

European Social Partners' project on Circular Economy

Background paper - Regional seminar 29 October 2020

1.1 Introduction

The project at hand on Circular Economy is jointly commissioned by the European social partners (European Trade Union Confederation - ETUC, BusinessEurope, SMEunited and CEEP). The main purpose of the project is to investigate the consequences of the shift to the Circular Economy on the world of work. As such, the project aims at developing a joint understanding of this phenomenon and to anticipate the impacts it may have on the world of labour: on employment, on skills and on working conditions.

Aside from interviews, the findings of which are outlined below, the Social Partners together with consultants from Trinomics B.V, organise a regional seminar to discuss the impacts of the transition to circular economy on labour and working conditions in four EU Member States (Belgium, Czechia, Denmark and Germany) and to exchange good practices, including of effective collective agreements and public policies.

1.2 A brief presentation of the Circular Economy

The Circular Economy was defined by the European Commission in its Action Plan 2015¹ as

“where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised”.

The transition to this economy is a central component of the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy.

Typically, a transition to a Circular Economy would include the following:

- Durable goods being designed and manufactured for longer lifetimes, and for more intense maintenance and repair, and thus replaced less frequently;
- Durable goods being used more intensely, e.g. via sharing, lending or leasing models, and thus being less numerous to serve the same market;
- Industrial goods including in their composition a higher proportion of recycled materials or of sustainably-sourced renewable materials, and thus less primary, non-renewable raw materials (i.e. coming directly from the mine or the oil well);
- A higher proportion of waste being recycled or prepared for direct re-use.

A transition to a circular economy is not only likely to incur environmental and economic impacts, but also impacts on the **labour market**: overall employment numbers, but also on qualifications of workers, on the location of their jobs, on the organisation of work and on health & safety at work.

¹ EC COM (2015) 614 final, Closing the loop - An EU action plan for the Circular Economy

1.3 State of knowledge

1.3.1 Literature review

The literature review examined the **impact of circular economy (CE)** on of the following: (national) **labour markets, changes in qualifications and skills required, technologies, and working conditions.**

Impacts on labour markets

Creation of new jobs and destruction of existing jobs

There is a general consensus that both within countries and in Europe as a whole, the transition to Circular Economy will create jobs. These new jobs are expected because the CE is labour and technologically intensive.² The following sectors will especially benefit from the CE transition in terms of job growth: trade and repair/maintenance activities, the production of electricity by solar photovoltaics, recycling, sectors capitalising on reuse (i.e. mainly repurpose, refurbish and re-process/manufacture), and research and development (R&D).³ Conversely, important job losses are anticipated in the construction sector. To a lesser extent, the extraction and processing of raw materials, the production of durable goods (e.g. electronics, with a knock-on effect on plastics), machinery, cars and accommodation, as well as agriculture and food manufacturing (with a knock-on effect on chemicals) will experience losses.⁴ It should however be noted that the overall figures for job gains and losses remain small, specifically when compared to the impact of other mega-trends (e.g. digitalisation, de-carbonation of energy-intensive industries).

Net change in a number of jobs

The gains are expected to outweigh the losses,⁵ with a net positive effect of CE predicted in Europe (from around 250,000 by 2030 under continuity of current CE developments, to 520,000-700,000 assuming transformational expansion),⁶ although with variations per country. A net positive effect is expected in all EU countries, except for Slovakia and Croatia where a small negative effect is modelled, and with a very small positive effect in Finland and Hungary. Most growth (as a percentage from the base employment) is expected in Austria, Spain, Malta, Bulgaria, the Netherlands and Sweden. This variation reflects the different economic structures and labour intensities of the main CE activities across the EU.⁷

² Circle Economy (2020) <https://www.circle-economy.com/insights/jobs-skills-in-the-circular-economy-state-of-play-and-future-pathways>

³ - ILO (2018) https://www.ilo.org/global/publications/books/WCMS_628654/lang--en/index.htm;

- Willeghems, G. and Bachus, K. (2018) <https://vlaanderen-circulair.be/en/summa-ce-centre/publications/employment-impact-of-the-transition-to-a-circular-economy-literature-study>;

- Cambridge Econometrics, Trinomics and ICF (2018) https://circulareconomy.europa.eu/platform/sites/default/files/ec_2018_-_impacts_of_circular_economy_policies_on_the_labour_market.pdf

⁴ Cambridge Econometrics, Trinomics and ICF (2018)

⁵ - Chateau, J. and Mavroeidi, E. (2020) <https://www.oecd.org/environment/the-jobs-potential-of-a-transition-towards-a-resource-efficient-and-circular-economy-28e768df-en.htm>;

- Horbach, J., Rennings, K. and Sommerfeld, K. (2015) http://conference.iza.org/conference_files/environ_2015/horbach_j11332.pdf;

- Laubinger, F., Lanzi, E. and Chateau, J. (2020) [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP\(2020\)9&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP(2020)9&docLanguage=En);

- Willeghems, G. and Bachus, K. (2018)

