

Strategy of Circular Economy for BMO – Metropolitan Centre

Green City Project

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Introduction

According to Our World in Data (2018)¹ more than half of the world's population live in urban areas which is the outcome of the past 50 years urbanisation trend. By 2050 it is projected that 68 % of the world's population will live in cities (Ritchie & Roser, 2018), which puts city policy planners in a significant position. Cities are important economic actors—on average they are responsible for 75 % of national GDP— which puts a link between cities and energy consumption—on average cities consume 75 % of global primary energy (UN–Habitat, 2022.)². Cities are also significant GHG emissions emitters and according to Dasgupta, Lall & Wheeler (2022)³ they account for 70 % of global CO2 emissions.

In the context of climate change, social development and other issues, the circular economy may be seen as a tool towards sustainable development. The purpose of this paper is to present the phenomenon of the circular economy and how it has been implemented so far in some of the selected European cities in order to assess circular possibilities for the city of Brno.

In this document you will find...

- Literature review of circular economy
- Urban literature review
- Institutional and self–government review
- International case study overview
- Background of the Czech institutional and self-government review
- Proposals for the city of Brno

¹ Ritchie, H., & Roser, M. (2018, June 13). Urbanization. Our World in Data. Retrieved June 15, 2022, from <https://ourworldindata.org/urbanization#what-share-of-people-will-live-in-urban-areas-in-the-future>

² UN-habitat. (2022). Energy. Unhabitat.org. Retrieved June 15, 2022, from <https://unhabitat.org/topic/energy>

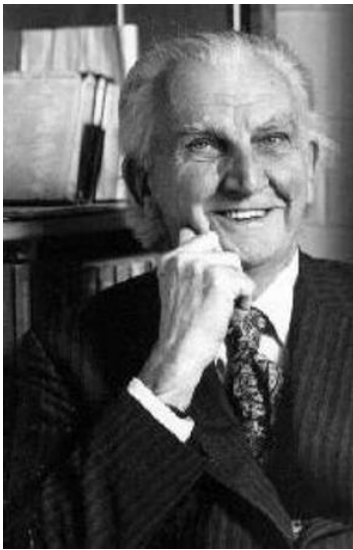
³ Dasgupta, S., Lall, S., & Wheeler, D. (2022, January 5). Cutting global carbon emissions: Where do cities stand? World Bank Blogs. Retrieved June 15, 2022, from <https://blogs.worldbank.org/sustainablecities/cutting-global-carbon-emissions-where-do-cities-stand>

Chapter 1

In this first chapter, we will understand the notion of circular economy through its literary genesis, its definitions and its evolution in the scientific field. We will see that the circular economy has taken on several meanings, clarified with research and scientific discoveries, all putting a little more emphasis on its essential role in solving the economic and environmental challenges of our era.

Literature review of circular economy

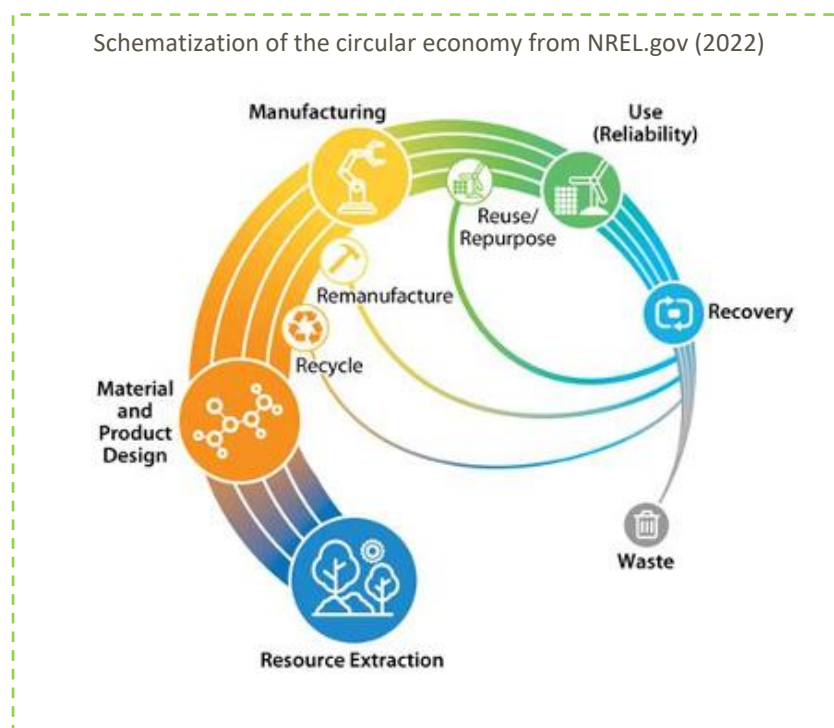
When the history of the problem begins to occur in research literature?



“I am tempted to call the open economy the «**cowboy economy** », the cowboy being symbolic of the illimitable plains and also associated with reckless, exploitative, romantic, and violent behavior, which is characteristic of open societies. The closed economy of the future could similarly be called the **astronaut economy**, in which the Earth has become a large spaceship, without any stock of unlimited resources, whether it be extraction or pollution, and in which, consequently, man must find his place within a cyclical ecological system capable of continuously reproducing matter, even if he cannot do without energy inputs. “

Kenneth Boulding, 1966

In this excerpt symbolizing the emergence of the idea of the **circular economy**, Kenneth Boulding draws the contours of an alternative economic paradigm and calls for a shift away from the expansionist cowboy economy, where endless frontiers imply no limits on resource

