solutions being developed and successfully established on the market. These types of innovation are usually capital and time intensive and associated with significant commercial risks. Here, the state FTI subsidy can play a decisive role, create impulses and open up sustainable opportunities, in particular if no market for this has been established.

Applied Research - FTI focal point on the circular economy

The future circular resource use will consist of networked subsystems, which requires the interaction of a number of technologies, innovations and actors. These challenges must be met with a mission-oriented innovation policy. Therefore, the “circular economy” was already anchored as an FTI focal point in the BMK. With this interdisciplinary approach that includes all FTI themes, an impact-oriented mix of instruments is provided for the implementation.

Measures are implemented along mutual FTI goals that are anchored in various national funding initiatives and are widely transacted through the Austrian Research Funding Association (FFG). In addition to the classical technology subjects, further education measures such as interfaces to implementation, such as the innovation-promoting public procurement (see “Expanding circular procurement” in chapter 3) or the support of the marketing of innovative Austrian products abroad.

The next steps:

- Continue the previously started FTI initiative of the circular economy, that enable the innovative application-oriented and cooperative research and development plans in interdisciplinary alignment through annual theme-specific calls for tender on central questions along the entire value creation cycle.
- Mobilisation, networking and inclusion of stakeholders and experts for the further development of the FTI focal point circular economy.
- Anchoring circular economy subjects in existing theme-specific FTI initiatives, such as production technologies, digital technologies, mobility and space technologies or the climate-neutral city.
- Establishment of the circular economy as interdisciplinary material in all FTI-relevant activities of the federation, starting with internships to promote new talent to small and corporate projects to public procurement that promotes innovation.
- Initiation of leading projects such as pilot and demonstration projects on particularly relevant topics (e.g. innovative use of CO₂ recuperated from industrial processes as a secondary raw material (Carbon Capture and Utilization).
- Broader use of European FTI funding for circular economy and bioeconomy through the provision of information on European funding programmes (such

as Horizon Europe, Circular Biobased Europe Joint Undertaking) and support of Austrian actors in project development and participation in European consortia.

- Initiation of dissemination and networking activities to create a comprehensive actor network and informing the interested public of current FTI activities.

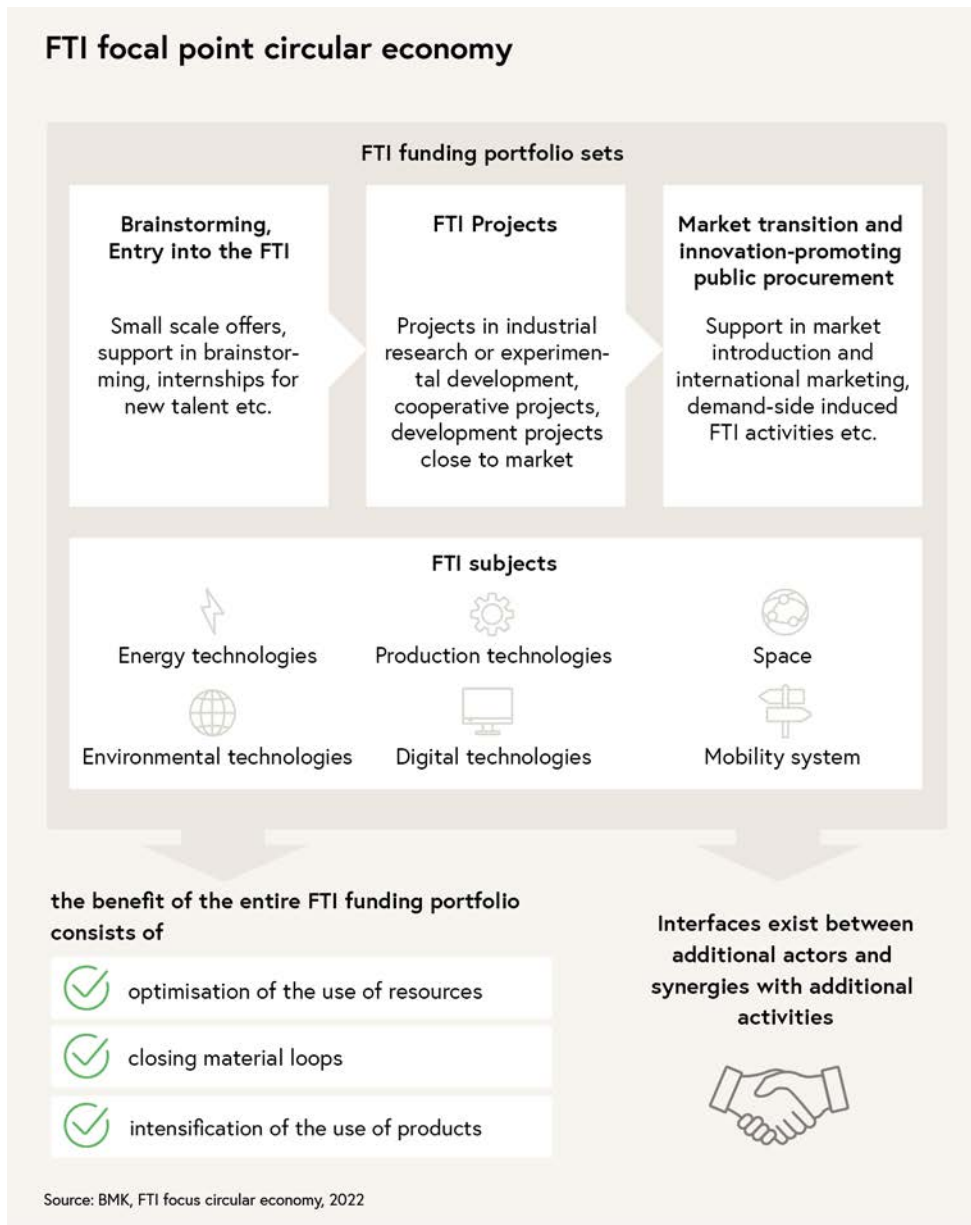


Figure 12: FTI focal point circular economy

Promotion of social science research and social investment

A contribution not to be underestimated for the circular economy is creating social innovations. It requires new lifestyles that are circular and conserve resources: such as new types of living, working models, consumption patterns, social recognition patterns, models of care, welfare, neighbourhood assistance, provision with goods for daily needs. Research and development is required in the area of social innovations. The currently usually civil societal niche experiments should be widely rolled out and integrated into the mainstream.

The next steps:

- Identification of the need for socio-economic research in the area of the circular economy and development and endowment of a respective research programme.
- Increased consideration of social innovations in promotion of investment.

3.5 Digitalisation

Digitalisation is very important to the Austrian federal government. The goal is to “Further develop Austria into a leading digital nation to ensure and expand prosperity, employment and quality of life in the long term”⁶³. At the same time, digital technologies and solutions play a key role in the circular economy. It is therefore suggested to interlock the digitalisation offensive with the transformation into a circular economy and thus use the high potential for synergies.

Opening up areas of application

The digital networking in combination with Big Data, AI-based data analytics and machine learning make it possible for the massive quantities of data created by the management of the circular economy to be processed in a useful way and to be made available for additional applications. Distributed ledger technologies such as the blockchain allow for new forms of transaction, but also secure data storage and transfer.

In this way, material and information flows are closely linked, for example to significantly expand the use of secondary materials or to recycle (remanufacture) products at the end of service life or to feed them back into production as reusable materials. For this, digital, AI-supported platforms should be created for the matching of supply and demand of secondary materials, in terms of a virtual “industrial symbiosis”.

The digital networking of infrastructure, such as of energy networks, devices and facilities (“Internet of Things”) through to social networks, then creates digital platforms on the basis of which new, circular business models such as sharing, leasing and product-as-a-service can be realized. In production, Industry 4.0 enables high indi

⁶³ Digital Austria - Initiative of the federal government for successful digitalisation in Austria.

vidual manufacturing (lot size 1). These can significantly reduce the quantity of goods produced and increase resource efficiency and the use of secondary materials in goods production through optimal control.

