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IDEA CONSULT thinking ahead

Socioeconomic impacts assessment of the climate transition in Belgium

Factsheet – Circular economy

23 September 2024

Santé publique
Sécurité de la Chaîne alimentaire
Environnement

Introduction to the factsheet

This factsheet aims at :

- Providing an **overview of the status and potential of the circular economy** (CE) in Belgium
- Identifying the **CE levers to be activated in a 2050 transition scenario** for Belgium
- Identifying the **jobs that are behind the necessary activities**, and the **skills needed** to ensure a successful transition
- Analysing the **training needs** to support the development of circular activities

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NACE codes do not accurately represent the activity in circular jobs

Many “circular jobs” remain classified **within the NACE code of the sector linked to the core business of the company** (for example, car mechanics fall under NACE code G). No specific NACE code exists for circular economy.

This supported our decision to rather look for **the most critical jobs for each subsector**, as a result from the transition scenario. These jobs are either

- **CORE JOBS**: They ensure the **closure of raw material cycles**, including jobs in repair, renewable energy, waste and resource management.
- **ENABLING JOBS**: They **remove barriers for and enable the acceleration and upscaling of core circular activities**, including jobs that arise in leasing, education, design and digital technology.

Type of jobs	Circular economy issues	Sectors
“Core” circular jobs	Prioritize regenerative resources	**D** – Electricity, gas, steam and air conditioning supply
	Sustain and preserve what is already there	**C** – Manufacturing **G** - Wholesale and retail trade; repair of motor vehicles and motorcycles **R_S** – Arts, entertainment and recreation, other services activities
	Use waste as a resource	**E** - Water supply; sewerage; waste managment and remediation activities **F** - Construction **G** - Wholesale and retail trade; repair of motor vehicles and motorcycles
“Enabling” circular jobs	Rethink the business model	**F** – Construction **N** - Administrative and support service activities **R_S** - Arts, entertainment and recreation, other services activities
	Design for the future	**M** - Professional, scientific and technical activities
	Team up to create joint value model	**R_S** - Arts, entertainment and recreation, other services activities
	Incorporate digital technology	**J** - Information and communication

Table 5 – DISRUPT framework to categorize sectors and jobs, from the Circular Jobs Monitor (Circle Economy)

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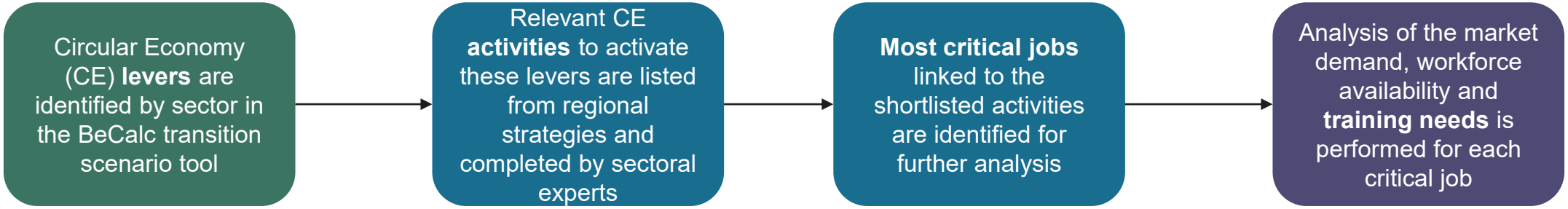
Methodology



Illustration

*In the Transport sector, **decreasing car ownership** is one of the levers in the BeCalc tool.*

*A relevant CE activity to decrease car ownership is to **develop and manage free-floating scooters and bikes***

***"Fleet manager"** is shortlisted for further jobs and skills impact analysis.*

*A moderate **increase in employment** of fleet managers is expected, requiring logistics and management skills*

Core-95 in Scenarios for a climate neutral Belgium by 2050, FPS Public Health (2021) (link)

Regional documents used for the analysis

- Feuille de route du réemploi 2025
- Stratégie Good Food 2.0
- Programme Régional en Economie Circulaire
- Stratégie Régionale de Transition Economique
- Stratégie Rénolution
- PNEC 2030
- Plan Good Move

- Toekomstpact voor de Vlaamse industrie
- Vlaamse mobiliteitsvisie 2040
- Strategy for smart specialization in Flanders 2.0
- Maakindustrie Engagementsverklaring
- GLB Strategisch plan – CAP Strategic Flanders
- Lokaal Materialenplan 2023 -2030
- Vlaanderen Circulair Memorandum
- Regionaal mobiliteitsplan 2030
- Strategie Go4Food
- Vlaamse klimaatstrategie 2050
- Vlaamse langetermijnrenovatiestrategie
- Werkagenda Circulair Bouwen
- Werkagenda Circulaire voedselketen startcharter

- Plan Wallon Déchet Ressource
- Stratégie Régionale de Mobilité des marchandises
- Stratégie Régionale de Mobilité des Personnes
- Stratégie Circular Wallonia
- Stratégie de Spécialisation Intelligente 2021 – 2027
- Plan stratégique relevant de la PAC
- Stratégie Manger Demain
- PACE Wallon 2030
- Stratégie wallonne de rénovation à long énergétique

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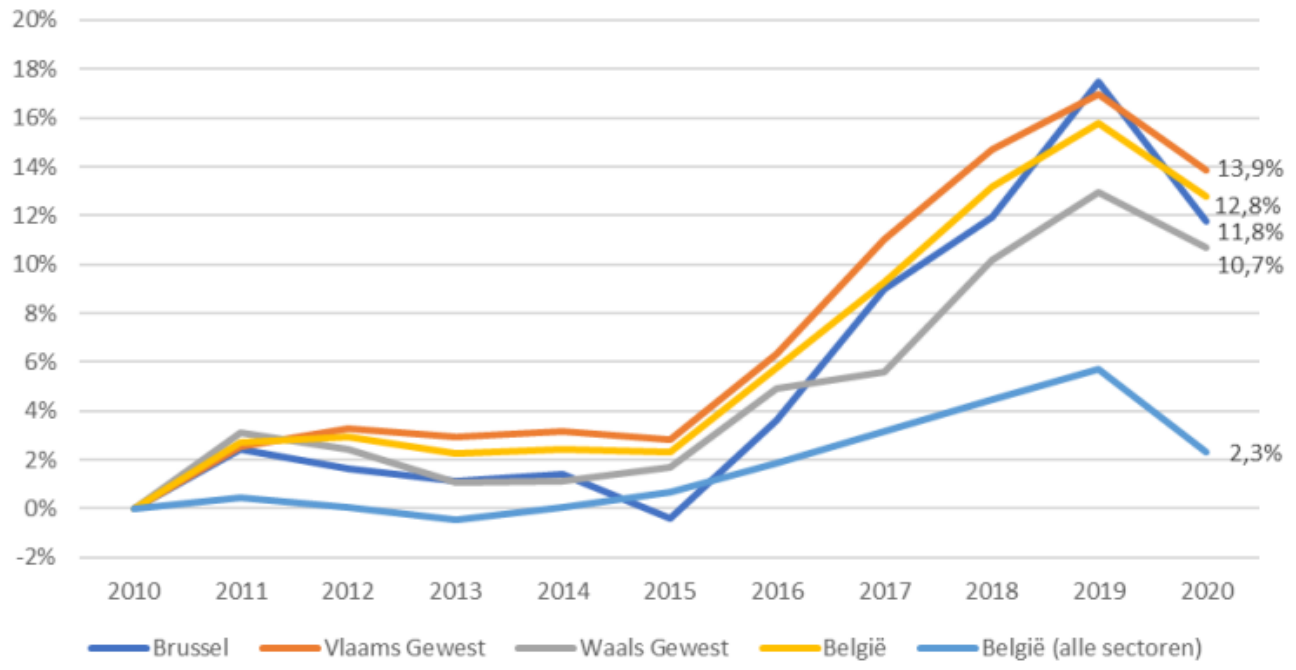
Growing CE practices are key to the transition