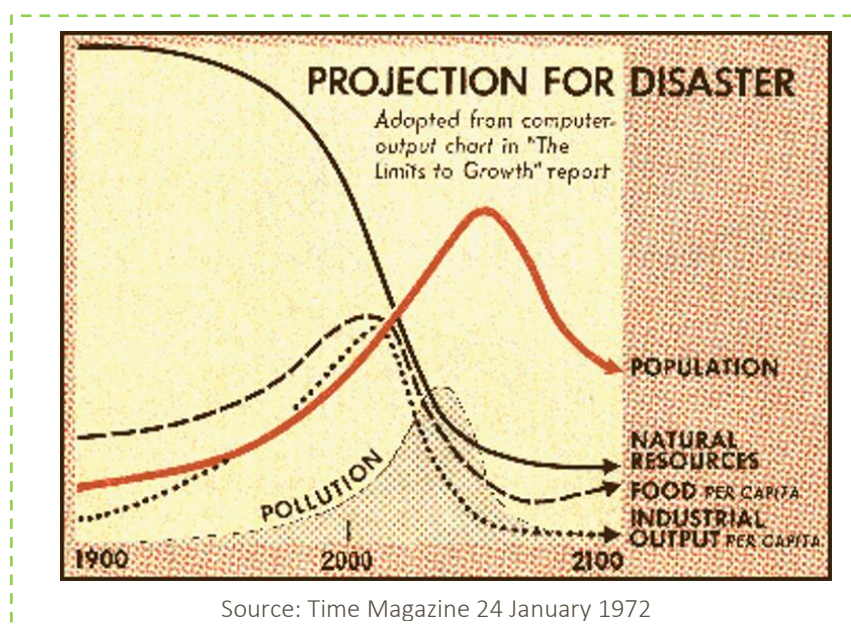


consumption or waste disposal, to “a spaceship economy”, where everything is engineered to be constantly recycled.

If the concept of circular economy is high on the agenda today, it is far from being a recent phenomenon. While the idea of a **circular flow for materials and energy** appears as early as 1966 in the book of Kenneth E. Boulding, the term of circular economy appears for the first time in **1988** in “*The Economics of Natural Resources*”, a paper written by D.W Pearce and R.K Turner (Pearce & Turner, 1990). However, historical evidence shows that industries have long been exploring different ways of turning residuals into resources and thus experimenting with a circular economy. Since environmental problems were largely disregarded in social decision-making as weak as in economy theory, the main motivation to use resources smartly wasn't driven by an increasing awareness on resources depletion but was the result of competitive pressures that continually forced manufacturers to identify new ways of creating wealth and reducing disposal costs.

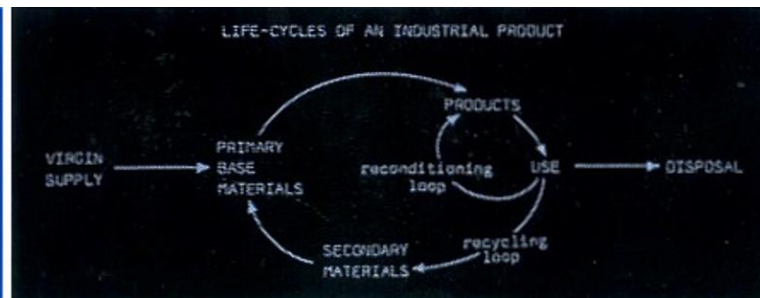
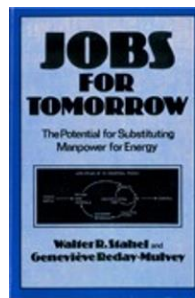
Faced with the observation that we are coming to the end of an economic system based on economic performance and the over-exploitation of limited natural resources, scientists are alarmed and raise the question of the survival of the human species: “*we must enroll in a real and complete paradigm shift in our economic system*” (Potočník, 2014).

The **Meadows report** promises to be the first cry of **alarm on planetary boundaries** (Meadows & Randers, 1972). The first major study highlighting the dangers of economic and demographic growth as it has unfolded since the middle of the 20th century, the Meadows report highlights the need to implement a transition towards a model of production and consumption that does not involve unbridled exploitation of resources and does not cause significant environmental repercussions (Collard, 2020).



One of the recommended solutions is the **transition** to a circular economy. Following this report, many organizations and global commissions are committed to its direction, thus spreading the concept of the circular economy. For example, In the early eighties, Walter R. Stahel and Genevieve Reday are appointed by the Commission of the European Communities to study the potential for substitution manpower for energy. The report, published in 1981 under the title « Jobs for Tomorrow, the potential for substituting manpower for energy » analyzed cars and buildings from a micro and macroeconomic perspective (Stahel &

Reday-Mulveey, 1981). It concluded that a circular economy, as opposed to manufacturing new goods, would create jobs locally and reduce resource consumption, greenhouse gases emissions and waste. Thirty years later, the conclusions of the research remain more than valid.

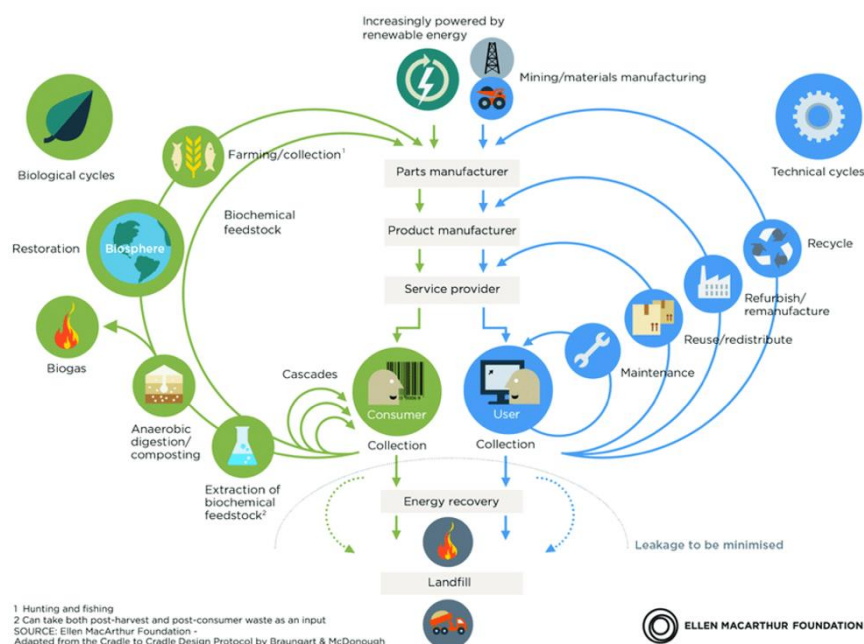


Life cycle of an industrial product – sketching the vision of an economy in loops and its impact on job creation, economic competitiveness, resource saving and waste prevention (1976)

Source: The Product-Life Institute (2022)

Other publications have also contributed to this debate, such as the book "Thinking About the Future: A Critique of the Limits to Growth" written by the innovation economists of the Sussex School, which recognizes the necessity to alert the world to the limits of growth and considers innovation as the key to change the destiny of human society (Cole, 1973).