⁶ Morgan, J. and Mitchell, P. (2015)

<https://wrap.org.uk/sites/files/wrap/Employment%20and%20the%20circular%20economy%20summary.pdf>

⁷ Cambridge Econometrics, Trinomics and ICF (2018)

Skills and education level - job opportunity and job security

The CE transition is said to present opportunities at all skills levels, depending on the activity. The waste management sector relies on low-skilled employment for collecting, handling and processing materials for recycling, while higher-skilled employment will be required for technical sorting systems and logistics.⁸ In reuse and repair, many opportunities will require low- to medium-skills.⁹ A variety of other jobs will be created in servitization, notably in customer support and sales (low skilled), engineering and servicing (medium-skilled), and IT and leadership roles (high-skilled).¹⁰ These new opportunities could affect the job balance in sectors such as electronics, in which a shift may occur from assembler to trades roles.¹¹ In remanufacturing and biorefining, opportunities will mostly arise for skilled and highly educated employees.¹² Other jobs requiring low to medium skills are also expected in biorefinery (e.g. plant and crop development, cultivation and harvesting, transport, distribution and storage of feedstock, plant design, and deployment).¹³ Finally, jobs in the renewable energy sector tend to require a highly educated workforce, with the obtention of a university degree being more important than practical work experience.¹⁴

Impacts on qualification and skills

When anticipating the skills needed in a transition to Circular Economy, these anticipations are made for a job market which does not exist yet, thus creating uncertainty. This is leading to the growing appreciation of ‘future-proof’ skill-sets tailored to flexibility and adaptability, including creativity, social and people skills, and complex problem solving. These cross-cutting competences are also well-suited to many CE jobs for which workers will need to be adaptable.¹⁵ The transition will also require a fundamental shift in mindsets, to ensure that workers adopt an extended responsibility and a growing recognition of products as services (i.e. holding responsibility for products after their purchase by customers).¹⁶

The nature of knowledge and skills needed will vary from an occupation to the other.¹⁷ And the higher the level of skills required in a Circular Economy context, the more difficult the training is likely to be. The take-up of CE should also be seen in the broader context of technological advances and the shift to high-skills jobs in certain sectors (e.g. increasing demand for STEM-related skills).¹⁸ For jobs related to repair and extending the lifetime of products and materials, practical and technical skills acquired through on-the-job training are predominantly needed. In waste management, few specific skills will be needed. For jobs linked to renewable energy, technical knowledge and skills mainly gained through practical experience will be needed (e.g. for installing/maintaining equipment).¹⁹

⁸ Willeghems, G. and Bachus, K. (2018)

⁹ - Morgan, J. and Mitchell, P. (2015); Montalvo, C., Peck, D. and Rietveld, E. (2016)
https://www.europarl.europa.eu/RegData/etudes/STUD/2016/579000/IPOL_STU%282016%29579000_EN.pdf;
- Willeghems, G. and Bachus, K. (2018)

¹⁰ Willeghems, G. and Bachus, K. (2018)

¹¹ Cambridge Econometrics, Trinomics and ICF (2018)

¹² Willeghems, G. and Bachus, K. (2018)

¹³ Morgan, J. and Mitchell, P. (2015)

¹⁴ Circle Economy (2018) <https://www.circle-economy.com/insights/circular-jobs-skills-in-the-amsterdam-metropolitan-area>

¹⁵ - Cambridge Econometrics, Trinomics and ICF (2018);

- Circle Economy (2018) <https://medium.com/@circleeconomy/arming-the-workforce-for-a-circular-revolution-skills-and-labour-in-a-circular-economy-6da4a15f65cb>

¹⁶ Circle Economy (2020)

¹⁷ Circle Economy (2020)

¹⁸ Cambridge Econometrics, Trinomics and ICF (2018)

¹⁹ Circle Economy (2018) <https://www.circle-economy.com/insights/circular-jobs-skills-in-the-amsterdam-metropolitan-area>

Impacts on technologies

CE is widely viewed as being technologically-intensive²⁰ and requires the use of some specific (new) technologies (e.g. technology platforms to buy and sell goods and services). However, existing literature provides scant evidence documenting the technological shifts in occupations deriving from the increasing circularity of economies.

Impacts on working conditions

There is also little evidence of the CE transition's effects on working conditions.²¹

The emergence of Circular Economy as an important component of the EU policy agenda has elicited the publication of reports on the existing working conditions in the waste management sector. Waste management is the most visible and best known part of the Circular Economy concept - but does not represent the whole set of activities that will be affected by this transition (as seen above). The outcomes of our literature review should thus be read by keeping in mind that:

- The reports represent the situation in one segment only of the activities that will be transformed by the transition to a Circular Economy;
- They represent the situation as of the writing of this background note (2020). Further evolutions of the waste management sector (described in the interview reports below § 1.3.2) tend to show that the transition to the Circular Economy would induce a trend towards the automation and industrialisation of the sector, with improved working conditions.