Digitalisation enables the virtual illustration of physical substance (such as product, building, infrastructure, machines) over the entire life cycle in the form of a “digital twin”. This can save comprehensive, relevant information over the entire use period and be used for the simulation and modelling of maintenance, modification, renewal etc., which can significantly reduce material usage and waste.

The “Digital Product Pass”, whose introduction will be forced by the European Commission, should be comprehensive and easy to use to provide information about raw material acquisition, contents, materials and components, the ecological footprint and the social impact of the product.

Not least, digitalisation is a particular breeding ground for radical and/or disruptive innovations as they require targeted, fundamental reformation of the entire economic system into a circular economy.

These many areas of application of digitalisation for the circular economy are currently sparsely used and should be developed as quickly as possible.

Design digitalisation to be circular

Simultaneously, digitalisation itself must be designed in a circular-oriented manner, as it causes increased consumption of often critical raw materials and energy through the rapid growth. Previously, themes of sustainability and the large ecological footprint of the digital industry have been considered relatively little. Linear production and consumption patterns are dominant, and digital products usually have a relatively short duration of use.

Ecodesign, dematerialisation, extension of useful life, use of renewable raw materials and energy, as well as reuse and recycling, should therefore become central guiding principles of technology development in the future. In addition, one must take into account high data protection and security requirements (protection from cyber-attacks, General Data Protection Regulation).

The use of digital technologies in the circular economy must also be planned so that the net balance is positive, thus the savings of raw materials achieved is significantly greater than the consumption for manufacturing and use of the digital technologies themselves.

The next steps:

- Development of digital product passes for sustainable products that fall under the new ecodesign regulation. Implementation of pilot projects under consideration of the EU specifications in cooperation with the affected industries and companies.
- Development of guidelines for the circular, sustainable design of the digitalisation and digital technologies.
- Identification and detailed assessment of digital key technologies and areas of application for the circular economy.

3.6 Information, knowledge and cooperation

For many of the aspects and areas relevant to the circular economy, the potential actors still lack information and detailed knowledge essential for the concrete steps for implementation. Comprehensive information and a wide-ranging build-up of knowledge and competencies are therefore a central lever.

The enterprises are the most important target group for this, because they must refocus their strategies, business models, processes and practices, the awareness of their employees and their qualifications for the circular economy and provide the necessary investments. Attention to this has recently significantly increased among the enterprises. Despite this, we need to take a broad offensive to increase competency. Provision of information, increase in knowledge, offers of advice and suitable formats for exchange and cooperation should therefore be strongly increased and expanded. For this, the Circularity Lab Austria must be strengthened and existing knowledge and competency networks and cluster initiatives used.

The consumers can support the transformation through their consumption behaviour. For this, awareness must be raised and suitable information made available.

To achieve this type of comprehensive transformation, as it requires circular economy and climate neutrality, we also need new forms of knowledge production and participative solution development to design the required social innovation and transformation processes.⁶⁴ Circular competency must be built up in a co-creative learning process, new knowledge must be generated about the circular society and new abilities developed for implementation. The educational institutions, research institutions and cultural organisations play an important role here; at the same time, there is a need for the necessary resources and infrastructure.

Not least, the circular economy requires broad cooperation if it is to be implemented completely and quickly. This applies to the transformation overall, as well as

⁶⁴ social design lab (2020): Paths to a Circular Society. Potentials of the Social Design for social transformation.

to the various fields of action. The circular economy strategy therefore requires open exchange and cooperation among the various stakeholders.

Strengthen enterprise competency

We are just at the beginning of the transformation to the circular economy. The group of dedicated pioneers is still very manageable. They are followed by a growing number of businesses that recognise the necessity for change and see opportunities in the circular economy but do not know exactly how to approach this. Gaining information and knowledge is central for these companies.

Modular and scalable offers are preferred, which can quickly be adapted and implemented including low-threshold support offerings especially for SME. They include targeted information, training offers, competent advisement and support as well as the provision of experts. Networking and exchange for increasing competency should also be promoted. The latter also aides in developing the potential of inter-industry cooperation, which is of particular importance for the creation of value added loops. Circular entrepreneurship and loop-oriented thought should be particularly anchored in top management as a guiding principle.

In addition to the transformation, the development of new business models is important, whereby start-ups play a central role. The pursuit of green technologies and ecological goals is a trend gaining in importance for start-ups. Surveys from the Austrian Startup Monitor (ASM 2020) show that 63% of all of the start-ups queried within the framework of the survey already belonged to the group of Green Start-ups, thus to those who are building their corporate goal on a positive contribution to society (Green Impact and Green Business Start-ups). Green Start-ups pay particular attention to sustainable consumption and sustainable production. This includes the reduction of the resource consumption (water, energy etc.), the use of sustainable materials in production, increasing the life span and recyclability of products and many other activities that make their actions and those of their customers less environmentally damaging according to current knowledge. Particularly for Green Start-ups, cooperation with partners are important that have complementary and strengthening resources.

Funding initiatives of the Austria Economic Service (AWS) like those for PreSeed/Seedfinancing Innovative Solutions and First Incubator support young start-ups and entrepreneurs in the development of innovative solutions as well as entrepreneurial competency. In the First Incubator programme, an annual focus on themes of sustainability is realized, which can also cover circular economy. Competitions like “Teller statt Tonne” (plate instead of waste bin) address important aspects of waste avoidance as a central pillar of the circular economy. The subject of Entrepreneurship Education is also focussed above all on young women.

Austria also has active knowledge and competency network on national and regional levels in the area of the circular economy, like the Circular Economy Forum Austria, the Resource Forum Austria, Circular Futures, RepaNet, or other various cluster initiatives in the federal states, as well as the cluster platform as a central information hub of the

Austrian clusters. These should be included in the conception and implementation of the increase in competency for the companies. Numerous institutions and knowledge and competency partners are connected to these networks, which can be used as multipliers. Austrian Best Practices are illustrated in the European Cluster Policy Toolkit. The next steps:

- Implementation of a broad campaign for Austrian companies that provides information about the circular economy and motivates them to act, in cooperation with the federal states and social partners.
- Development of training and further education programmes for companies that promote circular thinking, abilities and competencies, in particular in seminars and workshops about ecodesign, to support the development of new circular products, services and business models.
- Cooperation with existing national initiatives in the development and implementation of information, training and consultation offers for companies.
- Provision of consultation and support offers, in particular for SME and start-ups (such as using a consultation check), that want to take the next steps regarding the circular economy.
- Establishment of fora and “communities of practice” for exchange of knowledge and experience and to learn from each other in the company to gain new, practice-relevant knowledge of the circular economy and to share this with other companies.

Establishing the Circularity Lab Austria

The establishment of the Circularity Lab Austria should accelerate the transformation to a circular, resource conserving and climate neutral society and economy. The goals are the promotion of circular economy activities in companies (including the use of innovative clean technologies, efficient resource systems, circular business models and renewable resources and recycled materials) and the stimulation of the demand for circular products and services by end users. The tasks include:

- Information, communication and qualification of the actors in the circular economy
- Organising transfer of knowledge and know-how and holding specific events
- Connectingg Austrian companies and research institutions in the area of the circular economy and among industries
- Exchange of information and cooperation with domestic and foreign experts, companies, institutions and research institutes.

The next steps:

- Detailed conception an implementation of the Circularity Lab Austria.

Stimulating private demand

It is the primary task of the companies to bring an attractive offering of sustainable, circular products to the market that is affordable, meaning not more expensive than conventional products. Politics and administration must create the suitable framework conditions for this.

The consumers can support the transformation into a circular economy by giving increased attention to circular products and services if available in their purchasing decisions. This increases the incentive for companies to develop and to sell such products. The demand for circular products and services by consumers has previously been very limited, even if sustainability aspects are of increasing importance for them in purchasing. This is primarily due to the lack of offerings and higher prices, but also due to a lack of knowledge and awareness.