The notion of circular economy was then successful until the end of the 2000s thanks to the conjunction of three concomitant events which created an environment receptive to its diffusion: the boom in the prices of raw materials which quadrupled between 2000 and 2010, the Chinese embargo on rare earths and the growing ecological crisis (Arnsperger & Bourg, 2016). In this sense, the British charity Ellen MacArthur Foundation defines the circular economy as "restorative and regenerative in nature and tending to preserve the intrinsic value and quality of products, components and materials at every stage of their use. This economic model aims to decouple global economic development from the consumption of limited resources" (MacArthur, 2013). This definition has helped to publicize the concept, has made political



decision-makers aware of the advantages that accompany the implementation of a circular economy and is now used as a reference.

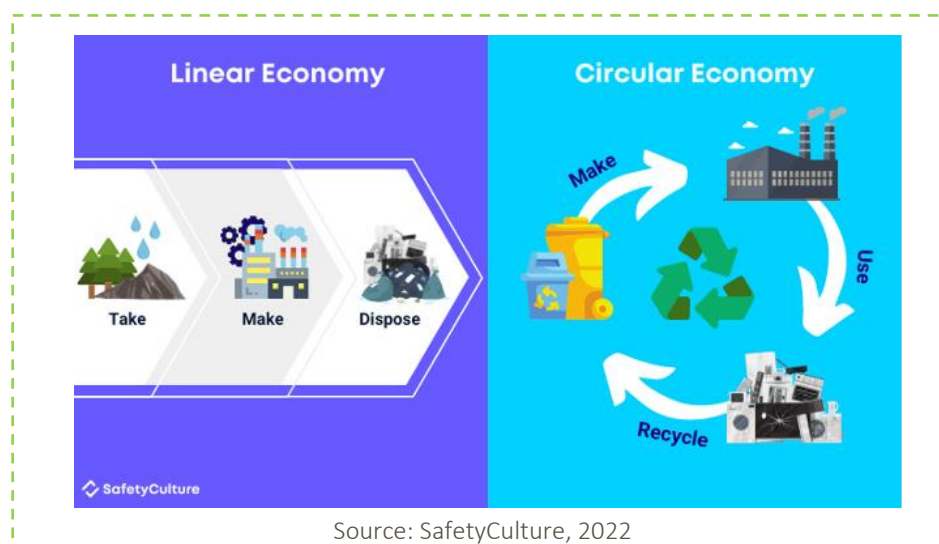
Source: Ellen MacArthur Foundation, 2012, p.24

What is the key discussion about?

The need to opt for a circular economy model stems from the observation of the **incompatibility between growing global demand** on the one hand and the **finiteness of natural resources** on the other, generating the need to find a **sustainable balance** between two factors to ensure the survival of the human species and the preservation of biodiversity.

The increase in the need for resources in relation to the current consumption of raw materials is made visible by « the work of the united nations program for the environment [which] has shown that maintaining the current growth rate of consumption of raw materials (biomass, industrial ores and minerals, fossil fuels, construction materials) would lead us, according to a « business as usual » scenario, to a world demand in 2050 three times higher than in 2000 and thus exceeding 150 billion tons per year » (Potočník, 2014). This increase results from the conjunction of three factors: demographic growth, the increase in the standard of living and the growth of the middle class, and urbanization and the ethnicization of goods. However, the consumption of these materials puts pressure on essential natural resources such as water and soil and has a significant impact on the environment, reinforces climate change and accentuates the loss of biodiversity. These concomitant phenomena question the physical availability of raw materials and the competition, both economic and geopolitical, in access to these resources.

Faced with this global challenge *“the optimization of our linear economic system inherited from a century and a half of industrial development (production-distribution-consumption-waste management) is no longer appropriate”* (Potočník, 2014) and the sustainable use of resources becomes more than necessary. Proponents of the circular economy advocate a **break with the linear economic model** in favor of an optimized use of each resource and their reuse, involving the implementation of ambitious strategies at different scales and the renewal of the place given to consumers.



Indeed, the linear economy model based on the extraction or harvesting of resources - manufacture and assembly of goods - distribution and use - waste production scheme encounters a series of important limits essentially concentrated around the environmental impact and resource depletion. While this model inherited from the industrial revolution has enabled unprecedented industrial development and growth, it

is nevertheless considered to be at the origin of social and environmental upheavals. In addition to the impact in terms of greenhouse gas emissions emitted by an economy based on economic performance which only aims to optimize the flows produced without internalizing in the equation the social and environmental consequences, the linear economy reinforces the incentive to consume single-use objects so that the logic comes down to accumulating goods or getting rid of them to replace them with new ones (Collard, 2020). For example, this is concretely illustrated in fast-fashion or in the craze for technological objects (smartphones, connected objects, tablets, etc.) whose compositions make them difficult to recycle. In a finite world where resources only exist up to a certain limit, this critical exploitation threshold generates both their disappearance, but also negative externalities ranging from climate change to soil degradation and ocean pollution in through the disappearance of biodiversity and natural heritage.

The logic of the linear economy is now difficult to sustain for the environment and it leads certain economic, political, and societal actors to completely rethink the question of production, consumption and waste management. Today, the climate emergency and environmental challenges induce companies and individuals into rethinking their production and consumption patterns. Thus...

The circular economy is rated as one of the answers to these challenges to reconcile economic growth and environmental protection

In general, when we talk about circular economy, we often refer to a development model that “seeks to minimize the negative impact of human activities by applying the principle of the **3Rs: reduce, reuse and recycle** to maintain the greatest utility and value of products, components and materials” (Bourdin & Maillefert, 2020) and minimizing the use of resource input and the crayon of waste, pollution and carbon emissions in a closed-loop system.