The few existing studies discussing working conditions in the Circular Economy thus focus on waste management and informal employment. Workers in Material Recovery Facilities for municipal solid waste can face 'hard' and 'dirty' work in a noisy and smelly environment, with very long shifts and few breaks.²² Similarly, in some textile recycling plants, work is physically demanding and is carried out in a smelly and dusty environment. Health effects were observed due to insufficient use of appropriate gear (e.g. allergies and skin irritation).²³

Informal or less-regulated work, prevalent in some core CE sectors such as waste management and construction,²⁴ exacerbate these problems. Poorly regulated work results in short-term contracts, precarious working conditions, and long working hours. Informal recycling is taking place in Eastern and Southern Europe, but also in Northern European Countries (e.g. bottle collectors in Germany and Denmark). Informal workers do not receive a wage and are exposed to greater health and safety risks. In addition, this work is mostly performed by vulnerable people (e.g. elderly, homeless, refugees, migrants or minority groups).²⁵

1.3.2 Stakeholder interviews

²⁰ Willeghems, G. and Bachus, K. (2018); Circle Economy (2020)

²¹ Wegmann, V. (2017)

<https://www.epsu.org/sites/default/files/article/files/Waste%20Management%20in%20Europe.%20Good%20Jobs%20in%20the%20Circular%20Economy%20for%20web.pdf>

²² Gregson, N. *et al.* (2016) <https://journals.sagepub.com/doi/full/10.1177/0969776414554489>

²³ Wegmann, V. (2017)

²⁴ Circle Economy (2020)

²⁵ Wegmann, V. (2017)

Next to the literature review, a number of stakeholder interviews have also been conducted. At the very initial stage of the project, so called **scoping interviews**, in which the consultants deepened their understanding of the subject (next to the literature review) and which further helped to lay foundation for further tasks.

- Stakeholder agree that shift to circular economy will bring about a **big change**, in general. At the same time, stakeholders expect more **qualitative**, rather than quantitative, change.
- Stakeholders expect no major change in relation to employment volume, however **changes in skills** are anticipated. It was suggested that the nature of skills is likely to change, given workers will likely have to deal with irregular and inhomogeneous secondary raw materials. This will require **adaptability and autonomy of workers**.

Aside from the scoping interviews, a number of **sector-specific interviews** have been conducted, both on macro and on company levels, during which a thorough understanding in several sectors has been collected. Up to this point interviews with representatives of five sectors have been conducted, namely construction, automotive, chemicals, retail and waste management. The main points learned can be summarized as follows:

- The representative of management in the **construction materials sector** indicated that recycling of their own waste and of waste from demolition sites has become a strategic orientation of the company, with a benefit in customer image. It noticed a difficulty in convincing the employees of the innocuity of the recovered materials. The employee representative did not experience any significant impacts on (most of) their labour conditions, however at the same time feels that employees have not been kept in the 'loop' and/or have not been consulted enough regarding the shift to circular economy.
- Workers in the **automotive industry** already, to some extent, **embrace the concept of circular economy**, namely principles of recycling (also for regulatory reasons) as well as prolonging lifespan of vehicles, which are already in place. However, the workers are **concerned by the emerging concept of car sharing** as it could lead to **potential loss of turnover**. With regards to qualification and skills, it is expected that **less mechanical skills** will be needed and there will be a **shift towards IT and soft skills**. In addition, the worker representative expects a need for an 'intermediate' organisation between the workers and the industry, to ensure that workers are properly reskilled.
- A new emerging technique is being developed for recycling of plastics in the **chemical industry** by taking mixed plastics, which are hard to sort and recycle conventionally, and to submit these to very intense (pyrolysis) heat to recover base material and thereby use the pyrolysis oil recovered and feed it back into plastic manufacturing. Management expects it to have **very limited impacts** on labour. During this process the existing facilities would be used and, as such the skills, labour conditions or organization of work would not change.
- In the **retail sector no significant changes are expected** by employer representatives, with the exception of potential marginal changes in relation to required skills. In general, the retail sector has been part of the global shift for a number of decades and is quite flexible in adapting to changes. The sector considers itself as a stable one in terms of employment volume and its capacity to solve issues through social dialogue and collective bargaining.
- The sector of **waste management** is moving towards a more sophisticated treatment of waste and, as such, relying upon new technologies (robotisation), which is likely going to make some jobs obsolete. Within the sector they aim to focus on collaborative economy, between workers and technologies. **Increase of skills** will be required in the sector, for example for waste acquisition.

New skills are also expected to be required, however this needs to be further evaluated. Regardless, there will be a need for **training programmes** for trade unions to improve the management of the transition. Impacts on working conditions depend on the occupation of workers, though there is an ongoing shift from manual to more mechanised work and as such, the ‘traditional’ health and safety problems are decreasing. Nevertheless, it is necessary that if the amount of waste sorting/recycling increases, the working conditions improve.

1.3.3 *Conclusion on the current state of knowledge*

As a conclusion, the transition to a Circular Economy is likely to deeply transform our productive systems, and thus the nature and the conditions of work.