- **2/3 of total GHG emissions** are linked to **material-related activities**, such as manufacturing, freight transport and buildings activities (FPS, 2021)
- Circular Economy could contribute up to **32%** of **GHG** reduction by 2050
- Growth in circular sectors **exceeds general growth**

Evolution of the number of employees in the circular sectors (Belgium, three regions), compared to employment in the whole economy (Belgium all sectors)



Multani, & Bachus (2022), based on data of the Crossroads Bank for Social Security

Federal Public Service – Health, Food chain safety and Environment (2023), Implications of the climate transition on employment, skills and training in Belgium

The importance of CE goes further than GHG emissions

- 90% of **biodiversity loss** is caused by extraction and processing of raw materials, fuels and food. (1)
- EU listed 30 **raw materials** whose supply security is critical for EU industry. (2)
- 7.5% of **jobs** in Belgium are linked to circular economy (3)
- The **economic potential** of the circular economy in Belgium is between €1 billion and €7 billion by 2030. (4)
- Up to 100,000 additional **jobs** could be created by 2030 (4)
- In Flanders, a switch to circular economy could create 30k **jobs** by 2030 (5)
- By adopting the principles of the circular economy, Europe could take advantage of **new technologies** and generate a net **profit** of 1,800 billion by 2030, $900 billion more than by following the current path of a linear model. (6)

(1) IRP (2019). Perspectives des ressources mondiales 2019. United Nations Environment Programme. https://www.resourcepanel.org/reports/global-resources-outlook
(2) Commission européenne (2020). Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability. Disponible sur : https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en
(3) Fondation Roi Baudouin et Circle Economy (2019). L'emploi circulaire en Belgique - Analyse de référence de l'emploi dans l'économie circulaire en Belgique. Disponible sur : https://www.kbsfrb.be/fr/Activities/Publications/2019/20190919avc
(4) Price Waterhouse Cooper (2016). Economie circulaire : potentiel économique en Belgique. Disponible sur : https://www.health.belgium.be/fr/leconomie-circulaire-potentiel-economique-en-belgique
(5) KU Leuven - HIVA (2018): Impact van de circulaire economie in Vlaanderen op de sociale economie en de tewerkstelling van kansengroepen.
(6) Ellen MacArthur Foundation (2015). Growth within: a circular economy vision for a competitive Europe.

A transition towards a circular economy will create jobs and make other disappear

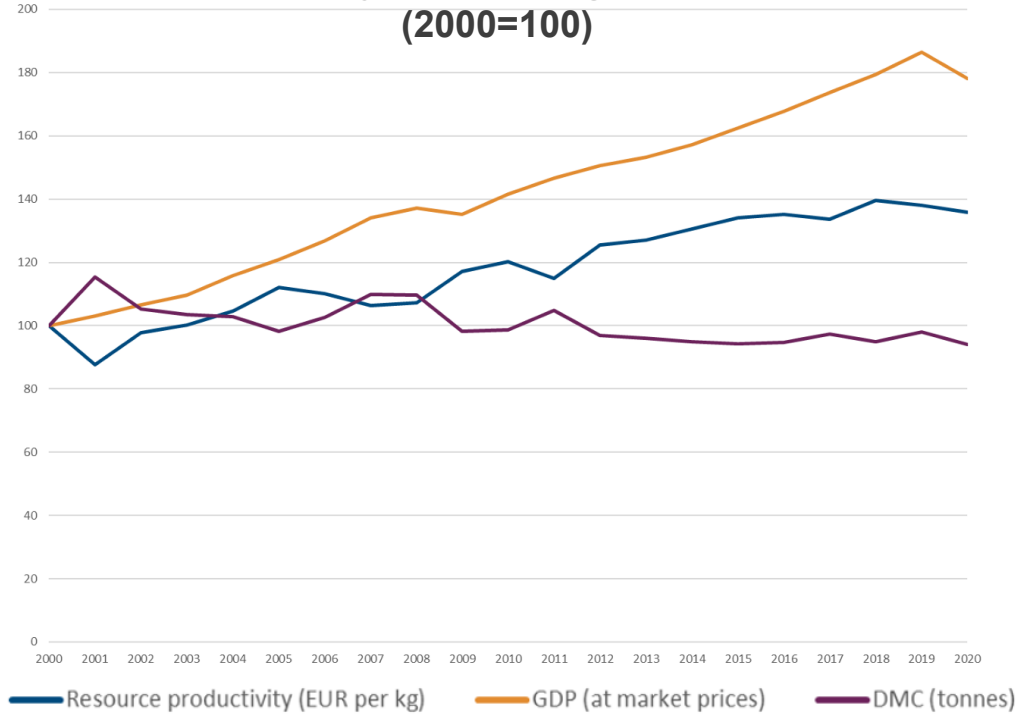
- In Belgium, an **increase** in **employment in circular economy of 0.3%** is expected by **2030**. Ambitious scenarios expect up to **1.6%** increase. (1)
- Job **losses** are expected in **mining and extraction** sectors, as well as in sectors processing these raw materials.
- Job **losses** are also expected in sectors **producing durable goods**, like cars, machinery and electronics.
- The **waste** sector is expected to grow, as well as the **repair** sector and some **service** sectors.
- More specifically, circular economy is expected to create a **shift to more labour-intensive sectors** like repair and maintenance. Digitalization and automation could however counteract this trend.
- The development of CE will **primarily require low- and medium-skilled workers**, constituting a vital job opportunity for these groups
- **Employment** in the construction sector could **slightly fall because of improved productivity** with new (circular) building techniques, but this effect might be (more than) **compensated** by the **acceleration of renovation activities** for reasons of energy efficiency and climate change mitigation (4)

(1) European Commission. Directorate General for the Environment., Cam bridge Econometrics., Trinomics., & ICF. (2018). *Impacts of circular economy policies on the labour market: Final report and annexes.*
Willeghems, G., & Bachus, K. (2019). *Modelling job creation in the circular economy in Flanders. CE Center Circular economy policy research center.*
Ellen MacArthur Foundation (2015). *Growth within: a circular economy vision for a competitive Europe*
(4) SPF Health (2023). *Implications of the climate transition on employment, skills, and training in Belgium*

Circular Economy activities are increasing

Circular material use rate in Belgium, 2011–2020, per cent

Gross domestic product, domestic material consumption and resource productivity trends, Belgium, 2000–2020, index (2000=100)



- Circular material use rate is increasing in Belgium
- Economic growth is continuing, while domestic material consumption shows a slight decrease, which could point towards a potential decoupling

Eurostat (2022)

“Core” CE activities will drive most of the employment volume growth

- **72% of direct circular jobs** are concentrated in the sectors of wholesale and retail trade; repair of motor vehicles and motorcycles; electricity, gas, steam and air conditioning supply and Information and communication.