The concept of 3R: Reduce, Reuse, Recycle, end-of-life product and waste management strategy



Source: 3rconcept (2022)

In short, the **circularization of flows** makes it possible to “*minimise the withdrawals of resources and the rejections at the end of the chain*” (Bourdin & Maillefert, 2020) through waste recovery. The circular economy prioritizes actions that have clear positive impacts on the environment, such as the use of recyclable packaging, energy savings, the use of consumer goods with low environmental impact, the eco-design, or the promotion of ecological products.

Thus, faced with the challenges of resource scarcity, economic actors, but also territorial actors (residents, public actors, associations, funders) are led to explore possible ways for the transition of production and business models, but also of uses, towards greater sustainability by recovering and reusing waste, allowing the reuse of materials in the supply chain in order to decouple economic growth from the consumption of resources.

The concept of decoupling is used to refer to the end of the correlation between increased economic production and decreased environmental quality (IRP, 2017). The past 30 years have seen immense progress in improving the quality of life for much of humanity: extreme poverty has fallen, life expectancy has risen in most of the world, along with literacy and access to education while infant mortality has fallen. However, this growth has come at a cost: “between 1990 and 2019, global emissions of CO₂ increased by 56%. Historically, economic growth has been closely linked to increased energy consumption leading some to argue that a more prosperous world is one that necessarily has more impacts on our natural environment and climate” (Hausfather, 2021). This is where decoupling joins the game: “the adoption of clean energy technology can allow emissions to decline while economic growth continues”(Hausfather, 2021). Briefly, decoupling, in economics and ecology, refers to the dissociation between economic prosperity and the consumption of resources and energy. Succeeding in growth without increasing damage to the environment is a sustainable development challenge considered by the circular economy.

Even if the negative effects of unsustainable use of natural resources are already being felt, the Decoupling 2: Technologies, opportunities and policy options report praises the merits of decoupling technologies and techniques that deliver more resource productivity that are already available, “allowing countries to pursue their development strategies while significantly reducing resource use and negative environmental impacts” (Smith, 2014).

Example taken from the report: “Cape Town in South Africa is conducting a 10-year traffic signal upgrade programme, retrofitting 120 intersections per year with LED lamps. The LED lamps consume almost 90% less electricity than the old lamps, yet produce the same lighting service. The programme is expected to save US\$2.9 million and 29,000 tones of CO₂ emissions” (Smith, 2014).

Beyond the transition from a productivist so-called linear economy to a circular economy, two concomitant issues appear: the concept of the circular economy has been almost exclusively developed by practitioners, that is to say political decision-makers, companies, consultants, associations, corporate foundations, (non-governmental organizations, etc (Bourdin & Maillefert, 2020). At the same time, scientific research has paid very little attention to it, although this tends to be contradicted, both from a conceptual and theoretical and empirical point of view. If the concept suffers from its own scientific basis and distinct from its heterogeneous objects such as the functional economy, natural capitalism or even green growth, its implementation varies even more as it takes into account the specificities of the different territories in which it is implemented.

What are the most current findings in the field of study?

The contemporary understanding of the circular economy and its practical applications to economic systems evolved incorporating different features and contributions from a variety of concepts sharing the idea of closed loops.

Among the relevant historical theoretical influences is the "cradle to cradle" (C2C) concept that fits into the company's environmental ethics. This concept has been popularized by the book *"Cradle to Cradle: Remaking the Way We Make Things"*, written by Michael Braungart and William McDonough detailing how to achieve their **Cradle-to-Cradle Design model** which calls for a switch from a cradle to grave pattern to a cradle to cradle one (McDonough & Braungart, 2010). In accordance with Lavoisier's famous adage *"nothing is lost, nothing is created: everything is transformed"* (Lavoisier, 1789), the C2C theory stipulates that the finished product must be able to be used, after recycling, for the manufacture of the same product; in this sense, it integrates three axes ranging from the manufacture of the product to the celebration of diversity through the consumption of energy. In other words, for a product to be C2C certified, it must be:

- Manufactured to be used in a closed cycle (i.e., integrated into the next production cycle)
- Positively impact the environment and use renewable energies (wind, solar or green energy)
- Result from the use of several processes and cooperation to promote innovation.

Thus, the elements shaping the circular economy are multiplying, the concept of C2C being only a part of it, ranging from design (economy of functionality, eco-design, cradle to cradle) to the biological cycle (composting, biomethanation, biorefining) through the technical cycle (reuse, maintenance, repair, recycling, remanufacturing, reconditioning, energy recovery) (Collard, 2020). Be that as it may, research on the circular economy has evolved since its conception and no longer concerns the same facets of this object.

The circular economy was therefore born from the linking of a variety of research on the optimization of economic growth and the preservation of natural resources and the environment. Although this concept, born of practice, lacks a scientific basis, it is constantly being the subject of new research to understand and perfect its meaning. Beyond the analyses, definitions, and redefinitions of the circular economy, we are now seeing work of various kinds aimed at updating the circular economy at the mercy of the digital revolution, at extending this concept and putting it into practice in a globalizing logic, to illustrate its implementation with concrete cases and finally to perfect its model by considering the criticisms against it. Concretely, current research on the circular economy focuses on the study of its productivity and its sustainability, based on practical cases, in order to extend the model and its applicability throughout the world while reinventing itself in line with developments.

- ⇒ As such, we can mention the article *“Measuring circular and collaborative economies: towards new methods for analyzing the value produced by economies”* which presents a work carried out by a public statistical institute, the IWEPS, regarding the challenges posed by collaborative and circular economies for its evaluation, forecasting and statistical missions (Calay & Guyot, 2017). The institute identifies the need to jointly develop with economic and political actors a common reference system embedded in a regulatory framework to measure the value produced by the circular economy.
- ⇒ To overcome this issue, the article *“Assessment of the Impact of the Circular Economy on CO2 Emissions in Europe”* seeks to establish a link between the objective of moving toward an economy without any climate impact by 2050 of the European Commission and the concrete results of the implementation of the circular economy. The results of the study over the period 2000-2015 show that, in the long term, circular economy practices tend to reduce CO2 emissions, while in the short term, the effect is the opposite (Mongo, Laforest, Belaïd & Tanguy, 2022).
- ⇒ To illustrate the implementation of the circular economy on a national territory, Ren Yong has endeavored to report on this implementation in China through his article *“The Circular Economy in China”* which shows that the urgent need to cope with environmental pollution and a severe shortage of natural resources constituted a solid motivation for implementing circular economy at several levels (enterprises, eco-industrial parks and regions) in the country (Yong, 2007).