From what is currently known, the transition to a Circular Economy is not anticipated to change significantly the total number of hours worked, and if at all, it should increase it slightly. However, shifts are likely within companies or sectors (towards more work in the after-sales functions) and between sectors (towards more work in maintenance, repair and services such as leasing and sharing).

Higher skills are likely to be requested, to work on more diverse materials, and with higher quality requirements (e.g. to achieve longer lifetimes). Jobs in the waste management sector, which traditionally experienced difficult working conditions (and still does in some Member States or segments), are likely to be transformed towards higher requirements for the quality of the output, with the support of technology.

1.4 **Statistical overview - how far are we in the transition to the Circular Economy?**²⁶

Since the Circular Economy Action Plan of 2015, the European Union monitors its transition to a Circular Economy. The Commission mandated [Eurostat](#), the official statistical body of the European Union, to monitor a [set of indicators](#) describing this transition along some of its key aspects.

We hereby present a selected set of these indicators, for the whole European Union, and for the four Member States represented in this workshop, namely Belgium, Czechia, Denmark and Germany.

1.4.1 *Material flow diagrams*

Material flow diagrams illustrate visually where the materials come from, how they are processed, and where they end up.

²⁶ All information under this section are available at the Eurostat database at https://ec.europa.eu/eurostat/data/database?p_p_id=NavTreeportletprod_WAR_NavTreeportletprod_INSTANCE_nPg_eVbPXRmWQ&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_pos=2&p_p_col_count=3.

Figure 0-1 Material flows in the EU-27 in 2017 in Gt (billion tonnes)

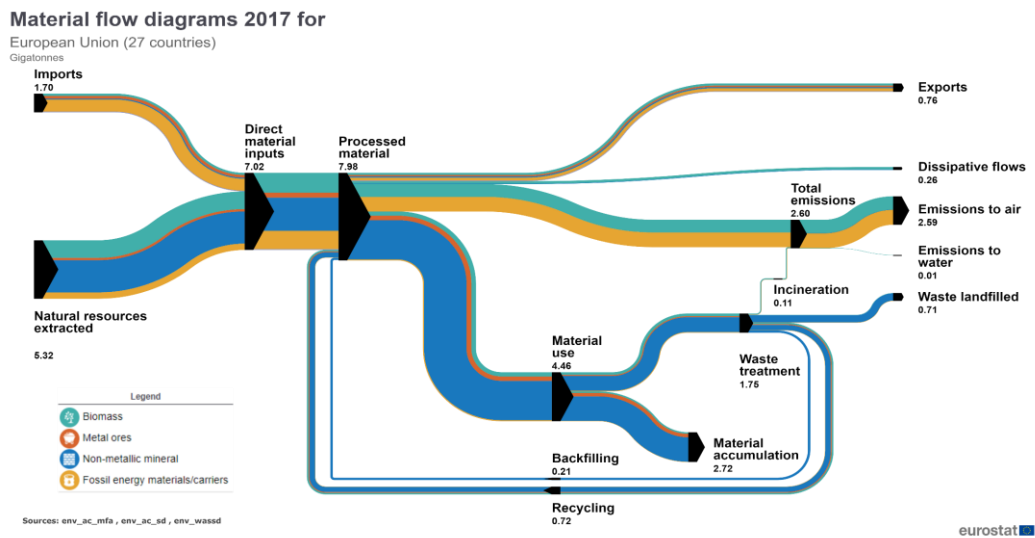


Figure 0-1 illustrates the flows for four broad categories of materials:

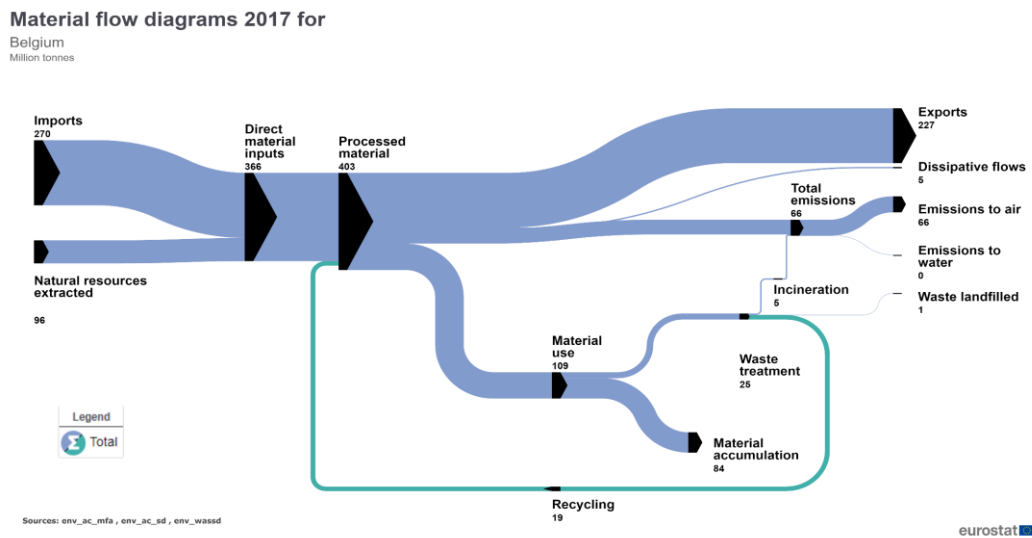
- biomass;
- metal ores;
- non-metallic mineral materials such as cement, gravel, bricks; and
- fossil energy material carriers such as oil, coal and gas.