- **“Core” circular activities account for 82%** of direct circular jobs and are expected to remain stable or to increase.

- **Additional workers are mainly required in the “Core” circular economic activities** (vs “enabling” activities), supporting the tremendous volume of additional workers required in the repair.

- **“Enabling” jobs** account for the **18%** remaining direct circular jobs. **IT jobs are predominant** (68%), and should continue to be, with a potential growth driven by new business applications where digitalization remain low (construction, agriculture).

Circular Jobs Monitor (2024)

Circular economy will contribute to some already existing skills shortages

- **Specific CE skills**, such as repair of electronic devices and clothing, already suffer from considerable skills shortages.

- **Technical profiles**, with a wide range of sub-profiles (electronics, mechanics, ICT, engineering, operators, automation, etc.) and skills levels (high, low and medium-skilled profiles) are already facing serious shortages.

- **Transversal skills**: our formal education systems are not always fit to deliver these profiles, and their increasing need is not only specific to the CE, but also to several other labour market trends, including the climate transition.

Federal Public Service – Health, Food chain safety and Environment (2023), Implications of the climate transition on employment, skills and training in Belgium

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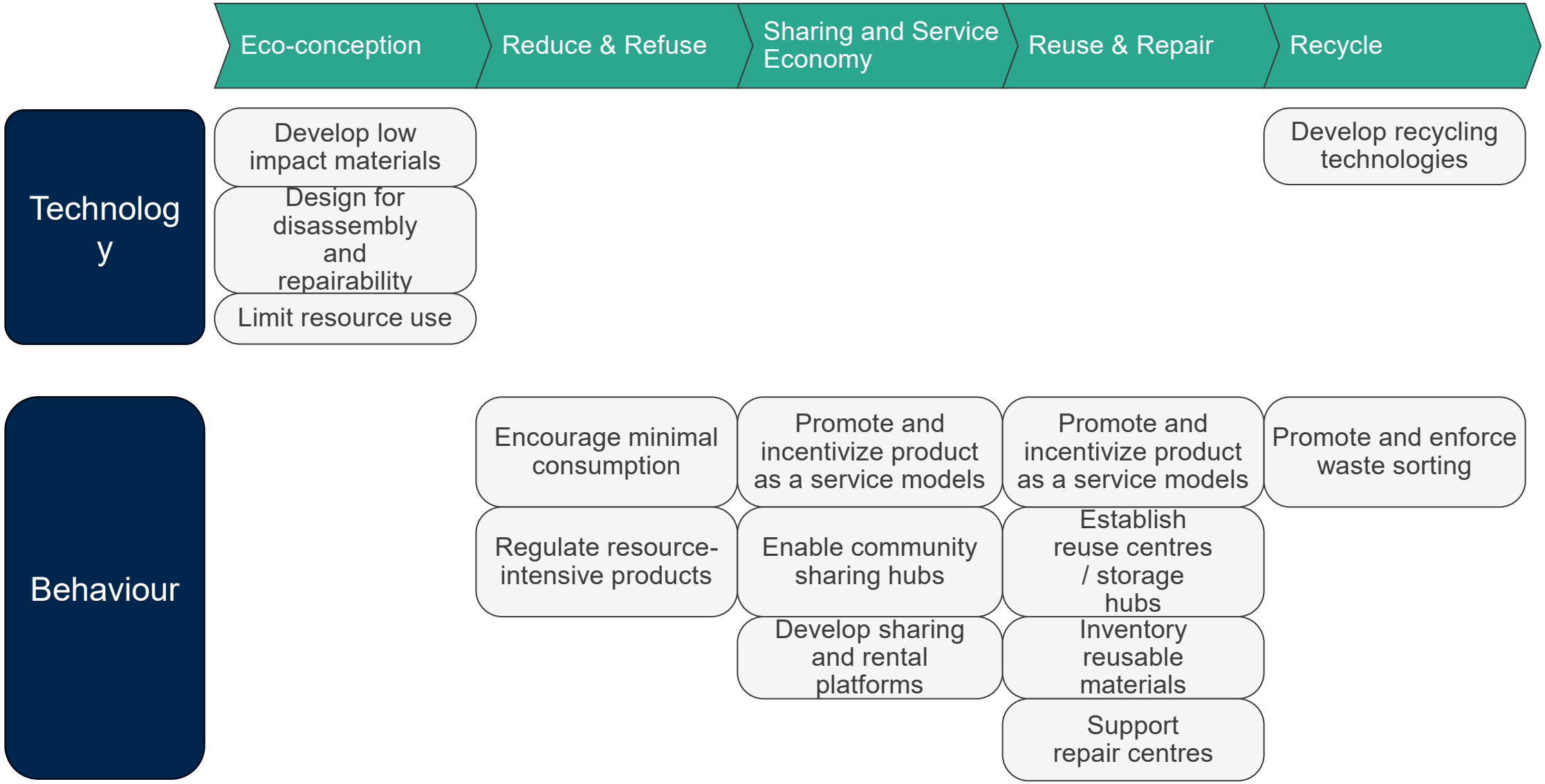
Technology and behaviour levers can be activated along the CE framework