Studies of circular economy and innovation have received increasing attention in academic literature in the last quadrennium; they constitute one of the most current findings in the field of circular economy. They fill a managerial gap on how to operationalize the transition from the linear model to the circular. They show practices, tools and mechanisms that allow creation of business models based on circularity premises.

- ⇒ The article “*Circular economy and innovation: A look from the perspective of organizational capabilities*” analyses the intellectual contours of this emerging field and shows that eco-innovation and innovation in business models are highlighted in this field. Overall, scientific articles linking digital technologies, innovation and the circular economy are proliferating (Sehnem, Queiroz, Pereira, Dos Santos Correia & Kuzma, 2022).
- ⇒ The paper “*Critiques of the Circular Economy*” presents a reasoned account of the critiques addressed to the circular economy and circular business models. These critiques enlighten the limits, and the structural obstacles circular economy faces. The paper concludes by proposing critical issues that need to be addressed to the circular economy for more sustainable economic development (Corvellec, Stowell & Johansson, 2022).

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Chapter 2

Chapter 2 provides an overview of the institutional frameworks in three countries (France, Slovakia, and the United Kingdom) while comparing them to the Czech Republic. The chapter aims to identify how different institutional frameworks are suited for accelerating the transformation toward the circular economy. To this end, the focus is on the division of the circular economy competencies between the different levels of self-governance within each country. The final summary identifies the advantages and disadvantages of highly fragmented and decentralized governance structures when it comes to implementing circular policies and can serve as a basis for future policy planning.

Institutional & Self-government Review

1. France

Like the Czech Republic, France is a **deconcentrated** and **decentralized** unitary state – deconcentrated because the central authority has great power over the national territory thanks to decentralized services, relays at the level of each of the subdivisions, and decentralized because since 1982, it has also been based on independent territorial communities with a real autonomy (Greffé, 2005).

The exercise of power at different scales

National level

“Circular economy is a more competitive, more climate-protective and more resilient economy,” said Agnès Pannier-Runacher, Minister Delegate for Industry. To accelerate the transition to the circular economy in France, the government is directing its strategy towards innovation, the orientation of behavior and the financing of projects in this direction.

The concept of circular economy has officially entered the **law on energy transition for green growth** as of August 18, 2015 (Ministère Écologie, Énergie, Territoires, 2020). This recognizes the transition to a circular economy as a national objective and as one of the pillars of the sustainable development. This law also defined ambitious objectives linked to the circular economy, such as that of a 30% increase by 2030 in the ratio between GDP and internal consumption of materials: it is therefore a question of production using less materials, in order to decouple growth from material consumption and prioritize quality over quantity. The law contains significant advances in terms of sustainable production (ban on plastic bags, criminalization of planned obsolescence, etc.) and sustainable consumption (fight against food waste, etc.). It also contains structuring objectives concerning the prevention and management of waste. For example, achieving 65% recycling for non-hazardous and non-inert waste by 2025 is one of these objectives.

The **circular economy roadmap** published on April 23, 2018, proposes concrete measures to achieve the objectives set by the energy transition law for green growth such as aiming for 100% recycled plastics by 2025, reducing greenhouse emissions and reducing resource consumption by 30% in relation to GDP by 2030 compared to 2010 (Légifrance, 2022).

On February 10, 2020, **the anti-waste law for a circular economy** (AGEC) was enacted. The law is based on 5 main axes (Ministère de la Transition Écologique, 2021):

- Get rid of everything disposable (gradual bans to reduce the use of single-use plastic);

- Better inform consumers (harmonization of the colors of bins, implementation of a single logo to facilitate sorting);
- Fight against waste and for solidarity reuse (prohibition of eliminating unsold non-food items);
- Act against planned obsolescence (creation of a reparability index);
- Better production (overhaul of sectors subject to extended producer responsibility).

On September 13, 2021, the national strategy was launched in France to accelerate waste recycling and the transition to the circular economy. To succeed in accelerating the recycling of plastics, composites, textiles, strategic metals and paper and cardboard, the French government is committed through the **France Relance plan** and the **4th future investment program** (PIA4). While 200 million euros have already been mobilized as part of the circular economy component of the France Relance plan over the 2021-2022 period, 370 million euros of additional public funds are now being added to support innovation for the circular economy over the period 2021-2027 (Ministère de l'économie, des finances et de la souveraineté industrielle et numérique, 2021). These supports put research and development, industrial deployment and product design and, therefore, target all stages of the chain recycling value at the service of the circular economy.

To optimize its impact, the government has also launched **a call for projects** led by the ecological transition agency, entitled "innovative solutions for improving the recyclability, recycling and reincorporation of materials"(ADEME - Agence de la Transition Écologique, 2022). It aims to support innovation projects in the field of materials sorting technologies and in the field of plastic recycling.

Regional level

If French laws indicate the objectives to be achieved in terms of the circular economy, the territories are at the heart of its implementation. Through a phenomenon of deconcentration, the French State is represented at the territorial level and, as a central power, sets up services and authorities (prefectures) in the constituencies to defend its policy. Conversely, a phenomenon of decentralization gives local authorities (municipalities, departments, and regions) powers allowing these authorities to represent their territories, and not the State.

The current administrative framework requires the different levels of local authorities to be involved in waste prevention and management and assigns them an essential role to play in the development of the circular economy in their territory.

The 13 French regions, as communities, have two assemblies: the deliberative assembly (the regional council) and the consultative assembly (the regional economic, social and environmental council) (Carroué, 2017). The president of the regional council constitutes the executive of the assembly. The revenue of the regions comes mainly from local taxes, other taxes and state grants provided for in the context of decentralization.