Suitable awareness and information measures using concrete examples should help consumers to understand the relevant sustainability aspects of circular products, take them into account when purchasing and trying out new types of use (e.g. renting instead of buying products). It should be demonstrated that circular products (= repaired, remanufactured, with high content of recycled material etc.) satisfy high quality demands. The information activities are closely linked to the expansion of the consumer rights (see “Expand consumer rights” in chapter 3).

In addition, consumers must be motivated to return products they no longer need to the product and material loop in a timely manner, preferably at the highest possible value level, to close the loop. In addition to information, return options and incentives for the end user must be improved.

The next steps:

- Development and implementation of measures that promote sustainable consumer behaviour based on behavioural economic approaches⁶⁵ (such as nudging).
- Expand informational offerings for consumers with circular aspects (e.g. the Austrian Environmental Seal, topprodukte.at, product testing by consumer organisations, digital product pass).
- Information campaigns for mobilisation of unused consumer goods for either use by third parties or for recycling.

Determine the need for qualification

Because the transformation to the circular economy affects all sectors and areas of the economy, the resulting requirements are diverse and can be very specific, it is currently difficult to create qualification prognoses. The European Commission currently sees no significant trends for the training requirements of the people involved. In any case, in the future more overall interdisciplinary qualifications will be needed.⁶⁶

The Commission and OECD recommend setting measures for supporting the acquisition of new skills for low-qualified employees, who are coming under increasing pressure on the employment market. This includes the support of socio-economic businesses that are active in the circular economy (see “Strengthening socio-economic businesses in the circular economy” in chapter 3. The need for qualified persons in the sustainability industry is currently strongly increasing (such as sustainability managers) and in the expansion of the training options in the repair industry.

There is a need for additional and more specific analyses to create concrete activities in the qualification and employment market policy from the viewpoint of the circular economy.

The next steps:

- Analysis of the implications of the circular economy for the employment market and need for qualifications to accelerate the transformation to the circular economy.

Integrating the circular economy into the education system

The new concept of a society and economy based on circularity and bioeconomy should be anchored into the Austrian education system step by step. The first offers on this are already present in technical colleges and universities as special curricula that will be extended. In addition, the subject should be integrated into existing curricula and in schools. We can build on many activities in the field of ecology and sustainability

⁶⁵ For example, see bi.team

⁶⁶ European Commission, 2018.

that are traditionally gaining great importance within the framework of the primary and secondary natural sciences curricula in Austria.

The next steps:

- Creation of an Austrian knowledge map for the circular economy.
- Provision of further education offerings for students in primary and secondary education.
- Thematisation of the circular economy in vocational colleges and universities within the framework of the alliance of sustainable universities and the federation of sustainable institutions of higher education.
- Establishment of a course of study on “Green Chemistry” by the University of Vienna, Vienna Technical University and the Vienna University of Natural Resources for the qualification for R&D for sustainable products, energy and technologies through (bio)chemical process in terms of the circular economy.

Promoting cooperation

Currently various actors are trying to further the transformation to the circular economy in their fields (companies, politics and administration, science, associations, NGOs etc.). For these initiatives to have a broad effect and accelerate development, they must be networked and establish the most trustworthy cooperation possible.

If the top decision-makers from economics, politics and civil society are involved as promoters, the public effect is strengthened. Possibilities for participation from civil society should be created so that the social interests in terms of a “just transition” are taken into account.

Cooperation is also required for the structuring of new regional production chains and economic cycles that are enabled or strengthened by the circular economy.

Not least, international partnerships and cooperation with other circular initiatives must be expanded. On the one hand, we can therefore profit from the knowledge and practical experience of the forerunners. Whereas on the other hand, Austria can establish itself as a provider of circular technologies, products, services and system solutions on the international market.

The next steps:

- Networking the relevant actors (persons and institutions) and establishment of a “circular economy coalition” as a network of the circular actors for the support and further development of the Austrian circular economy strategy.
- Increased integration of the circular economy in the waste management plans of the states and municipalities.
- Promotion of local and regional ecosystems of the circular economy.
- Creation and further development of flexible, creative forms of cooperation and institutions in which a variety of various actors work together (public-private partnership).
- Active use of existing international cooperation fora and development of national offerings for international cooperation.
- Creation of a Central European cooperation area with the surrounding countries for systematic and strategic market development for circular products and services.

4 Starting points for the transformation

In order to reform the Austrian economy and society into a climate-neutral, sustainable circular economy by 2050, we need a very accelerated procedure on the most varied of levels. For this, we need an interaction of numerous actors from economics, science, administration and civil society. 14 in-depth interviews with selected early adopters and nine online workshops organised by the Federal Environmental Agency provided comprehensive input for this.

Subsequently, goals and very concrete measures will be executed in selected transformation focal points. Originating from the EU action plan on the circular economy 2020, the following seven transformation focal points⁶⁷ will be derived as relevant for Austria:

1. Construction industry and infrastructure
2. Mobility
3. Plastics and packaging
4. Textile industry
5. Electrical and electronic devices, information & communications technologies
6. Biomass
7. Waste and secondary resources

Within the transformation focal points, more than 600 proposals for measures from actors in the circular economy will be developed, assessed on their possibilities to be implemented in Austria, content summarized and included in the present circular economy strategy. With these measures, the turnaround will support a sustainable circular economy and will be the foundation for future new measures to achieve the goals by 2050.

The transformation process will be additionally supported by further initiatives such as the waste avoidance programme⁶⁸, the raw materials master plan 2030, the bioeconomy strategy, the “Food is precious!” initiative, the sewage strategy, the soil protection strategy, the construction culture reform programme and the microplastics

⁶⁷ Federal Environmental Agency (2021): Documentation of the themed workshops on the development of the Austrian circular economy strategy.

⁶⁸ According to the European waste framework directive and national waste guidelines (waste management law 2002), a regular waste avoidance programme is to be created. The program will be re-released in 2022. Regarding waste avoidance, in addition to the measures listed in the following chapters, numerous other initiatives and activities will be listed in the waste avoidance programme. The goal is to disconnect the economic growth from the environmental impact associated with waste.

action plan. In addition to focussing on national implementation measures, on a European and international level, the further development of pertinent regulatory policy and market-oriented instruments to increase circularity of materials will be actively supported.

The individual transformation focal points focus on the one hand on individual sectors, and on the other on utilization of materials.

To decarbonise the Austrian energy-intensive big industry, it will also be necessary to close the carbon loop at least in the medium term through Carbon Capture and Utilization (CCU). The Austrian companies have already taken good first steps toward this.⁶⁹

4.1 Construction industry and infrastructure

The “Construction and Buildings” industry is one of the areas in which the most resources are utilized. It is thus even more important to establish circular and resource-conserving construction methods. Even the development phase (conception, planning and procurement) has a decisive influence on the lifespan of buildings as well as the recycling and reusability of the materials used. In addition, decisions will be made in this phase of constructions on the use of materials that have a lesser material and ecological footprint (such as biogenic materials such as wood, flax or wool). The development phase is thus a great lever for the circular economy in constructions, as well as land use planning (e.g. zoning plans with their impact on land use), the construction culture (e.g. implementation of the construction culture guidelines of the federation) and the standardised data management (e.g. Building Information Modelling).

In order to meet the EU specifications for avoidance, reuse, preparation for reuse and recycling, the potential for resource conservation must be used in the construction industry.

For this, the following goals were set:

- Buildings will be developed in view of circularity in consideration of all life cycle phases (production and erection, use, disposal), including relevant credits and charges. The focus here is a long service life, flexibility of use, reduction of maintenance (e.g. through low-tech applications), modular construction, separability, reuse of components, ability to recycle the construction materials used and the use of the highest possible share of sustainable construction materials and secondary materials.
- The duration of use of existing buildings will be extended through maintenance and renovation. In renovation, the focus is on the improvement of energy efficiency, the reduction of energy consumption and/or CO₂ emissions, separability

⁶⁹ WIFO (2021): Investments in digitalisation and decarbonisation in Austria.

and reusability of components and on the use of the highest possible share of sustainable construction materials and secondary materials.