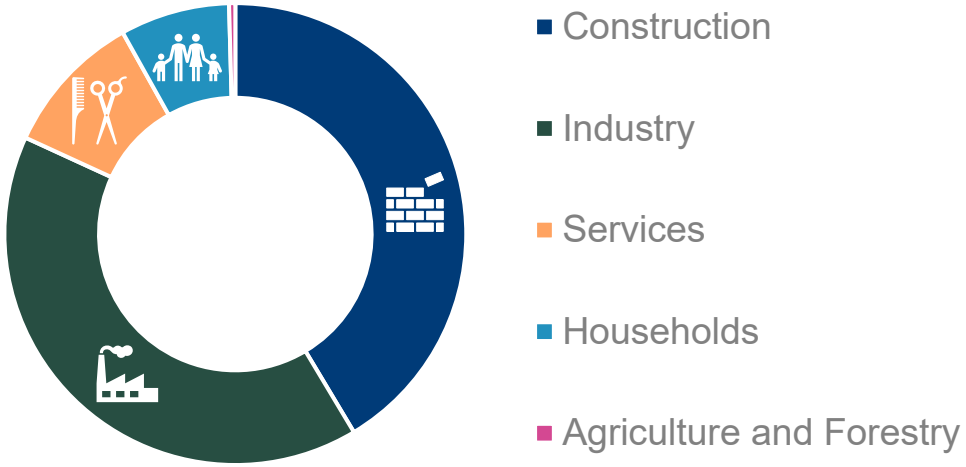


CE levers can be activated along the circular economy framework for all sectors

	Eco-conception	Reduce & Refuse	Sharing and Service Economy	Reuse & Repair	Recycle
Buildings	Design for energy efficiency, modular construction	Minimize material use, avoid non-recyclable materials	Collaborative housing, space-sharing services	Retrofitting, repair of structural components	Use of recycled building materials
Transport	Electric vehicle design, sustainable fuel alternatives	Promote public transport, reduce single-use vehicles	Car-sharing, ride-hailing platforms	Maintenance and repair of vehicles, spare parts	Recycling of vehicle parts, batteries
Industry	Sustainable product design, energy-efficient machinery	Minimize resource extraction, optimize material use	Service-based models for machinery (e.g., leasing)	Industrial equipment repair and refurbishment	Industrial waste recycling, by-product recovery
Agriculture	Sustainable farming techniques, eco-friendly machinery	Reduce water and chemical use, zero-waste farming	Shared farming equipment, community-supported agriculture	Repair of agricultural machinery	Composting, recycling of organic waste

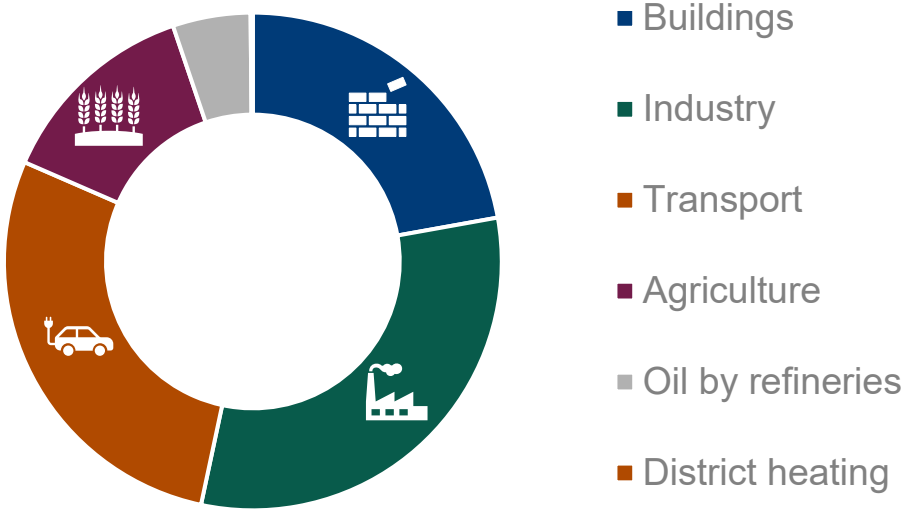
Buildings and Industry are leading in terms of waste generation and GHG emissions

Distribution of waste generation in Belgium (2022)



Statbel, 2022

CO2e emissions (2022)



2050 Pathways explorer

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CE levers in the Buildings sector to reach 2050 climate targets

- The **demolition rate increases** across all scenarios (from 0.1% to 0.225%) because of the deep energy renovation of the building stock. This leads to development of local material banks and value chains for the transport, storage and reuse of deconstruction materials.
- The **increase in the material efficiency** (between 8.5% and 85% across sectors) leads to the development of activities for the prefabrication, standardization and industrialization of buildings' elements production
- The **material switch** leads to the development of low-carbon and biobased alternatives
- The **increase in recycling** reduces the use of virgin materials to the benefit of reclaimed materials, which requires new digital tools to better manage the supply chain

The transition of the buildings sector requires new skills

	Multi/Flexible uses of buildings	Logistics chain to deconstruct and source for reuse + recycle	Off-site construction: prefabrication, standardization, industrialization	Complex small size renovation: craftwork and standardization
Description	Multi-use and flexible buildings maximize the utility of space, reducing the need for new construction and resource use. By designing adaptable buildings that can easily transition between purposes, the lifespan and functionality of structures are extended. This reduces material consumption, energy use, and waste associated with demolition and new builds.	Selective deconstruction of buildings is a key challenge to limit our dependence on raw materials and limit the embedded carbon of buildings. It poses significant challenges of sorting, transporting and storing reusable components.	Prefabricated modules allow to reduce on – and off-site waste from construction through more efficient processes. They are a key asset for scaling-up energy renovation. When they become obsolete, they can easily be reused somewhere else. This mode could lead to a small demolition of jobs.	95% of the housing stock is already built, with 80% of this stock that must be adapted to the CO2 neutrality. This stock is lowely standardized and hardly allow a one size fit all approach.
Impact on jobs	➢ *Spatial optimization into buildings must increase, that suppose more craftsman.* ➢ *Eco-design must increase, aiming an extension of product lifespan.* ➢ *Financial mechanism to support return on investment in a very long term*	➢ *Deconstruction contractors : On-site material recovery and separation* ➢ *Certifiers* ➢ *Creative insurance system* ➢ *Storage optimisation*	➢ *Create the modules off-site (skills of plumbing, electricity, carpeting…) and "Assembler"* ➢ *Increase in logistic optimization system, also in urban context* ➢ *Engineer and designer awareness*	➢ *Craftsmanship miust be reinforced, with certification approach* ➢ *Mason reskilling needs* ➢ *Construction contractor: Standardisation of small-scale construction sites*
Questions to stakeholders	*To what extent is the sector prepared for deconstruction, sorting of materials and reusing materials?* *How to support the standardization in the sector (share of reused on-site / off-site materials) and to prepare the sector to welcome it?* *How to reinforce the vocational education and the expected working condition to bring more people able to work in the sector?* *How to enable the sector in working on the small-scale construction side?*			

Labour market demand for the transition of the buildings sector

Upskilling :

- Adaptation to **new materials** (bio/geo-based, reclaimed), **construction methods and value chain processes** for *architects and construction professionals.*
- *Architects, designers and engineers* must master advanced design and construction methods including **prefabrication, standardization** and **industrialized methods**.
- *Logistics professionals* must develop skills in **reverse logistics** to manage collection, sorting and storage of deconstructed materials.
- *Certifiers* will require updated expertise to **assess and guarantee the quality of second-hand materials**, ensuring they meet reuse standards
- *Marketing professionals* will need to **develop innovative strategies to promote and sell recovered materials**.