It also shows how limited the circular part of our economy is (see the size of the arrow for recycling). The largest part of our material consumption goes to “emissions to air” (via the combustion of fossil fuels) and to the “material accumulation” in the form of accumulation of material goods and of new buildings.

At national level, the diagrams by Eurostat only deliver aggregated figures for all four types of materials.

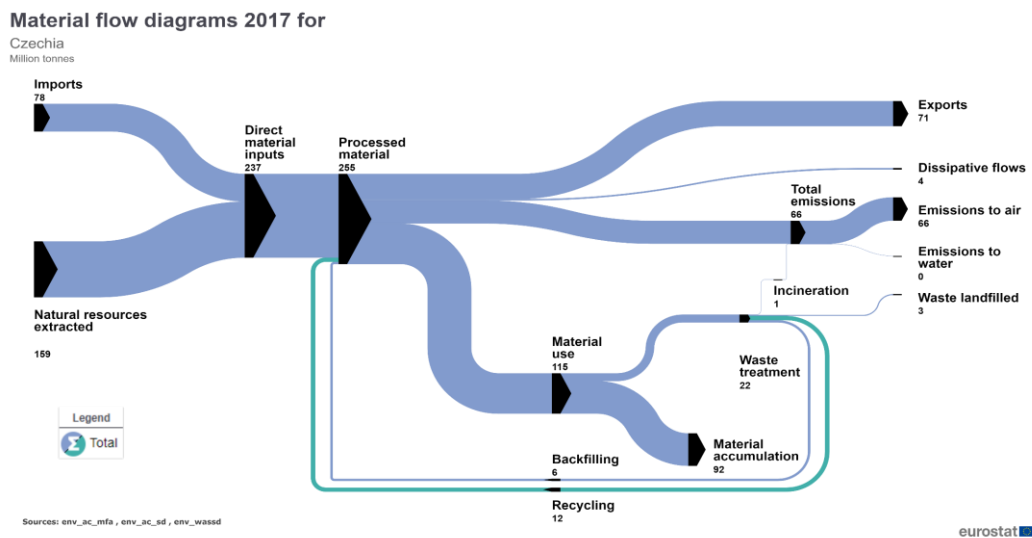
In **Belgium** (see Figure 0-2 below), the resource flows are dominated by imports and exports, illustrating how open the country’s economy is. The internal use of resources is very much dominated by the “material accumulation”, in a context where the recycling rate is very good.

Figure 0-2 Material flow diagram for Belgium in 2017 in Mt (million tonnes)



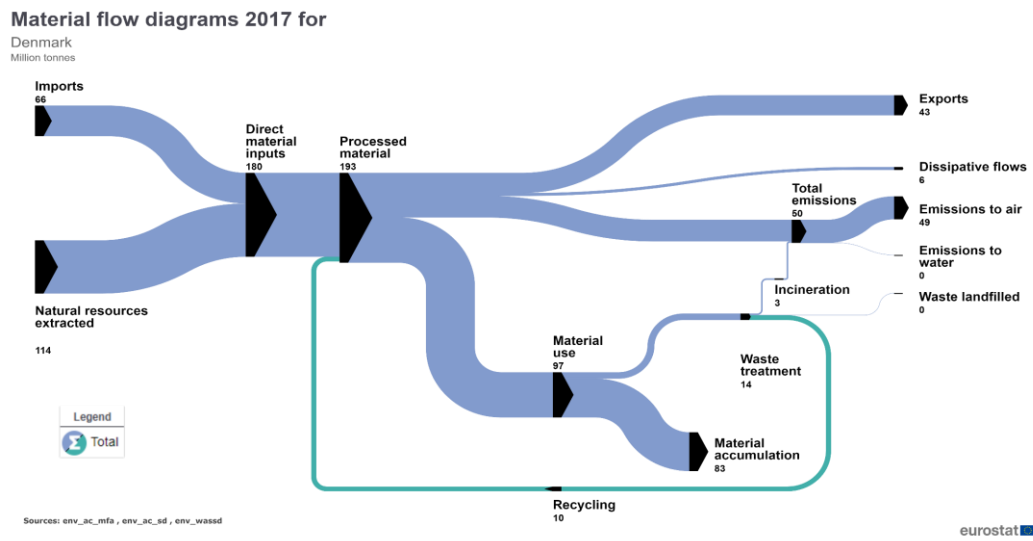
In **Czechia** (see Figure 0-3 below), the resource flows are dominated by the “Material accumulation”, mostly in the construction sector, illustrating the large investment made in this sector.