- The material recycling of excavation material, building and demolition materials will be increased if ecologically and economically possible. This will be achieved through better separation during dismantling and demolition, removal of pollutants, dismantling with an eye on recycling and using new recycling technologies and business models.

The following measures should take priority so that these goals can be achieved.

Preferred promotion of resource conserving and circular construction methods

- Reduction of the quantity of materials used and increase in material efficiency.
- Building planning that promotes methods that enable the simplest separation and dismantling as well as the highest possible flexibility in construction in the event of change of use (e.g. through appropriate design of floor plans, room heights, etc.).
- Building methods that allow for the simplest possible separation and dismantling to enable sorted dismantling as well as easy renovation (e.g. modular construction, use of removable components and system building methods, in some circumstances associated with deposit or buy-back systems etc.).
- Use of aggregates only if their circularity has been proven.
- Creation of an OIB guideline or ÖNORM for the implementation of basic requirement 7 (Sustainable use of natural resources) of the construction product regulation (EU/305/2011) in Austria.

Sustainable procurement in high-rise and underground construction

- The most use of the high-rise and underground construction criteria of the national action plan for sustainable public procurement (naBe)⁷⁰ for procurements by all public customers.
- Implementation of an incentive system for using the naBe criteria in high-rise and underground construction in procurement activities by non-public institutions, companies and private parties, as well as consideration in the granting of contracts of public housing subsidies and of subsidies in the area of residential hydraulic engineering and commercial estates.
- Obligatory dismantling concepts for buildings already being constructed.
- (Financial) subsidies for implementation of circular building products/methods (such as allowances for the implementation of sustainable construction with regenerative raw materials in housing subsidies).

⁷⁰ BMK (2021): The naBe action plan.

Extension of the duration of use of buildings and construction products

- Striving for an Austrian authorization requirement for dismantling or demolition of buildings and expansion of the decision-making framework of the authorities in consideration of ecological practicality.
- Fundamental prioritisation of renovation before new construction. Stimulate extended duration of use of existing buildings through fiscal, legal measures and funding instruments.
- Implementation of multifunctional (re)utilization concepts including the possibility of small structural changes in the submission of construction permits.

Increase reuse, recycling and recovery

- Creation of a practice-oriented legal framework for reuse of components, in particular in the course of the revision of the EU construction product regulation (above all regarding CE marking, if the fundamental requirements for construction for “sustainable use of natural resources” is set on an EU level, liability law).
- Closing the material recovery loops of excavation material⁷¹, mineral construction materials (in particular gypsum, asphalt, concrete), metals, plastics, glass and wood with a high reuse potential and secondary raw material demand through respective legal measures (dumping ban, recycling requirements) after reviewing the economic and ecological practicality and introduction of material-specific minimums of recycled construction materials and secondary raw materials in selected products.
- Creation of financial incentives for using recycled products/secondary raw materials to promote recycling (secondary raw materials).
- Collection of material data over the entire life span and documentation in digital form (e.g. Building Information Modelling).
- Creation of a marketplace for reusable building materials and early provision of information on available components.

4.2 Mobility

Questions of climate- and environmentally-friendly mobility are closely linked with aspects of the circular economy. Sustainable batteries and emission-free vehicles form the basis for the mobility of the future⁷². The mobility master plan 2030 for Austria⁷³

71 BMNT (2017): Federal waste management plan 2017, chapter 7.8. In supplement to the recovery of excavation material for soil recultivation, we refer to the “Guideline for soil recultivation from the advisory board for soil fertility and soil protection” (bfw.ac.at/050/pdf/Rekultivierungsrichtlinien_%202Auflage_%202012.pdf).

72 EC (2020): A new action plan for the circular economy.

73 BMK (2021): Mobility master plan 2030 for Austria.

describes the necessary mobility change for the future mobility system 2040, for which the circular economy will play an important role. One of the goals in the Austrian mobility master plan 2030 is to avoid traffic or transfer it to environmentally-friendly vehicles (e.g. bicycles, bus, train) to conserve resources. Thus, the requirements for planning, construction and maintenance of infrastructure and the vehicles change.

If there is a long-term revision of the road network, we can assume that the demand for mineral raw materials (e.g. sand, gravel and ballast) will be reduced. At the same time, with the electrification of the vehicles, the demand for metallic raw materials (e.g. copper) will rise and thus there is a necessity to expand and modernise the recycling infrastructure. In addition, the further expansion of car sharing concepts can reduce the demand for vehicles. The remaining demand for vehicles should be met through a value-added chain that increasingly integrates the use of sustainable materials, reuse, repair and recovery of components. The future design of mobility thus provides a decisive contribution to the establishment of a sustainable circular economy. Conversely, the demand for mobility can be satisfied increasingly while conserving resources and being more climate friendly through circular approaches.

For this, the following goals were set:

- Reduction of traffic volume through measures in the area of the circular economy (e.g. local use of excavation material) as a supplement to measures in land use planning (see soil protection strategy and mobility master plan 2030).
- The highest ambition in the implementation of the European directive on batteries and accumulators (directive 2006/66/EC) as an accompanying condition for the electrification of road traffic: advocating safe and sustainable circular economy for all batteries (e.g. vehicle batteries, PV accumulators), including duty of care along the supply chain (reduction of raw materials) as a flanking condition for the electrification of road traffic.
- Further development of environmentally-friendly, reusable, modular and recyclable materials, components and overall systems for vehicles, their energy provision and the required (digital infrastructure).
- Higher utilization of vehicles, greater comfort and optimisation of traffic flows through new forms of intermodal and use-oriented mobility solutions, possibly using digitally supported platform solutions.

To achieve these goals, the following measures must be given priority in implementation to put the circular economy perspectives for land use planning and traffic policy on the path to climate neutrality 2040.

Efficient use of transport infrastructure and vehicles

- The planning, construction and maintenance of the transport infrastructure is laid out in the mobility master plan 2030 of the BMK for Austria⁷⁴ and is aligned with its goals. Through the envisaged transfers of unavoidable (motorised) transport to environmentally-friendly means of transport, in particular the train, public transport, bicycle and foot traffic, the road infrastructure can be re-dimensioned in the long term. This leads to a reduction of the demand for mineral raw materials (e.g. sand, gravel, ballast, limestone). The comparably resource-conserving expansion of the foot and cycle path infrastructure results in a new distribution of the uses in the public space as well as through restructuring and expansions of the infrastructure. The use of secondary raw materials is driven forward to conserve primary resources (see 4.1 “Construction industry and infrastructure”).
- Sharing economy: Creation of attractive framework conditions for increased use of car sharing through improved offers for the first and last mile on roads with public transport, through the reservation of traffic lanes for vehicles with an occupation of greater than two and consideration of the occupation with the commuter allowance.
- 100% emission-free vehicle new registrations and conversions: The new registration goals for new vehicles required for the mobility transition for Austria are listed in the mobility master plan 2030. Accordingly, 100% emission-free new registrations for passenger vehicles must be achieved at the latest in 2030, for trucks <18t 2030 and passenger vehicles >18t in 2035. In particular in the area of heavy commercial vehicles, conversion from fossil fuel vehicles to emission-free drives offer potential in terms of the circular economy and national value creation. Regarding the emission-free drive technologies, the focus in the passenger vehicle sector is on battery-powered electric drives, and in the commercial vehicle sector, in addition to battery-powered electric drives, for special requirements, in particular in long distance and heavy load transport, also on fuel cell drives with hydrogen.