Emerging professions

- *Valoristes* will be key to identifying, sorting and recovering recyclable and reusable materials.

Buildings - Are the regions on track ?

	Multi/Flexible uses of buildings	Logistics chain to deconstruct and source for reuse + recycle	Off-site construction: prefabrication, standardization, industrialization
	• CityDev and perspective.brussels plan the creation of a One Stop Shop to ease temporary occupation of unoccupied buildings • Planned imposition of reversibility, adaptability and flexibility thresholds for public projects (2030) and all projects (2050)	• The region participates to the BAMB (Buildings As Material Banks) project aiming at more reuse and reversibility. • Planned imposition of reversibility, adaptability and flexibility thresholds for public projects (2030) and all projects (2050) • Creation and stimulation of a reuse industry for buildings materials (PREC) • Online and physical materials library to ease reused sourcing	
	• Housing that is easily adaptable to different phases of life, allowing people to move to more compact, energy-efficient homes when they no longer need as much living space (for example, when children leave home). • Businesses optimising the use of their floor space (for example, through flexible working practices). • More efficient and shared use of buildings (for example, sports associations using a school gym after school hours).	• For existing buildings at the end of their useful life, selective demolition is envisaged to improve the recovery and recycling of material flows.	
		• PWD-R plans to progressively enforce selective deconstruction of buildings. • The PWD-R plans to study the possibility of offering re-use operators access to buildings prior to their selective dismantling to facilitate the recovery of materials. • Circular Wallonia encourages reuse of materials from construction.	• S3 supports innovation in the renovation sector.

Key findings in the building sector

Enabling condition

- The benefit of a recycled material only becomes apparent when the costs associated with extraction, reconditioning, storage, and transportation are lower than those of raw material (extraction, waste disposal fees, and transportation). This balance has to be influenced by public policies (call for innovative project, public tendering, standardisation, support to the transition of the sector)

Building as a mine

In the construction sector, the main challenges related to the circular economy involve **transforming the demolition phase into a phase of recovery and reuse**.

- The following jobs will emerge: *"Valoriste"*, material sorting system design and operation, standardization, and addressing logistics challenges, particularly those linked to the transport sector.
- The needs for workforce will **increase in this valorisation phase** (previously demolition)
- There is already a shortage in the building sector, leading companies to hire an international workforce, which complicates the implementation of a consistent public skilling strategy. This shifts the responsibility of training to the companies themselves, who would benefit from more support in taking on this new role.

New building in a circular paradigm

- In addition to energy efficiency techniques, construction using circular materials will likely increase the demand for skilled labour and adaptability. The need for company support in workforce training will also grow.

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CE levers in the transportation sector to reach 2050 climate targets

In the **passenger transport** sector

- **Car sharing** services and memberships increase exponentially to support the decrease in car ownership and the increase rate of occupancy of vehicles.
- **Free floatin**g scooters and bikes activities keep on growing to support the modal shift.
- **Bike maintenance** activities increase exponentially while car maintenance activities decrease gradually, as discussed in the Transport section.

In the **freight transport** sector

- The demand for transportation reduces, because of the decrease of the amount of material transported over long distances.

The transition of the transportation sector requires new skills

	Develop car hire and sharing services	Free-float scooters and bikes	Bike repair
Description	Car hire and car sharing support the circular economy in transportation by intensifying vehicle utilization, reducing the total number of vehicles needed, and thus material use. Without specific ecodesign conception, shared vehicles reach the end of their lifecycle faster, increasing turnover and allowing the introduction of low-carbon technologies to happen sooner.	Free-float scooters and bikes reduce private vehicle ownership and thus material and energy consumption. Their upscaling triggers challenges in infrastructure management (parking and charging stations), float management (charging and relocating vehicles) and maintenance.	With more bikes on the road, more repair services are necessary. This also reduces the demand for new bikes and minimizes waste. Introducing faster "minute repair" options would further enhance efficiency, allowing quick fixes that encourage regular maintenance.
Impact on jobs	*Mainly a change on design process in order to ensure a longer lifespan for cars* *The decrease of private car will have an impact on the number of jobs on the sector.* *A significant number of cars will be decommissioned and recovered*	➢ *the maintenance and manufacturing of bicycles* ➢ *fleet management* ➢ *Bicycle relocation* ➢ *station maintenance* ➢ *customer service* ➢ *software development*	*Number of Bike repairers to be significantly increased (about 3000).* *Profiles are well developed already, that's the attractivity of the profession that could be improved.*

Questions to stakeholders

- *How to increase the focus on longer lifespan in the design product?*
- *How to prepare the reduction of private cars in the fleet?*
- *How to increase the workforce offer in the "Bike Repair Sector"?*

The transition of the freight sector requires new skills

Improve logistics

Description

Centralized hubs enable more efficient consolidation of goods, while increased intermodality—using waterways and rail for long distances, trucks for shorter routes, and bikes for last-mile delivery—minimizes emissions and resource use. Achieving this requires high logistical coordination and maximizing shared transportation resources (mutualization) to optimize efficiency. It also suppose a strong public intervention on developing hubs at the right place in the urban territory.

Impact on jobs

- *An important aspect of sustainable logistics is the management of reverse product flows for their reuse, recycling, or responsible disposal. This includes the processes of collecting, sorting, storing, and reintegrating recovered materials into new production chains.*
- *The conception of logistics hub in urban territory suppose an important real estate component :*
  - *Determination of the best location*
  - *Complexity and intensity of buildings*
  - *Complex contract development (emphyteusis, etc)*
- *Face the challenge to fill empty containers*

Questions to stakeholders

How prepared is the demolition sector to play a role in the transition?
How structured is the logistic sector to welcome those new practices?

Labour market demand for the transition of the transportation sector

Upskilling:

- *Sellers and customer service professionals* need to develop their communication, analytical thinking, and problem-solving abilities to manage the growing complexity of shared mobility services.
- *Fleet managers* need advanced tools to optimize the allocation of vehicles, ensuring demand is met efficiently.

- *Software developers* play a critical role in creating platforms for real-time tracking, fleet management, and user-friendly interfaces.
- The growing reliance on bicycles drives demand for skilled *repair professionals* to meet increased maintenance needs.
- *Logisticians* must manage highly complex systems in freight transport, while *software developers* are essential for designing and operating them.

Transportation - Are the regions on track ?