In general, the regions are in charge of economic development, business support and transport. In addition to the prerogatives shared with the departments (tourism, sport, culture, etc.), the regions have several exclusive competences concerning transport (management of ports, airports, regional trains, interurban and school road transport, bus stations, ...), high schools (construction, maintenance and operation), vocational training (professional integration, training for job seekers, etc.), land use planning and the environment (waste management, regional natural parks, rural and urban development, regional plan for air quality, planning, sustainable development, territorial equality, etc.), economic development (animation of competitiveness clusters, regional plan for economic development, innovation and internationalization ,...), and the management of European programs (La Finance Pour Tous, 2022). The regions are responsible for planning the prevention and management of all waste through the regional waste prevention plan (PRPGD) according to the NOTRe law (2015). By the AGECE law (2022), the French regions acquire the role of coordinator and facilitator of the actions carried out by the various actors on their territory. They must also define guidelines for the circular economy and territorial industrial ecology.

Departments

The competences of the 101 departments placed under the authority of the prefects have been modified and clarified by the NOTRe law (2015). The law reaffirms the vocation of the departmental community to manage social action, digital development, and territorial solidarity. The law plays a role in promoting solidarity and territorial cohesion. The social action of the department mainly concerns children, the disabled, the elderly and legal social assistance benefits. The department has skills in the field of education and ensures the construction, maintenance, and equipment of colleges. The action of the department in development and transport mainly concerns rural equipment, dismemberment, land development and the management of water and rural roads, special transport services for disabled students and the management of the departmental road. The department also has cultural competence (creation and management of lending libraries, archive services, museums, heritage protection, etc.) (Manier, 2015). The departmental budget is fed by 4 major types of revenue: local taxation, transferred taxation, state grants and borrowing (République Française, 2022).



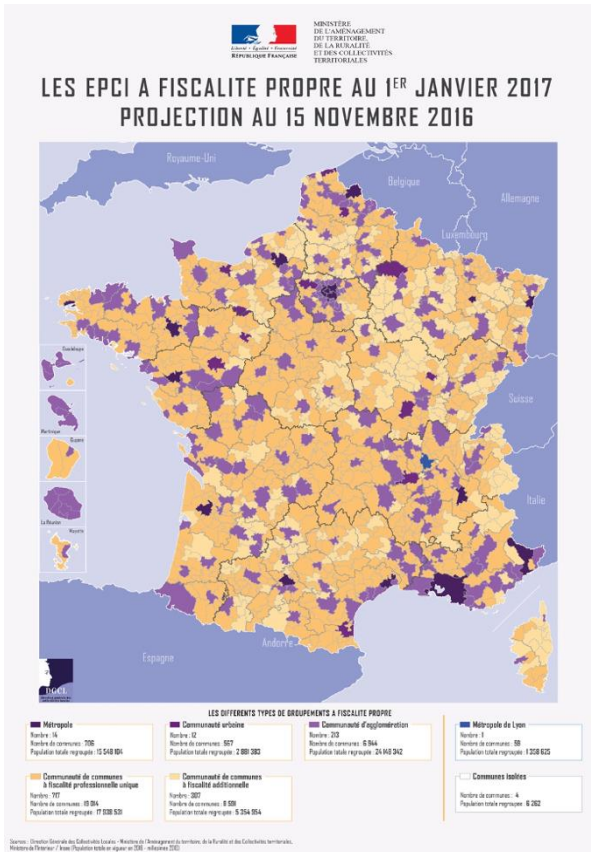
Municipal level

The 34,965 French municipalities placed under the authority of the mayor are responsible for sustainable mobility and air quality. They have the general competence to manage any matter of municipal interest and competences identified in the most varied fields, in particular concerning housing, social assistance, elementary and nursery schools, culture, heritage, tourism and sport and town planning and soil control. The revenue of French municipalities is essentially made up of State funding and local taxes (housing tax, property tax).

In order to fight against all forms of waste, the anti-waste law for the circular economy provides for changes in the practices of communities. At the level of a municipality, actions can be implemented such as the

reduction of food waste, the reuse of materials, or the purchase of local eco-responsible products (Lety, 2015).

EPCI (Public establishments for inter-municipal cooperation)



Map of public establishments for inter-municipal cooperation (EPCI)

Source: Ministry of Territorial Planning, Rural

The inter-municipalities are a level of subdivision of the French territory, intermediate between the municipal level and the departmental level, which are not territorial communities (Lety, 2015). They are of different types: the metropolis, the urban community, the community of agglomeration and the community of commune. EPCIs act within the framework of powers delegated to them by municipalities, departments, regions and the State; can exercise compulsory and optional skills. At the local level, it falls within the remit of public establishments for inter-municipal cooperation (EPCI) with their own taxation and municipalities to ensure the protection and enhancement of the environment through the skills of collection, disposal and recovery of household waste. And similar, the fight against air pollution, support for actions to control energy demand, and economic and sustainable development conferred by the RCT law (2010). Thus, the French metropolises (Paris, Toulouse, Lyon, etc.), by exercising as of right, instead of the member municipalities, powers in matters of development and economic, social and cultural planning, in terms of the metropolitan area and in terms of city policy, can guide the policy of its metropolitan hinterland (Braun, 2016).

NUTS and LAU classification: France

NUTS I	NUTS II	NUTS III	LAU I	LAU II
National territory - France	Regions + DOM	Departments	Cantons	Municipalities
1	18	101	3787	34 965

(Authors based on Eurostat, 2021)

2. Slovakia

There is no EU legislative prescribing a specific model of public administration and territorial administrative structure (Council of Europe, 1985). Consequently, EU member states are far from having a uniform

organization of public administration, often due to different historical and cultural development. These two factors – common cultural and historical development - resulted in Slovakia and the Czech Republic having similar models of territorial self-governance.

Like the Czech Republic, Slovakia is a unitary state with a **3-level public administration framework** (central government – regions – municipalities) (Constitution of the Slovak Republic, 2004, Title 4).

The exercise of power at different scales

National level

The central administration has executive powers, and the responsibility for the exercise of state administration is shared between the ministries and other central government bodies. Concerning the regional policy – the central government shares its competencies with the municipalities and the self-governing regions (Act No. 575/2001 Coll.).