Batteries

- Intensifying the Austrian dedication in the European Battery Alliance to increase recycling and production in Europe and with the EU battery regulation with the goal of creating strict regulations (including duty of care) for all batteries along the entire value-added chain.
- Increasing secondary use of batteries for alternative applications (buffer batteries for photovoltaic systems) through legal and organisational framework conditions (e.g. product pass).

74 BMK (2021): Mobility master plan 2030 for Austria.

Promoting mobility industries on the path to the circular economy

- Transformation of the transport technology industries into circular mobility industries
 - through the creation of a market for new vehicle models that are optimised to the needs of the first and last mile in the use of public transport (e.g. route from stop to home address). This should reduce the demand for second cars in households and the material demand for vehicles (smaller size).
 - Through use-oriented research to implement increased secondary raw materials in the Austrian car industry, producing recyclable components and reducing material use and hazardous waste.
- Increased controls when exporting old vehicles and their proper use and/or treatment abroad.

4.3 Plastics and packaging

Plastics and packaging are a significant component of the economy and daily life.

Plastics have a broad application spectrum due to unique and varied material properties. Above all in the hygiene, safety, food safety, lightweight construction and insulation industries, plastics make up an essential part of everyday life. At the same time, plastic waste enters the environment and affects the landscape, soil and water, flora and fauna and other living things. Emissions from plastics along the life cycle of products must thus be prevented to the greatest extent possible and plastics used in a targeted manner for high-quality applications.

According to the EU action plan for the circular economy (2020), packaging is one of the seven “central product creation groups” in which the most resources are used, and therefore has a high circularity potential. The promotion of material-optimised reusable packaging as well as the recycling of packaging are central points for the circular economy. The mechanical recycling should be supplemented with chemical recycling for those fractions that cannot be recycled using this method.

Austria has a strong packaging industry and is a global leader in the production of machines for the plastics industry. Innovations in this area could simultaneously increase the competitive edge of the Austrian economy and support the circular economy.

For this, the following goals were set:

- Use plastics contentiously and in a targeted manner and consider economic and ecological aspects to keep them in the cycle as long as possible.
- Avoid packaging materials as much as possible and sensibly and keep them in the cycle as long as possible in consideration of economic and ecological aspects.

- Increase circularity of plastics and packaging through adapted product design (Design for Reuse, Design for Recycling, expansion of reuse of plastic products and packaging).
- Unavoidable plastic and packaging waste must be returned to the cycle at the end of the service life as the highest possible quality secondary raw material or recycle.

The following measures should take priority so that these goals can be achieved.

Reduce packaging material and increase the share that is reusable

- Concretise regulations and make them binding so that the packaging volumes and weight are limited to the minimum requirements for product protection.
- Further increase obligatory multi-use quotas, including labelling requirements for reusable and single use packaging for beverages, take-away packaging and transport packaging.
- Development and use of modular multi-use packaging and drive forward the logistics concepts required for this.

Accelerate sustainable product design of plastic products and packaging

- Create financial incentives for design of packages focussed on recycling through eco-modulation of the dispensation fees (licensing fees) depending on the “sustainability of the packaging”. The recyclability and recycle content of a package is the decisive criteria for the Eco-Fee modulation.
- Define and make binding the assessment criteria for the recyclability of packaging in accordance with EU specifications.
- Accelerating the use of recyclates and optimisation (with regard to energy consumption and CO₂ emissions) of the use of renewable raw materials in the production of plastics and packaging.
- By substituting hazardous materials and consequent implementation and control of material bans, avoiding that hazardous materials are used in plastics and plastic production in the circular economy.
- Create transparency in the products to make it visible which hazardous materials they contain (e.g. SCIP database ECHA). Reinforce implementation for the SCIP database and give recyclers sufficient information.
- Prevent the import of plastics containing hazardous materials through increased market surveillance so that the hazardous materials do not enter the economic loop.

Expand separate collection, modernise and adapt infrastructure for sorting and recycling of plastics and packaging

- Federal standardisation of the packaging collection, accelerating separate collection of plastics and packaging in commercial and industrial operations.
- Force acquisition and collection of all significant plastic flows for recycling.
- Expansion of sorting and recycling capacities and modernisation of the sorting facilities to increase sorting depth and quality, weed out hazardous materials and chemicals (legacy materials) and additives and achieving the best possible sorting of plastic groups in high quality, including through promoting investment.
- Expansion and optimisation of the recycling infrastructure under consideration of the chemical recycling for groups that are not suitable for mechanical recycling in consideration of relevant criteria such as the use of energy.

Increase recycling and secondary raw material utilization

- Set binding use quotas for material-specific raw materials (recyclates) in accordance with the development on the EU level in production, depending on their availability (considering transport routes) and under the premise of the priority of waste avoidance.
- Remove barriers to the use of recyclate, in particular for food packaging.
- Increase markets for recyclate in cooperation with the plastics processing industry through: policy, specification of qualities, quality assurance and management, certification, logistics and pricing systems.
- Reinforcement of the polluter pays principle regarding payments for non-recycled plastic packages under EU law.

4.4 Textile industry

The textile and clothing industry is one of the most important global consumer goods industries. Its multi-faceted product and service offerings range from clothing to home textiles to technical applications. In the EU “Circular Economy” action plan, textiles are proven to be resource-intensive with a high circular economy potential, and the development of an EU textile strategy was announced. The market-dominating business model of Fast Fashion causes high strain on the environment and the climate, high consumption of resources and has many socially negative effects. Clothing is worn for increasingly shorter times and often disposed of unused.⁷⁵ Currently, textile recycling is still in its infancy, and very few old clothes are processed into new fibres and recycled for the textile industry.

Considering the ecological, social, economic and technological challenges in the textile industry, a strategic reorientation is needed that takes into consideration the

⁷⁵ EEA (2022): Textiles and the environment: the role of design in Europe’s circular economy.

total life cycle of textile products. With the publication of the European strategy for sustainable and circular textiles⁷⁶ in March 2022, the Commission puts the focus on the ecological and digital transformation of the textile and clothing sector. The strategy strives for the goal of establishing an environmentally-friendly and competitive industry that is more resistant to external shocks.

The strategy includes the Vision 2030 for textiles and proposes key measures. The goal is that all textile products on the EU market are durable, repairable and recyclable, are made up to a great extent of recycled fibres, are free from hazardous materials and are produced under consideration of social rights and the environment. The consumers have high-quality and affordable textiles available and Fast Fashion is no longer in fashion. Profitable reuse and repair services are widely available. The textile sector is competitive, resistant and innovative, because the manufacturers take responsibility for their products all along the value-added chain and that sufficient capacity is available for innovative fibre-to-fibre recycling. Circular clothing instead of clothing with a short life has become the norm.

With the EU textile strategy, concrete key measures are proposed: binding requirements for the design of textiles within the framework of the ecodesign regulation for sustainable products. Thus, sustainable and circular textile products become the norm in the EU. The introduction of digital product passes and clear information on labels. Measures against greenwashing to protect consumers. Proposal for a binding expanded manufacturer responsibility for textiles with environment-related fee schedule. Measures that start a turning point in overproduction and over-consumption (Fast Fashion) and counter the destruction of unsold or returned textiles. Further measures address the inadvertent release of microplastics, the export of textile waste and incentives for circular business models including the reuse and repair sector.

The implementation of the EU textile strategy starts under the broad cooperation of relevant interest groups with the common development of a timetable for the transition to the textile ecosystem to successfully design the green and digital transformation and to increase its resilience.

Austria supports the circular transformation in the textile and clothing industry with its new opportunities and possibilities. These lie above all in the increase of quality and with that the extended life of textiles, use of sustainable materials, in the reuse and recycling of textiles. Additional advantages are improved competitiveness, new corporate cooperation and better networking of the textile sector and improved inter-industry cooperation. In addition, public procurement can make a significant contribution to a sustainable and circular textile industry. The procurement volumes for textiles by public actors in Austria is estimated to be up to 560 million Euro.⁷⁷

⁷⁶ EC (2022): EU strategy for sustainable and circular textiles.