	Develop car hire and sharing services	Free-float scooters and bikes	Bike repair	Logistics optimization
	• Encourage car-sharing • Parking dedicated to car-sharing • Integration of car-sharing to MaaS platforms	• Dedicated drop-off zones • Ordonnance of the 29th nov 2018 regulated free floating. Operators need a licence. • Creation of "mobipoints" grouping different transportation services.	• The SRTE plans on "ensuring adequate training in the new professions in the trade and specifically in everything to do with repairs" • SRTE plans on supporting the development of the circular economy, including repair activities, with a focus on local job creation	• Bruxelles-propreté investigates the opportunity for reverse logistics, optimizing the collect of commercial and industrial waste. • The Region recognises the importance of creating logistics hubs for better management of goods flows • develops priority routes for heavy goods vehicles to ease traffic flow and avoid residential areas • study is planned to determine the potential of the rail network for logistics in Brussels, in particular the opportunities offered by Schaerbeek Formation and the outer port.
	• Vlaamse mobiliteitsvisie 2040 encourages the development of a diversified range of shared mobility services, accessible to all and promoting more efficient use of vehicles.			• Flanders stresses the importance of efficient transport links with international economic centres in order to maintain its position as a 'gateway to Europe'.
	• Massive deployment of car-sharing, aiming at 1 shared car / 1000 habitants by 2030 • Envisage possibility of mutualizing public vehicles float outside of working hours • Supporting private operators to speed-up deployment of offer	• Communes are advised to develop micromobility services	• PWD-R encourages repair of equipment • PWD-R aims at supporting repair-cafes • Wallonia plans to map all repair shops (including bike repair)	• Recognizes the need for a modal shift towards rail and waterways. • Supports development of multimodal logistics platforms to facilitate the transport of goods between transportation modes • Acknowledge the need to improve service towards zones of economic activity, including through rail and waterways

Key findings in the transportation sector

In the **passenger transport** sector, **the main impact of the circular economy is related to the raise of car sharing**. In terms of skills, it supposes:

- **Transversal skills** ('soft skills') will be increasingly needed: communication skills, analytic capacities, problem-solving, interest for learning, critical spirit, etc.
- CE will increase the need for employees with a **technical profile**.
- The need for **specific CE-related skills**, such as repair, sorting, circular business models, will be rising, but less than the transversal and technical skills
- **Skills shortage**: the already severe shortage of all types of technical skills is expected to worsen, while the shortage of transversal profiles may grow because our formal education systems are not always fit to deliver these profiles

The skills needed in the circular economy will be mostly provided by **on the-job training or in-company training**. Vocational education and training (VET) will be the crucial element that governments and social partners alike will need to work on to absorb the changes smoothly. Lifelong learning (LLL) will be key, as will be increased coordination, collaboration and exchange between industry and education.

In the **freight transport** sector, the main impact of the circular economy is:

- Increasing the transport needs for storage of reusable materials
- Decreasing the amount of material transported due to the decrease of imports and natural resources extraction
- Complexification of the recuperation process: chemical, automatized mechanics are likely to improve the ability to extract rare reusable materials (cement out of concrete, etc).

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CE levers in the industrial sector to reach 2050 climate targets

- **Material efficiency**: Reduce the amount of material per product by improving product design, using more efficient materials or reducing material losses
- **Material switch**: Substitute some materials by others to reduce the life cycle GHG impact of the products
- **Technology share / recycling**: Increase the share of low-carbon technologies and the share of recycled materials, to reduce the manufacturing use of virgin materials, of energy and of emissions.

When implemented at ambitious levels, the modelled levers related to the circular economy lead to a **reduction of materials demand of around 32% in the CORE-95 scenario.**

Industry – Key CE activities

	Recycling	Product as a service and sharing of appliances	Product repair and reconditioning
Description	Recycling turns waste into valuable resources. Effective waste collection ensures materials are recovered and reused locally. Currently, a significant portion of waste is exported but should be revalorized domestically. Investment in R&D for plastic recycling can improve processes, avoid downcycling, and maintain material quality. This reduces reliance on virgin resources and cuts emissions.	In Product as a Service (PaaS) models, the owner company owns the product and retains responsibility for maintenance, repair, and eventual recycling, incentivizing repairability and longer product lifecycles as well as reducing material waste. Mutualizing objects by renting instead of owning also allows for less material use.	Repairing and refurbishing significantly extend the lifespan of products, reducing waste and resource consumption. They are particularly transformative for the digital sector, where phones and computers have high turnover rates.
Impact on jobs	**Recycling engineering** – upskilling and growth	➢ **R&D** teams to develop eco-designed solutions, **QHSE roles** experts ensure the ecological impact of products and services is respected. ➢ **Marketing and sales** transform the customer approach, and **customer relation expert** becomes central. ➢ **Insures and lawyers** protect every step, **and finance teams adopt** news performance indicators. ➢ **Change manger** implement the new business models.	➢ **Eco-design engineers** focus on creating products that are easier to repair and disassemble, while **marketing teams** work to change consumer behaviour by promoting the value of repairs over new purchases. ➢ **Repair technicians** must develop advanced skills to handle increasingly complex products, ensuring they remain a vital part of the industry. ➢ **Financial directors** play a crucial role by prioritizing investments in preventive maintenance to reduce long-term costs.
Questions to stakeholders	*What are the key conditions to enable the development of PaaS models? How far is this already integrated in Belgium?* *Given the existing shortages of repair technicians, how can the industry proactively address this gap? What are the missing elements or key levers that need to be addressed today to promote the development of eco-design, particularly in relation to the repairability index and similar tools?* *How prepared is the sector to handle job growth in roles like recycling engineers, Paas Manager, repair technicians?* *What is the current maturity of the recycling sector in the industry, How equipped Is it to adopt new recycling technologies and processes?*		

Industry - Are the regions on track?

	Recycling	Product as a service and sharing of appliances	Product repair and reconditioning
	• Brussels plans to extend the scope of EPR to new waste streams, such as textiles, to encourage recycling and reuse. • The Region supports various programs and initiatives to promote recycling, including the Brussels Waste Network, the Brussels Green Network and specific projects focusing on construction waste.	• Brussels recognizes the functionality as a key economic model • Brussels stresses the need to help companies adopt this model, as it involves a break with traditional profit-generation models. • Brussels Environment will study the potential of different tool-library models, which could include the sharing of machines, appliances and tools.	• The Region intends to develop the supply of repair services by examining the legal and tax obstacles, analysing existing aid and encouraging repair businesses through the 'beCircular' programme. • The Region is committed to integrating 'IT and household electrical appliance repairer' training courses into its training offer, in collaboration with operators such as Bruxelles-Formation and the Horizon training centre.
	• As part of the recovery plan, Flanders is investing in a 'Recycling Hub' project to become a recycling centre, by supporting innovation projects in pre-treatment techniques and recycling facilities • Flanders is focusing its R&D efforts on recycling plastics, nappies and electronic equipment, tackling technical challenges and exploring innovative solutions.	• The "Lokaal Materialenplan" encourages local circular initiatives, such as "Klusbibs" (tool libraries), material banks and donation initiatives.	• Action no. 13 of the lokaalmaterialenplan aims to ban the destruction of reusable goods in certain product categories, such as clothing, footwear and electronics. • The lokaalmaterialenplan emphasizes waste prevention and reuse as key steps in the waste hierarchy. Action n°30 mentions the need to make repair activities more affordable and to improve conditions for a better repair service.
	• Wallonia encourages research and development in the field of recycling through various programs and initiatives, including competitiveness clusters, the FIRST and Win²Wal programs, and European and international calls for projects. • Wallonia has identified plastic and composite waste, refractory waste, bituminous waste, organic waste and construction and demolition waste as priority sources of materials for the research and development of recycling solutions.	• Wallonia encourages collaboration with rental centres, which suggests an interest in models based on use rather than ownership. • Wallonia is promoting the adoption of circular economy models within businesses, including the sharing of equipment and the creation of industrial symbioses.	• The Walloon Waste-Resources Plan calls for an inventory of the repair market in Wallonia, identifying the key players, growth factors and obstacles. • Wallonia is aiming to consolidate the network of repair centres, in particular by supporting the Repair Cafés, which offer citizens a place to repair their objects. • Wallonia plans to set up a 'valoriste' training course through FOREM, with a possible specialization in the repair of household appliances.