With regards to the transition to a circular economy, the role of the central government is essential, namely when it comes to (1) defining the ambition to undergo the transition, (2) setting up a legal framework, and (3) adjusting the policy/economic instruments (subsidies) to create conditions for the transition.

(1) In 2019, the Ministry of Environment of the Slovak Republic published a document **Circular Economy – Future of the Development of Slovakia**, which demonstrates the existing circular economy practices in the country. However, it only informs of the positive examples implemented at different levels of governance and outside of the government sector but does not provide any vision or steps to be taken at the national level and by the Ministry of the Environment (Gušťaříková, Kostúříková, & Lieskovská, 2019, 6). This could serve as a tool for sharing awareness and inspiring others to act but does not define the circular economy as a priority for the government. On the other hand, the **Strategy of the Environmental Policy of the Slovak Republic Until 2030** published a year later, defines the transition to a circular economy as a strategic priority for Slovakia. The section dedicated to circular economy states five goals (Haluš et al., 2020, pp. 48-53):

- Support the circular economy by promoting innovations,
- Increase the fees for waste landfill
- Incentives for waste collection based on the quantity of waste
- Prevention of solid waste dumping by implementing the “polluter pays” principle
- Prevention of the production of biodegradable and food waste

The stated goals mainly focus on waste prevention and do not tackle other areas such as decoupling. The structure is similar to the Brno Strategy but lacks medium and short-horizon goals, as well as concrete measures (#Brno2050, 2020). The document does not define a specific set of policies to achieve the mentioned goals, timeline to achieve them, or funding. Thus, the ambition to undergo the transition is stated, but the roadmap to the transition is still inexistent. On the other hand, the section dedicated to the circular economy counts on introducing the policies in cooperation with the municipalities, specifically the introduction of incentives and fees for waste collection and prevention of illegal dumping (Haluš et al., 2020, pp. 48-53). The document demonstrates the degree to which the success of these policies and their implementation depends on the upper and lower level of governance.

(2) The central government also defines important legislative aspects of waste management and sets guidelines for public procurement (self-government units have specific competencies in this area as well) and consequently may enforce green and circular principles (MŽP SR, 2022). A good example of adjusting the legislative framework is a law on food donation past the expiration date. Since 2017 any NGO may receive and distribute the food (Madajová & Belicová, 2019, pp. 207-208).

(3) A state may also choose to subsidize a particular practice, such as recycling, purchasing e-cars or prohibit a practice, e.g., by introducing a mandatory payment for plastic bags (Madajová & Belicová, 2019, pp. 207-208).

Self-governing Regions

As defined by the Title IV of the Slovak Constitution, the higher territorial units are the self-government regions. Regions are legal entities with independent territorial competencies and delegated competencies (state administration tasks). Their bodies are directly elected council and a president. Regions can engage in international cooperation at the level of higher territorial units and may issue binding regulations. Other independent regional competencies are elaboration and implementation of their territory's social, economic, and cultural development (spatial planning documents, regional integrated spatial strategy), entrepreneurial and investment activities, setting conditions for education and training, and tourism. State also transferred to the regions the competencies in the field of road communications, railways, civil protection, social services, health care, etc. (Zákon č. 302/2001 Z. z, 2001).

Municipalities

Like the region, a municipality is a territorial and administrative unit with the two main bodies elected directly by the residents – (1) the municipal council and (2) the mayor. The state's administrative control of local authorities is only in the area of compliance with the law and constitution. The Act on Municipal Administration makes municipalities equal (excluding Bratislava and Košice). This brings us to the risks of fragmentation since each city must fulfill the same role, no matter its size. This can cause difficulties for small municipalities to execute essential public services due to a lack of finances or personnel (Klimovsky & Nemec, 2021; Zákon č. 369/1990 Zb., 2001).

Slovak municipalities have a comprehensive set of competencies. They:

- Manage their property and finances independently.
- Administer local taxes and fees.
- Govern economic activities in the municipality (investments and use of their resources).
- May associate with other municipalities for the purpose of common interest (two mayor associations are ZMOS and SK8).
- The issue generally binding regulations.
- Approve territorial planning.
- Participate in the development of regional plans.
- Provide public services such as transportation; management of public space, parking, local roads, green areas, public lighting, local water resources, municipal waste, sewage treatment, health service establishments, essential social services, education (pre-school and primary), health care (primary and specialized ambulatory care).
- Have competencies in environmental protection, tourism, construction.

(Zákon č. 369/1990 Zb., 2001)

Beyond that, similar to Czech municipalities, they execute delegated state functions such as civil registry, building regulations, and competencies in the field of education. ZMOS argues that these competencies are only partially financed by the state. And even though the decentralization process happened, the Slovak municipalities spent approx. 7% (half of OECD average) of GDP and thus, in this aspect, remains a centralized country (Klimovsky & Nemec, 2021, p.369).

Same as in the Czech Republic, an essential part of municipality revenue consists of central government allocations of taxes; the rest is their own revenues. On top of that, both regions and municipalities benefit

from several EU funds and operational programs. Still, these are very unstable and depend on programming periods, and the program's design changes every period. On top of that, the capacity to draft projects is necessary – smaller municipalities have fewer capacities and could benefit from less fragmentation and a more cooperative institutional framework.

The self-governing regions and the municipalities hold competencies that can enhance the transition to a circular economy, such as education and training, waste and water management, spatial planning, green spaces, and transportation. When it comes to spatial planning, the regions and municipalities could incorporate circular economy goals and measures into their action plans. As of now, none of the regions has a strategy or an action plan dedicated specifically to the circular economy. Some regions and cities, for instance, the Self-governing Region of Trenčín, incorporated green measures somehow related to circular economy into other documents (Gušťaříková, Kostúriková, & Lieskovská, 2019, 23). Beyond planning, the regions and cities may also choose to directly support the circular economic practices of other actors through participatory budgets or public procurement. The biodegradable waste, small construction waste, and mixed municipal waste management are financed from the municipal budget; however, they do not pay a fee to the collector of sorted waste (Madařová & Belicová, 2019, p. 14). From this point of view, municipalities should aim to close the loop by ensuring that sorted materials end up used as materials for other products.