⁷⁷ IWI, Pöchlacker (2021): Incentives for a sustainable circular economy in the textile and clothing industry in Austria.

The textile focus of the Austrian circular economy strategy focusses on the categories of clothing, shoes, home textiles and housewares, flat textiles as well as technical, medical and smart textiles and is oriented to the specifications of the EU action plan and the EU textile strategy for sustainable and circular textiles. The subject of “microplastics and textiles” will be addressed in the “microplastics action plan”⁷⁸. This focus reveals paths to create the legal and economic framework conditions for a sustainable, innovative, circular and competitive textile industry in Austria.

For this, the following goals were set:

- Extending the product life and duration of use of textiles and clothing through environmentally-friendly, low pollutant and circular design (design for reuse, repair, upcycling and recycling), under consideration of the needs of society, the principles of the circular economy and green chemistry, use of recycled fibres as well as circular production processes.
- Increase supply and demand of reliably certified, sustainably produced and long-life products, including through more transparency along the supply and production chain with regard to ecological and social production conditions.
- Promote business models that reduce overproduction and over-consumption (Fast Fashion); stimulate the markets for reuse and resale of used clothing as well as for repairs; create economic incentives for sustainable fashion and make costs transparent.
- Introduction of the separate collection of textile waste as of January 1, 2025; increase the collection, sorting and recycling of textiles. Increase the share of textiles and clothing from recycled textile fibres by increasing the demand in public procurement for companies and consumers.
- Position Austria on the global market as a leader in circular regenerative textiles, textile innovation, textile recycling technology and in sustainable services.

The following measures should take priority so that these goals can be achieved.

Sustainable production

- Promote the use of regional, renewable fibres and materials that conserve the environment and resources and are low in pollutants and support the expansion of Austrian production facilities.
- Anchor sustainable and circular design rules in the education and further education system and in the textile companies and promote their use.

⁷⁸ BMK (2022): Microplastics action plan.

- Stimulate sustainable and circular business models such as renting, leasing, repair, resale or take-back programmes by fashion chains.
- Increase networking and cooperation of the relevant actors; develop partnerships, expand pilot projects and start-ups with a focus on sustainability and circularity to new product groups and promote them (such as remoulding of mattresses, bed covers, rugs) and making best practices visible in the European and global market.

Sustainable consumption

- Expand and further develop informational and awareness promoting measures to drive forward a change in value for sustainable, procure high quality fashion and textiles and drive forward a change in purchasing and use behaviour through to repair and second hand.
- Analyses on consumer behaviour and possible purchasing incentives for sustainable products.
- Raise awareness with information and explanation campaigns on the subjects of "Fast Fashion", careful handling and use of textiles in everyday life as well as "responsible online shopping".
- Disseminate reliable and easily accessible product information for consumers; increase sustainable, reliable environmental certifications such as the Austrian Environmental Seal/EU Ecolabel.
- Support rapid implementation of the EU product pass and increase commitments to fight greenwashing.

Public sustainable textile procurement

- Expand sustainable and circular procurement of textiles in the public sector.
- Take the principles of the circular economy, renewable raw materials and recycled fibres as well as social aspects increasingly into account in the procurement criteria.
- Increase reuse, repair and maintenance and expand product-service business models.

Collection, sorting and textile recycling

- Set goals and minimum standards for textile collection and processing; further develop existing collection and recycling systems specific to Austria, introduction of an increased manufacturer responsibility with eco-modulation according to EU legal provisions.
- Promotion of investment and technology development, such as automated and AI supported sorting and textile recycling technologies in Austria and for export.
- Establish competitive markets for recycled fibres by increasing demand in public procurement, companies and consumers; create web markets for recycled materials and production waste.

4.5 Electrical and electronic devices, information & communications technologies (ICT)

The electric and electronics industry is an elementary component of the European and national consumer goods industry and the consumer society. The trend for the use of electrical and electronic devices is still growing strongly. Along with this there is a growing consumption of resources and energy as well as for the repair of the devices even during use. (Critical) raw materials are lost through insufficient recovery.

In order to establish a future sustainable, resource-efficient and socially just electric and electronics industry and sustainable, fair consumption of the devices, we need an increased focus on a circular economy. For this, there must also be a change in the market regarding production, use and recycling. For electrical and electronics devices, the high import share must be taken into account, which is why ambitious measures for the reduction of the resource consumption in production, in particular on a European level is essential. Because a large part of electrical and electronic devices are imported into Austria, the measures are primarily positioned in the phases of consumption, use and recycling.

For this, the following goals were set:

- Reduce demand for new electrical and electronic devices with new business models (service instead of purchase, share instead of purchase, leasing) and communal use.
- Extend the life and duration of use of electrical and electronic devices.
- Increase recycling of electrical and electronic devices including batteries.

The following measures should take priority so that these goals can be achieved.

Extending product life span

- Intensification of the Austrian commitment on the EU level to determine minimum life spans that improve the reparability and replacement part availability for electrical and electronic devices, establish a repair index, make software updates of devices available for longer and extend warranty periods.
- Create true-cost pricing through consistent use of the expanded manufacturer responsibility and counter premature obsolescence.
- Increased market surveillance of the electrical and electronic devices in circulation regarding the existing legal product requirements (also for imports from third-party states).

Consumption and business models

- Increased acquisition of long-life, repairable, refurbishable, repaired and refurbished devices within the framework of public procurement.
- Use a criterion catalogue for the public procurement to extend the criteria such as longevity and reparability as well with social aspects and use them consistently.
- Testing financial incentives for repair services, for the purchase of repaired devices and for lending of devices.
- Stimulate a revival of a repair culture in Austria.
- Increase quality assurance and professional training for repair services.
- Support the further development of circular business models (lending, renting, leasing, repair, service) and make successful models and best practices visible.
- Creation of suitable framework conditions and instruments to promote the communal use of electrical and electronic devices (sharing initiatives) in consideration of regional demand.

Improve collection and recycling

- Increasing the collected volume of electrical and electronic devices through the improvement of the technical and legal framework conditions.
- Evaluation of the expansion of the return options for old electronic devices in addition to existing tracks.
- Increase inspections of waste collectors to ensure adherence to the legally proscribed reporting obligation in the assumption of old electrical and electronic devices (Old electronic devices regulation, EAG-VO; § 24).
- Intensification of inspections regarding cross-border waste shipments with regard to illegal shipments of electrical and electronic devices.
- Test a deposit system for batteries.

Increasing consumer awareness - sustainable consumption and sustainable use of electrical and electronic devices

- Integration of circular design regulations and repair knowledge in curricula.
- Information campaigns regarding a) return possibilities of reusable old electronic devices, b) repair options, c) purchasing options for used devices, d) loan and lease options, e) on the advantages of repairs from an ecological, economic and social point of view (conserving resources, partially replaces new purchases, creates value and jobs in Austria).

4.6 Biomass

The target of bioeconomy is avoiding the use of fossil coal in energy and the material economy. It thus makes a significant contribution to the transformation of the economy and to climate neutrality. With biomass there is great scope for action for increasing and efficient use of secondary raw materials of biogenic residual material, ancillary products and non-recyclable waste. Through the resource-efficient or cascade-type use, the value creation of biomass can be further increased. In the circular use of biomass, one must take into account protection goals regarding biodiversity, soil management, fighting climate change, defence against natural dangers and other needs in addition to the energy and material aspects. The use of biomass has a significant role in creating value, workplaces and supply reliability in the rural areas.

With this in mind, the following goals were set:

- Increasing efficient agricultural production with simultaneous diversification of cultivation adhering to superordinate protection goals and reducing residual materials and waste. Unavoidable residual material and waste must be processed to increase value and are to be returned to substance flow or energy processing.
- Push biogenic products in terms of efficient and long-term carbon storage. A sustainable, resilient and forestry management policy adapted to climate change can make the necessary raw materials available over the long term.
- Include renewable and previously unused raw materials in new paths of use, services and innovative logistics systems.