Figure 0-3 Material flow diagram for Czechia in 2017 in Mt (million tonnes)



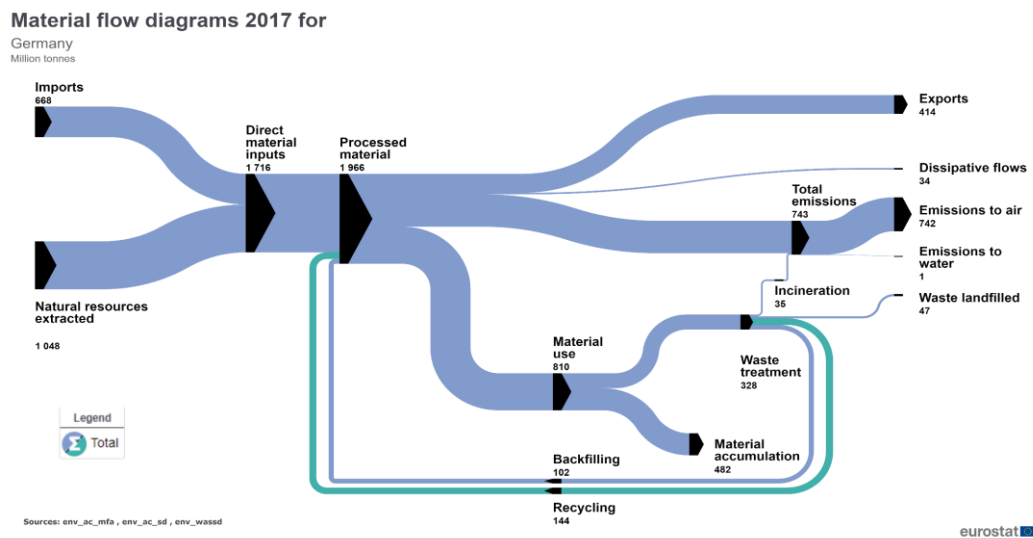
In **Denmark** (see Figure 0-4 below), material accumulation also dominates the resource flow, with good performance in recycling.

Figure 0-4 Material flow diagram for Denmark in 2017 in Mt (million tonnes)



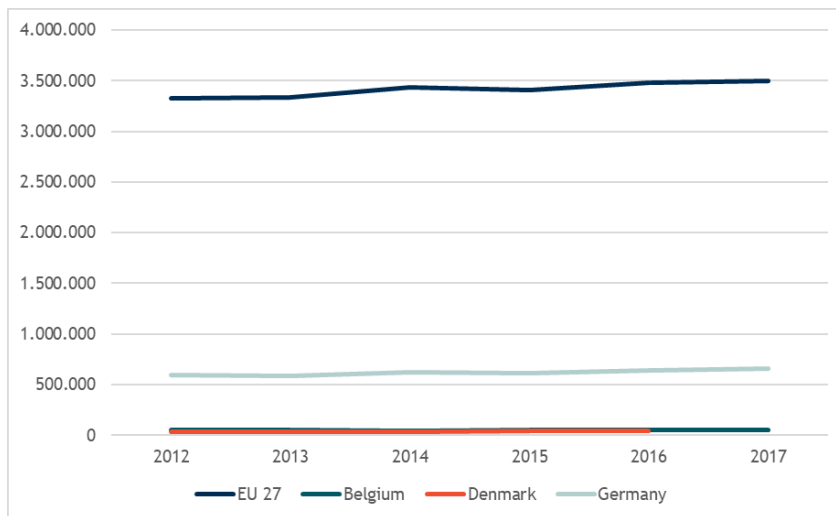
In Germany (see Figure 0-5 below), the dominant flow is that of emissions to air, with a notably high fraction of waste being re-used for back-filling in construction.

Figure 0-5 Material flow diagram for Germany in 2017 in Mt (million tonnes)



1.4.3 Employment in circular economy sectors

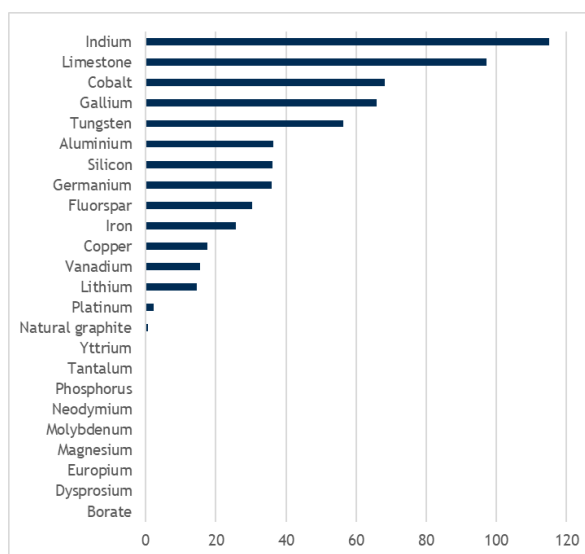
Figure 0-6 Number of persons employed in circular economy sectors



Although absolute figures in the number of persons employed in circular economy-related sectors differ, the percentage of persons employed in those sectors as a proportion of total employment is similar across the three countries and EU average (1,72% in the EU27, 1,1% in Belgium and 1,49% in Germany in 2017, and 1,36% in Denmark in 2016). No data was available for Czechia.