Labour market demand for the transition of the industry sector

Upskilling[1] :

- *Eco-design professionals* must master life cycle analysis (LCA), material science, and modular design to create durable, recyclable, and repairable products while ensuring compliance with sustainability standards.
- *Sales, marketing, and communication teams* must shift to promoting circular solutions, educating consumers on repair, reuse, and service-based models, and fostering behavioral change.
- *Logistics and purchasing teams* need expertise in supplier compliance, environmental standards, and material traceability across supply chains.
- *Strategy managers* must adopt long-term thinking, focusing on product longevity, service-based models, and collaborative leadership aligned with circular economy goals.
- *Customer service teams* play a critical role in maintaining strong client relationships in service-based models like Product as a Service (PaaS).
- *Finance and accounting professionals* must integrate performance indicators and accounting frameworks that prioritize long-term investments in circular solutions.
- *Repair technicians* require skills in modular repair, connected systems, and customer engagement to extend product lifespans and reduce waste.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Impact on skills & jobs: focus on eco-design (1)

Jobs involved:

Eco-design requires **a holistic approach** with ongoing communication and strong collaboration **among different departments** (such as design, production, purchasing, logistics, service, and customer relations) **and all relevant stakeholders** (including suppliers, subcontractors, and customers) (1) :

- *Decision-makers* (such as strategy managers and R&D managers): must **drive changes in production methods** within the company.
- *Eco-design product engineering***:** Engineers must work closely with quality, safety, and environmental managers **to ensure that the necessary life cycle assessments (LCA)** are carried out for eco-design.
- *The marketing, communication, and customer relations teams*: oversee **informing customers** about product sustainability and **encouraging them to choose** eco-designed products.
- *Purchasing and logistics teams* should work with **suppliers** to make sure that the materials and products they provide **meet environmental standards and can be fully traced**.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Impact on skills & jobs: focus on eco-design (2)

Skills required(1)

- Eco-design requires strong expertise **in life cycle analysis methods** and c**alculating the overall impacts of products to avoid rebound effects.**
- A deep understanding of **materials (recycled, recyclable, bio-based, etc.) is also essential.**

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Impact on skills & jobs: Focus on functional economy (1)

Jobs involved:

The functional economy demands **strong collaboration among stakeholders** and a **fundamental shift in production and consumption models** [1]:

- *Decision-makers* (such as strategy managers): must adapt the company's entire strategy to embrace a functional economy. It is necessary to rethink company culture, as well as its product and service offerings.
- *R&D teams:* Must develop innovative, diverse, and eco-designed technical solutions.
- *Quality, Health, Safety, and Environment (QHSE) roles:* Ensure that both products and services meet environmental impact standards and maintain high quality
- *The marketing, communication, and sales teams:* need to transform the company's approach, shifting from selling products to offering comprehensive customer-focused services.
- *Customer relations team*: become a central part of the company's objectives, as customer service plays a key role in this model.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Impact on skills & jobs: Focus on functional economy (2)

Jobs involved:

The functional economy demands **strong collaboration among stakeholders** and a **fundamental shift in production and consumption models** (1):

- *Insurers & lawyers*: must cover every step in the production
- *Finance and accounting roles*: should adopt new performance indicators and establish stronger relationships with financial institutions to secure funding for medium- and long-term investments in both tangible and intangible assets. Indeed, FE demands an adjustment in accounting frameworks. Current standards are aligned with traditional economic models, which do not encourage the medium- and long-term investments needed for integrating service-based solutions.

Skills required:

- For strategic roles, it is essential to develop environmental and social expertise, particularly regarding externalities, use performance, product life cycle and long-term client relationship as well as collaborative leadership, to spread these concepts across the company.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Impact on skills & jobs: Focus on repair and maintenance

Jobs involved [1]:

- *Eco-design product engineer*: Must ensure that products are designed for easy repair, with modular components that are simple to disassemble and replace.
- *Sustainable marketing:* Should work on shifting consumer behaviour towards repair rather than replacing products, by promoting economic and environmental benefits of repairing over buying new.
- *Financial directors*: Need to advocate for investments in preventive maintenance, understanding its long-term value in reducing breakdown costs and prolonging the lifespan of assets.

Skill required [1] [2]:

- A repairer must be able **to train the user in self-repair** and provide **advice on appropriate usage**, repair **objects as close as possible to their components**
- Also essential to master technical repair skills, have the ability to repair connected devices, understand online assistance systems for managing spare parts, and possess technical knowledge related to the functioning and repairability of the concerned objects.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).
(2) Etude sur la reparation et le réemploi. Mobius Business Redesign SA (2022)

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Agriculture - Key CE activities

	Food spoilage prevention along the supply chain	Bioenergy production	Fertilizer and compost production
Description	Preventing food spoilage along the supply chain maximizes resource efficiency and reduces waste. By improving storage, transportation, and handling processes, more food reaches consumers, minimizing losses and the need for additional production. This conserves resources like water, energy, and land but also cuts emissions associated with food waste.	Bioenergy production converts organic waste and by-products into energy, reducing waste and reliance on fossil fuels. This process recycles agricultural residues, like crop waste and manure, into valuable energy sources such as biogas or biofuels, contributing to cleaner energy while closing the loop on waste management	Fertilizer and compost production turns organic waste into nutrient-rich resources for soil health. Composting agricultural residues and food waste reduces landfill use and enhances soil fertility, cutting reliance on fossil-based synthetic fertilizers.
Impact on jobs	*Supply chain manager* *Data manager*	*Agricultural advisor* *Agricultural workers* *Energy provider* *Biogas technicians*	*Agricultural advisor* *Agricultural workers* *Biotechnologies engineers* *Biogas technicians*

Questions to stakeholders

What skills will supply chain managers and data managers need to handle the implementation of better storage, transportation, and food handling technologies?
How can the agricultural sector incentivize investment in advanced data-driven tools to reduce food spoilage?
How prepared is the agricultural sector to integrate bioenergy production into farming operations? *What will this entail in terms of required skills and training?*
What incentives or regulatory frameworks are needed to promote the widespread use of organic fertilizers and compost in agriculture?
How can agricultural workers be supported in adopting new technologies and circular practices, such as bioenergy production and composting?