Create a data basis regarding the availability of biomass

- Research the availability of biogenic residual material and improve the data level broken down on a regional level.
- Create a data basis on how much biomass is available for what, that also enables demonstration of goal conflicts.

Pushing options for cascading use

- Integrate existing and future biogas facilities into the biomass value added cycle, also material (recycling of residual materials from these facilities), including the fermentation of biogenic waste suitable for this or carbonisation as a pre-treatment before composting or other uses.
- Pushing an ecological, regional composting economy.
- (Further) development of industrial symbiosis (such as sugar, whey, beer) and link to inter-industry material flows to reduce waste.

- Extend networked, decentralized bio-refineries, link with local use of residual materials and further process their products (intelligent logistics). Use residual materials which are not otherwise able to be used through carbonisation ,for the fixation of carbon. Example: biochemical processing of biomass to provide platform chemicals and energy.

Avoid and reduce waste volumes

- Further push avoidance of food waste (waste avoidance programme⁷⁹).
- Pilot projects on the use of harvest residues and of residual material and waste from food production (such as agriculture in cooperation with social organisations or commerce).
- Use and reuse by-products and residual materials to increase the recycling of materials.

Optimise logistics of raw and residual material supply

- Optimise collection and sorting of biogenic residual materials, including optimised logistics concepts for agricultural and forest residual materials and obligatory separated collection of biogenic waste also in densely built-up areas.
- Creation of infrastructure for the storage of biogenic residual materials for better and better sorted recovery and to secure the biogenic energy raw materials (winter biomass storage).
- Create a digital residual material exchange (marketplace) to increase the regional information exchange on supply and demand and thus create a market.

4.7 Waste and secondary resources

A significant component of a successful circular economy is a transparent and integrated waste management policy with the goal of feeding waste into a new use through preparation for reuse or recycling. In the use of waste as a resource, the quantity and quality of the recovered materials (offer) are decisive, as well as a robust demand for secondary raw materials and reusable components and products.

The waste industry is required to communicate the requirements for an efficient and effective recycling to the upstream actors in the value-added cycle (in particular with regard to product design, type of use of the products and the separated collection of waste). It is also required to organise waste collection so that the waste can either be reused or recycled and thus consistent with the quality requirements of the production and processing industry without endangering the environment and public health.

In addition to the processing, the circular economy also includes the removal of waste that is currently not recyclable (any more) for technical, legal or ecological

79 BMNT (2017): Waste avoidance programme 2017.

reasons. A proper outward transfer and treatment of these materials requires a high degree of competency in disposal by the waste industry. In order to meet these requirements, facility capacities must be expanded, existing technologies modernised and new technologies utilized. In this, one must consider energy consumption and CO₂ emissions during transport, building and operating facilities. So that the economic loop can be closed as much as possible, there must be an exchange of information between the producers and actors in the waste industry.

For this, the following goals were set:

- Build up structures and sources of funding to promote reuse or the preparation for reuse, recycling or recycling and sorting technologies.
- Provide high-quality secondary raw materials and the associated outward transfer of pollutants and transfer to secured pollutant sinks.
- Improve the information exchange and increasingly include actors along the entire value-added chain.

Increase supply and demand of reusable products, product parts and secondary raw materials

- Create better framework conditions for the provision of used products or those prepared for reuse and for the production of high-quality secondary raw materials from waste and waste water, in particular through separate waste collection and the standardisation of quality requirements as well as increased fulfilment of random sample inspections of imported goods with regard to the presence of banned materials.
- Promote demand for secondary raw materials by setting binding quotas regarding the use of recycled materials in production, taking into account the quality requirements and available waste volume including documentation and burden of proof.
- Promote preparation for reuse, strengthen regional structures and networks for separate acquisition and preparation for reuse.
- Push acquisition of used products or those prepared for reuse and low-pollutant, recyclable products as well as secondary raw materials by establishing suitable technical specifications, surcharge criteria or implementation conditions.
- Determine criteria for the waste end in coordination with REACH/product guidelines and the EU chemical strategy (interface waste/chemical law).
- Legal minimum target specification for technology-independent recovery of phosphorus from a) communal waste water and sludge depending upon the phosphorous input in the treatment plant and its population equivalent and b) from animal by-products.
- Further development and use of norms and standards for waste streams/secondary materials.

Expand and modernise sorting and recycling facilities

- Promote investments in the building and modernisation of sorting and recycling facilities within the framework of the Austrian development and resilience plan 2020-2026 and within the framework of promotion of the environment.
- Promoting technological development for the sorting and recycling of complex waste streams such as composite materials or waste resulting from the generation and storage of renewable energies (such as carbon and fibreglass plastics from rotor blades, lithium batteries from electric mobility, photovoltaic modules).

Support the exchange of information along the value-added chain of materials

- Increase use of the SCIP database⁸⁰ for recycling by identifying examples of successful use, internal industry communication and developing and offering training courses for waste disposal companies. The existing “REACH Helpdesk” at the Federal Environmental Agency should be further developed into a “Circular Economy Helpdesk”.
- Increased enforcement of the REACH regulation, article 33 “Obligation for the disclosure of information about materials in products”.
- Determine the need for information in the waste industry to reuse products in high quality and the ability to recycle materials.
- Information obligation for the waste collectors to inform consumers and other waste producers about the separation quality of the residential waste and its recovery.

80 SCIP (Substances of Concern In Products) is a database for information about particularly concerning materials in products themselves or in complex objects (products) pursuant to the waste framework directive (2008/98/EC). The database is meant to contribute to a better circular economy by helping waste disposal companies to ensure that such materials are not present in recycled materials.

Bibliography

BMAW- Federal Ministry for Employment and Economy, Site Strategy. Available at: bma.w.gv.at/Themen/Wirtschaftsstandort-Oesterreich/Standortpolitik/Standortstrategie

BMF – Federal Finance Ministry, 2022. Digital Action Plan Austria. Design digitalisation together. Available at digitalaustria.gv.at

The Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology 2020 Possible elements of a biodiversity strategy Austria 2030+. Biodiversity dialogue - Public consultation [online]. Vienna. [Accessed on: 8 April 2022]. Available at biodiversitätsdialog2030.at/konsultation

The Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology 2020 Resource use in Austria 2020. Volume 3. Vienna.

The Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology 2021 Action plan and core criteria for the acquisition of more sustainable products and services [online]. Vienna. [Accessed on: 8 April 2022]. Available at: nabe.gv.at/nabe-aktionsplan/

The Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology 2021 The inventory of the waste economy in Austria. Status report 2021. Reference year 2019. Vienna.

The Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology 2021 Mobility master plan 2030 for Austria. Vienna.

BMKÖS – FEDERAL MINISTRY FOR ART, CULTURE, PUBLIC SERVICE AND SPORT, 2021. Fourth construction culture report. Concrete construction culture policy: The path to an agency for construction culture. Vienna.

BMLRT – Federal Ministry for Agriculture, Regions and Tourism, 2021. Raw materials master plan 2030. Vienna.

BMLRT – Federal Ministry for Agriculture, Regions and Tourism, 2022. Microplastics action plan [online]. Draft, status as of March 15, 2022. Vienna. [Accessed on: 8 April 2022]. Available at: bmk.gv.at/themen/klima_umwelt/kunststoffe/mikroplastik

BMLRT – Federal Ministry for Agriculture, Regions and Tourism. ÖROK resolves ÖREK 2030 and 1st Austrian soil protection strategy. Publication date [online]. 2021 [Accessed on: March 15, 2022]. Available at: info.bmlrt.gv.at/themen/regionen-raumentwicklung/raumentwicklung/oerok-tag

BMNT – Federal Ministry for Sustainability and Tourism, 2017. Federal waste management plan 2017. Vienna.