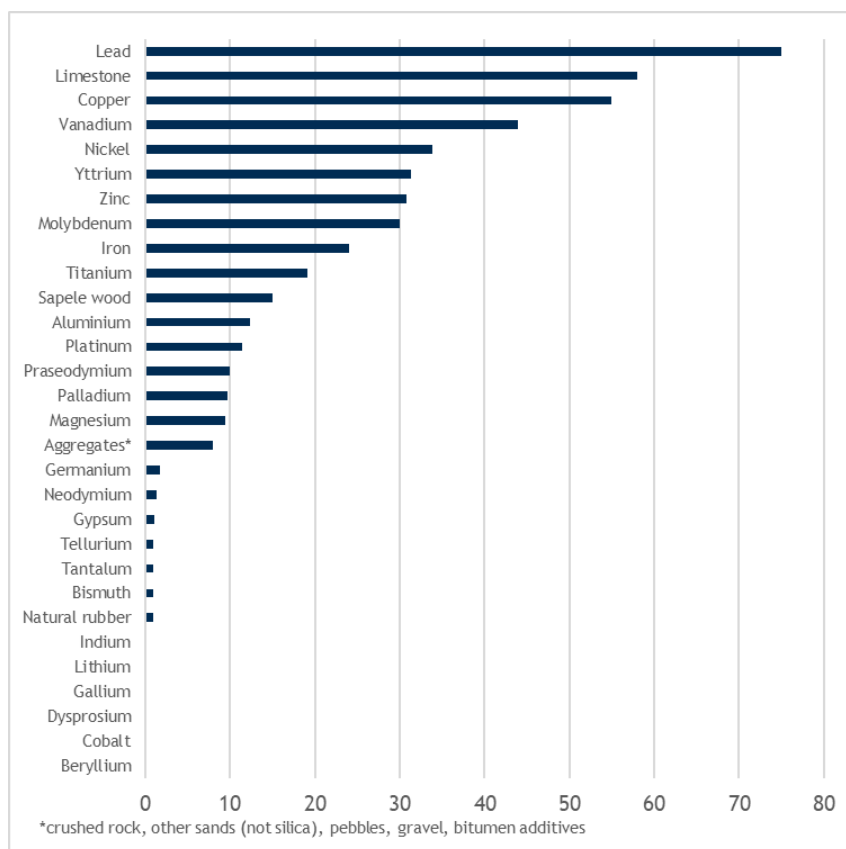
1.4.4 EU self-sufficiency for raw materials

Figure 0-7 EU-self-sufficiency for raw materials in 2016 in %



Raw materials are essential for the functioning of the EU's economy. A variety of industrial sectors depend on the secure supply of raw materials, typically in a diversified mix of domestic extraction, recycling and imports. This figure represents the fraction of EU needs that is covered by domestic extraction or by recycling.

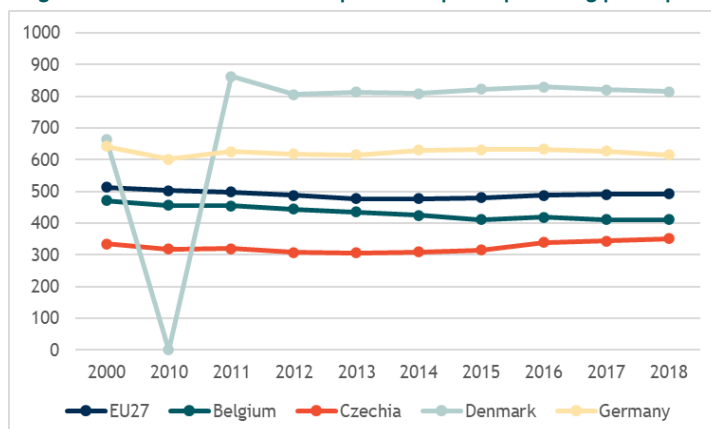
Figure 0-8 - Contribution of recycled materials to raw materials demand in 2016 in %



In a world of increasing demand for raw materials, the use of secondary raw materials can help to improve the EU's security of supply, reduce the extraction pressure on natural resources - and therefore, reduce related pressures on the environment, and contribute to developing a solid circular economy at sub-national, national and European scales.