The widespread development of on-site bioenergy production will require strong technical and collaboration skills

Circular practices in the agricultural sector mainly consist in the development of **on-site energy production**(1)

- *Biogas maintenance technicians* will be key professionals as the demand for bioenergy systems grows. They must possess the necessary skills to maintain systems that produce bioenergy.

- In the agricultural sector*, biogas maintenance technicians* will play a critical role as bioenergy systems become more widespread. These professionals require **strong mechanical and electrical skills** to maintain and optimize biogas production facilities.

- *Technicians* must also have a solid understanding of bioenergy processes and follow strict safety protocols to manage risks associated with hazardous gases and high-pressure systems.

- Collaboration with *engineers*, *agricultural workers*, and *energy providers* will be essential, positioning these technicians at the core of sustainable integration of bioenergy within the agricultural circular economy.

(1) Results of the circular economy skills and training groups, Ministère de la transition écologique et solidaire (2020).

Agriculture - Are the regions on track ?

	Food spoilage prevention along the supply chain	Bioenergy production	Fertilizer and compost production
	• Waste prevention is an integral part of all SGF2 initiatives, including the criteria for awarding the Good Food label to canteens and restaurants, training courses and information tools. • A system for monitoring data on food waste will be set up in collaboration with the Flemish and Walloon Regions. • SGF2 encourages the processing of unsold food by supporting innovative processing projects and facilitating links between suppliers of unsold food and processing companies.	• The Region recognises the energy potential of the biogas produced during wastewater treatment and wants to make greater use of it for energy production. • The Region plans to install a biomethanisation unit on its territory to recover bio-waste and green waste locally. This facility could produce between 15 GWh/year and 19 GWh/year of renewable energy, depending on how the biogas is recovered (cogeneration or injection into the gas network)	• The Region wants to reduce the amount of bio-waste incinerated and give priority to other recovery methods, in particular composting.
	• Action plan 'Voedselverlies & Biomassareststromen Circulair 2021-2025': this action plan, drawn up by OVAM and the Department of Agriculture and Fisheries, aims to reduce food waste at all levels of the chain, from production to consumption • Flanders supports innovative projects aimed at reducing food waste, particularly in the areas of processing surplus food and food technology.	• Financial aid is provided for small-scale biomethanization projects on farms. • Plans to explore pocket fermentation for dairy and pig farms to reduce methane emissions.	• The application of compost on agricultural land is encouraged as a means of sequestering carbon and reducing net greenhouse gas emissions.
	• Adopted in 2015, the REGAL plan aims to reduce food loss and waste at all levels of the food chain by 30% by 2025. • Green Deal 'Sustainable Canteens': This programme encourages community canteens to adopt sustainable food practices, in particular by increasing the proportion of local and seasonal food, reducing food waste and setting up food solidarity initiatives.	• Wallonia offers investment aid for the installation of biomethanisation digesters, particularly for farmers. • Wallonia plans to create a quality label for biomethanisation units to ensure their safety and performance • Wallonia is considering imposing binding targets on gas suppliers for the integration of renewable gas, including biogas.	• Subsidies are available to support high-quality domestic composting, in particular through training provided by master composters. • Wallonia has set itself the target of increasing the number of home composters from 31% to 39% by 2025. • Wallonia plans to generalise the selective collection of organic waste by 2025, either by home or neighbourhood composting, or by separate collection • Wallonia encourages the use of compost in agriculture and horticulture, particularly as an amendment to improve soil quality.

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Upskilling existing workforce through lifelong learning

- Ensure **lifelong learning programs evolve** with market needs and reward companies investing in workforce training.
- Focus on **practical, hands-on training** through on-the-job programs and vocational education centers.
- Foster **collaboration with manufacturers** to provide specialized knowledge and training on new technologies.
- Empower **sectoral federations** to coordinate industry-specific training initiatives.
- **Develop business networks** and incubators to support functional economy expertise through practical experience.
- Address structural challenges in repair services by **improving wages and working conditions**.
- **Update training programs** to reflect advancements in modular and connected devices.
- **Expand training for support roles** to integrate circular economy principles into legal, financial, and operational strategies.

Enhancing initial training to ensure future workers are adequately trained

- **Update curricula** to include skills for both emerging and existing roles aligned with circular practices.
- **Foster informal collaboration** between schools, training providers, sectoral funds, and companies to align training with industry needs.
- **Recognize and formalize emerging roles** like "valoristes" through dedicated programs and certifications.
- **Anticipate future trends** by developing training pathways for critical circular economy roles.
- **Integrate modules on eco-design, alternative materials, and industrialized techniques** into building sector training programs.
- **Incorporate life-cycle analysis (LCA)** and material sustainability into engineering curricula.
- **Strengthen foundational skills** in electronics, electricity, and soldering for repair technicians.
- **Expand non-technical training** to equip legal, marketing, and sales professionals with circular economy principles.

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Policy considerations (1/2)

- **Create sector-specific working groups that bring together industry experts and educators** to develop curriculum frameworks and training programs tailored to the needs of the circular economy.
- **Update curricula across all education levels to integrate circular economy concepts, ensuring that future workers are equipped with the necessary skills from the outset.** Revise educational programs for architects, engineers, designers, and technicians to include circular economy principles such as life-cycle analysis, eco-design, and sustainable materials. Incorporate specialized courses or certifications in emerging roles.
- **Formalize and institutionalize emerging roles,** by establishing recognized certifications and educational programs. Work with training institutions and sectoral federations to create dedicated training pathways for new circular economy roles, ensuring these positions are integrated into formal education and career progression systems.
- **Integrate circular economy principles into non-technical training programs, such as law, marketing, and finance, to ensure that professionals in support roles understand the operational aspects of a circular economy.** Develop specialized modules or certification programs for professionals in legal, accounting, and marketing sectors, providing them with the knowledge to advise businesses on circular economy practices and policies.

Policy considerations (2/2)

- **Offer specialized, continuous professional development programs for repair technicians, ensuring that they stay up-to-date with new technologies and product designs.** Additionally, create incentives to improve job conditions and wages in sectors such as repair services, which may face challenges in attracting workers.
- **Increase funding and support for on-the-job training programs, ensuring that companies are incentivized to provide practical, hands-on training in circular economy-related fields.** This could include government-backed subsidies or tax or parafiscal incentives for companies that offer training opportunities.
- **Implement a tax shift, from labour to extraction,** to increase the economic competitivity of reclaimed material over virgin resources while creating a tax incentive targeted on employment for companies who shift to circular practices (Mossay & Peters, 2024).

E. Mossay & A. Peters (2024), *Contribution sur le prélèvement des ressources minérales (CPRM). Vers un « principe préleveur-payeur » ?*