BMNT – Federal Ministry for Sustainability and Tourism, 2019. Integrated national energy and climate plan for Austria. Period 2021-2030 pursuant to EU regulation 2018/1999 of the European Parliament and Council about the governance system for the energy union and Climate Protection. Vienna.

BMNT – Federal Ministry for Sustainability and Tourism, BMBWF – Federal Ministry for Education, Science and Research, BMVIT – Federal Ministry for Transport, Innovation and Technology, 2019. Bioeconomy. A Strategy for Austria. Vienna.

BMVIT – Federal Ministry for Transport, Innovation and Technology, 2017. Energy research innovation strategy. Vienna.

Bringezu, S., 2015. Possible Target Corridor for Sustainable Use of Global Material Resources. Resources [online]. Resources, 4(1), 25-45. Resources. [Accessed on: 8 April 2022]. Available at: doi.org/10.3390/resources4010025

Federal Government of the Republic of Austria, 2020. Out of responsibility for Austria. Federal programme 2020-2024. Vienna.

Federal Government of the Republic of Austria, 2020. FTI strategy 2030. Strategy of the federal government for research, technology and innovation. Vienna.

Cramer, J., 2020. How Network Governance Powers the Circular Economy. Ten guiding principles for building a circular economy, based on Dutch experiences.

EEA – European Environmental Agency, 2022. Textiles and the environment: the role of design in Europe's circular economy. Briefing no.01/2022. Copenhagen.

EC – European Commission, DG Environment, 2014. Development of Guidance on Extended Producer Responsibility (EPR). Final Report.

EC – European Commission, 2015. Closing the Loop – An EU Action Plan for the Circular Economy. (No. COM(2015) 614 final). Brussels.

EC – European Commission, 2018. Impacts of Circular Economy Policies on the Labour Market. Final Report. Brussels.

EC – European Commission, 2019. The European Green Deal. (No. COM(2019) 640 final). Brussels.

EC – European Commission, 2022. An EU Strategy on Standardisation. Setting global standards in support of a resilient, green and digital EU single market. (No. COM(2022) 31 final). Brussels.

EC – European Commission, 2022. Proposal for a Regulation of the European Parliament and of the Council establishing a framework for setting eco-design requirements for sustainable products and repealing Directive 2009/125/EC. (No. COM(2022) 142 final). Brussels.

econsense, Accenture, Wuppertal-Institut, 2021. Germany's Transition to a Circular Economy. How to Unlock the Potential of Cross-Industry Collaboration.

Ecopreneur.eu, 2017. Improvement of Extended Producer Responsibility (EPR) crucial for circular economy. [online]. [Accessed on: 8 April 2022]. Available at: ecopreneur.eu/wp-content/uploads/2018/10/Ecopreneur-Position-on-EPR-revised-6-12-2017-1.pdf

EC - European Commission, 2001. Governing Europe - A white paper (No. (KOM(2001) 0428 final). Brussels.

EC - European Commission, 2009. Creation of a framework for the establishment of requirements for the environmentally-friendly design of products relevant to energy consumption. Ecodesign directive. Directive 2009/125/EC of the European Parliament and Council. Brussels.

EC - European Commission, 2018. Monitoring framework for the circular economy. (No. (KOM(2018) 29 final). Brussels.

EC - European Commission, 2020. A new action plan for the circular economy for a cleaner and more competitive Europe. (No. (KOM(2020) 98 final). Brussels.

EC - European Commission, 2020. Establishment of a framework to make sustainable investment easier and to amend the regulation (EU) no. 2019/2088. Regulation (EU) no. 2020/852 of the European Parliament and Council dated 18 June 2020. Brussels.

EC - European Commission, 2022. Making sustainable products the norm. COM(2022) 140 final. Brussels.

EC - European Commission, 2022. EU strategy for sustainable and circular textiles. COM(2022) 141 final. Brussels.

EC - European Commission, 2022. Proposal for a directive of the European Parliament and Council on amending the directives 2005/29/EC and 2011/83/EU regarding the support of the consumer for the ecological transformation through better protection from unfair practices and better information. COM(2022) 143 final. Brussels.

EUNOMIA, 2020. Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility Schemes. Bristol.

EUROSTAT, 2022. Eurostat Databases [online]. [Accessed on: 8 April 2022]. Available at: ec.europa.eu/eurostat/data/database

foreignpolicy.com/2020/06/18/more-from-less-green-growth-environment-gdp/
SOURCE: KRAUSMANN ET AL. (2009) AND U.N. INTERNATIONAL RESOURCE PANEL

IWI - Industrial science institute, Pöchlacher Innovation Consulting, 2021. Incentives for a sustainable circular economy in the textile and clothing industry in Austria. Analysis of framework conditions, instruments and action perspectives. Vienna.

OECD – Organisation for Economic Co-operation and Development, 2018. Global Material Resources Outlook to 2060 [online]. [Accessed on: 8 April 2022]. Available at: unstats.un.org/sdgs/report/2019

OECD – Organisation for Economic Co-operation and Development, 2021. The jobs potential of a transition towards a resource efficient and circular economy. JT03464648.

OECD – Organisation for Economic Co-operation and Development, 2021. Labour market consequences of a transition to a circular economy: A review paper. Environment working paper N°162. JT03461650.

PBL Netherlands Environmental Assessment Agency (2017). J. Potting, M. Hekkert, E. Worrell, A. Hanemaaijer: Circular Economy: Measuring innovation in product chains. The Hague.

Rechberger, H., P.H. Brunner, 2002. A new, entropy based method to support waste and resource management decisions. Environmental Science and Technology, 34(4), 809-816. Environmental Science and Technology.

Social Design Lab, 2020. Paths to a Circular Society. Potentials of the Social Design for social transformation. Hans Sauer Stiftung. Munich.

Federal Environmental Agency, 2021. Foundation document - Development of a circular economy strategy. Vienna: Federal Environmental Agency. Reports. REP-0782.

Federal Environmental Agency, 2021. Documentation of the results of the themed workshops on the development of the Austrian circular economy strategy. Vienna: Federal Environmental Agency. Reports. REP-0783.

Federal Environmental Agency, 2021. Synergies between sustainable resource use and Climate Protection. Pilot study for modelling material flows in the MIO-ES model of the Federal Environmental Agency. Vienna: Federal Environmental Agency. Reports. REP-0784.

Federal Environmental Agency, 2022. Land consumption [online]. [Accessed on: 15 March 2022]. Available at: umweltbundesamt.at/umweltthemen/boden/flaechen-inanspruchnahme

UN – United Nations, 2015. Transforming our world: The 2030 Agenda for Sustainable Development [online]. Resolution adopted by the General Assembly on 25 September 2015. A/RES/70/1. [Accessed on: 08 April 2022].

UNEP International Resource Panel, 2014. Managing and Conserving the Natural Resource Base for Sustained Economic and Social Development. A reflection from the International Resource Panel on the establishment of Sustainable Development Goals aimed at decoupling economic growth from escalating resource use and environmental degradation. Paris.

UNEP International Resource Panel, 2018. Resource Efficiency for Sustainable Development: Key Messages for the Group of 20. Report of the International Resource Panel. United Nations Environment Programme. Nairobi.

UNEP International Resource Panel, 2019. Global Resources Outlook 2019: Natural Resources for the Future We Want. United Nations Environment Programme. Nairobi.

UNEP International Resource Panel, 2020. Resource Efficiency and Climate Change. Material Efficiency Strategies for a Low-Carbon Future. Summary for Policymakers. United Nations Environment Programme. Nairobi.

UNFCCC – United Nations Framework Convention on Climate Change, 2015. Adoption of the Paris Agreement. [online]. [Accessed on: 8 April 2022]. Available at: unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

World Bank, 2018. What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050.

WIFO - Austrian Institute for Economic Research, 2021. Investments in digitalisation and decarbonisation in Austria. Drivers, obstacles and economic policy levers. [online]. Vienna: WIFO. [Accessed on: 8 April 2022]. Available at: wifo.ac.at/wwa/pubid/67181