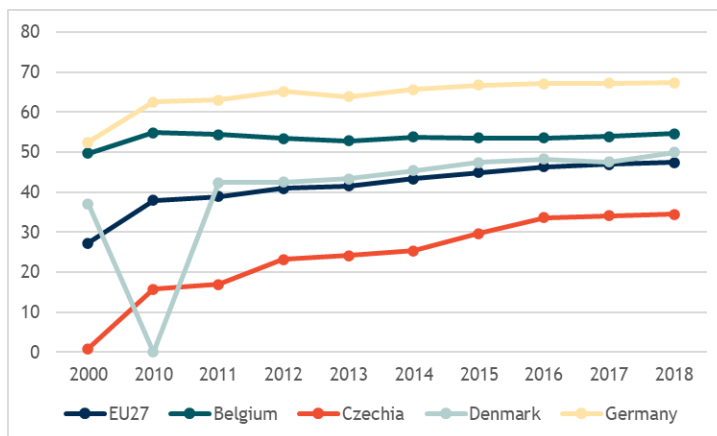
1.4.5 Municipal waste

Figure 0-9 Generation of municipal waste per capita in kg per capita



This CE indicator is used to monitor progress towards a circular economy regarding 'production and consumption'. In CE, the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of material waste is reduced quantitatively and improved qualitatively. No data were available for Denmark in 2010.

Figure 0-10 Recycling rate of municipal waste in %

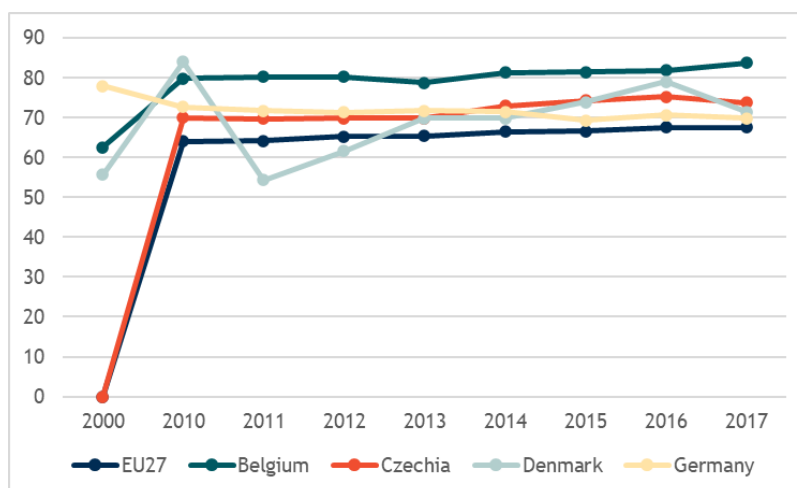


Recycling rate of municipal waste gives an indication of how waste from final consumers is used as a resource in the circular economy. Municipal waste reflects mainly waste generated by the final consumers as it includes waste from households and waste from other sources that is similar in nature and composition to household waste. It does not include the industrial waste

(generated during the production process), nor the demolition waste of buildings, which represent considerably larger volumes. No data were available for Denmark in 2010.

1.4.6 Recycling rates

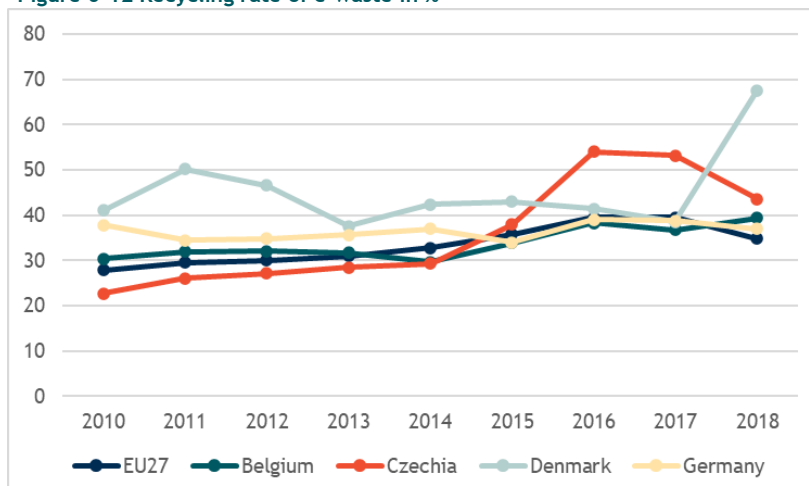
Figure 0-11 Recycling rate of packaging waste by type of packaging in %



One of the central pillars of a CE is feeding material back into the economy and avoiding waste being sent to landfill or incinerated, thereby capturing the value of materials as far as possible and reducing losses. The indicator is used to monitor progress towards the 55% packaging recycling target set for 2008 and the proposed 65% and 70%

targets by 2025 and 2030 respectively. No data were available for Czechia and EU27 in 2000.

Figure 0-12 Recycling rate of e-waste in %



Waste electrical and electronic equipment (WEEE), also known as e-waste, is one of the fastest growing waste streams in the EU. WEEE include precious materials the recycling of which should be enhanced.

1.4.7 *Conclusion on the statistical overview*

As a conclusion from this statistical overview, we can see that the transition to a Circular Economy:

- is only at its beginning, specifically when considering the material flow diagrams and the fraction of EU raw material needs that are covered by recycling;
- is an area of policy where progress has been steady, but slow, as illustrated in the evolution of the recycling rates.

It is thus normal that its effects remain modest, with the share of jobs employed directly in the Circular Economy in the order of 1% of the total workforce.