Metropolitan planning in Slovakia

Like the Czech Republic, Slovakia is characterized by a high level of self-government fragmentation, e.i. a large number of municipalities per number of inhabitants. To compare, the Czech Republic has approx. 58 municipalities per 100 000 inhabitants, while Slovakia has approx. 54 municipalities per 100 000 inhabitants (Eurostat, 2021). This implies similar fragmentation challenges in Slovakia as in the Czech Republic (see chapter 5.) These can be addressed by inter-municipal cooperation. Slovak municipalities may associate in different forms (joint municipal office, Euroregion, agreement on the performance of tasks) for the purpose of common interest (Zákon č. 369/1990 Zb., 2001). Another way a municipality may partially influence the development planning beyond its territory is to participate in the development of regional planning with the self-governing regions.

As of now, the Slovak legislation does not provide for metropolitan planning. Thus, the possibility for a municipality to govern beyond its cadastral area is more restricted than in the Czech Republic. However, after 50 years, the parliament amended the Building Act and the Territorial Planning Act. With effect from April 1, 2023, the newly adopted legislation allows for metropolitan spatial planning in the case of Bratislava and Košice (these cities are also divided into city districts). Consequently, the two cities could have the competencies of a regional authority within their functional metropolitan territories and could determine the spatial development in the whole area. This is only possible if both the municipality and the higher territorial unit, so in the case of Bratislava, Bratislava City and the Bratislava Self-governing region, agree to create such a spatial plan. On top of that, it must be approved by the regional and municipality councils, thus depending on the representatives' political will. Bratislava City stated they welcome the possibility of metropolitan planning, but some political representatives feel this violates the fundamental right of the local governments to be responsible for their development (TASR 2022).

NUTS and LAU classification: Slovakia

NUTS I	NUTS II - territorial units	NUTS III – territorial and administrative units	LAU I - territorial units	LAU II – territorial and administrative units
- (Slovak Republic)	4 Areas	8 Self-governing Regions	Districts	Municipalities

(Authors based on Eurostat, 2022)

3. The United Kingdom

Since 1922 the United Kingdom comprises four countries: England, Wales, Scotland, and Northern Ireland and sometimes they may be referred to as regions as well. Due to the processes of devolution, which is defined as “transference, as of rights, powers, property, or responsibility, to another” (Merriam Webster, 2022), all these countries gained some powers which enables them to administer their defined territory.

The United Kingdom is a parliamentary constitutional monarchy and as other democratic regimes, the power is divided between three branches: executive, legislative and judiciary. Because of the devolution process as has been described above, the UK has **three separate legal and governance systems**: one for England and Wales, Scotland, and Northern Ireland (Suzanne Rab, 2021). The Scottish and Northern Ireland Parliament can pass primary and secondary legislation in areas which are not reserved for the Westminster Parliament, since Westminster is considered, a supreme law-making body (Holden, 2007). Similar framework has been established for the local governments, with issues such as immigration, foreign policy and national security remaining in the power of the UK government (Scottish Government, 2022). The UK system is rather complicated, and it is not the aim of this paper to fully comprehend it. Therefore, to put it simply, each country within the UK arranges their own legal framework in accordance with federal level. Thus, implementing steps towards a circular economy may differ across the UK.



The exercise of power at different levels

National level

After the UK left the European Union, some issues connected to nature protection, water quality or clean air ceased to be covered by the UK's law (ClientEarth Communications, 2022). Therefore, in order to fill this gap, in 2021 the Environment Act has been passed by the Parliament, which has set a new framework for the UK environmental policy.

“Through the Environment Act, the UK Government will set out to improve the UK’s air quality, restore natural habitats, increase biodiversity, reduce waste and ‘make better use of our resources’”

(Darrel Moore, 2021)

With regards to the circular economy, this Act aims at encouraging citizens to recycle more and businesses to create sustainable packaging. On waste and resources, number of initiatives will be introduced such as:

- Extend producer responsibility to make producers pay for 100% of cost of disposal of products, starting with plastic packaging
- Charges for single use plastics
- Greater consistency in recycling collections in England
- Tackle waste crime
- Power to introduce new resource efficiency information (labelling on the recyclability and durability of products)
- Regulate shipment of hazardous waste
- A deposit Return Scheme for single use drinks containers

(Daniel Moore, 2021)

The law has created an independent institutional body, the Office for Environmental Protection, which can hold the government and other public bodies accountable if they do not fulfil their environmental obligations. (ClientEarth Communications, 2021)

“We need strong laws, investment by the private sector and clear, well-funded regulation to protect the environment. Without this, we will not see the progress we all want”

Emma Howard Boyd CBE, Chair of the Environment Agency (Daniel Moore, 2022)

Passing laws is only one way to facilitate change towards a circular system. Funding various initiatives is another example of good practice. For example, in 2020, the UK government announced that 22.5 million British pounds will be dedicated to five research centres that would think of new ways how industries could be better in tackling waste and boosting recycling (GOV.UK, 2020).

Regional (federal) level

Currently there are 12 regions within the United Kingdom– **England** (further divided into North West, North East, East Midlands, West Midlands, South East, South West), **Scotland, Wales, Northern Ireland, London, East and Yorkshire and The Humber**. However, the division serves only for statistical and strategy planning purposes. Therefore, there are no elected institutional bodies on this level (except Wales, Scotland, England, and Northern Ireland).

With regards to the circular economy, even though the UK left the European Union, the country is still devoted to implementing steps that would prevent climate change. **England** issued the *Resource and Waste Strategy*, which sets out how they intend to preserve material by minimising waste, promoting resource efficiency, and implementing circular economy measures (Department for Environment, Food & Rural Affairs and Environment Agency, 2018). The Welsh Government's strategy *Beyond Recycling* gives a strategy on how **Wales** could become a circular and emission-free economy by 2050. With similar intentions the **Scottish** Government published a strategy *Making Things Last* in 2016 and in Northern Ireland the strategy-making is still in the process



Map of 12 regions in the UK

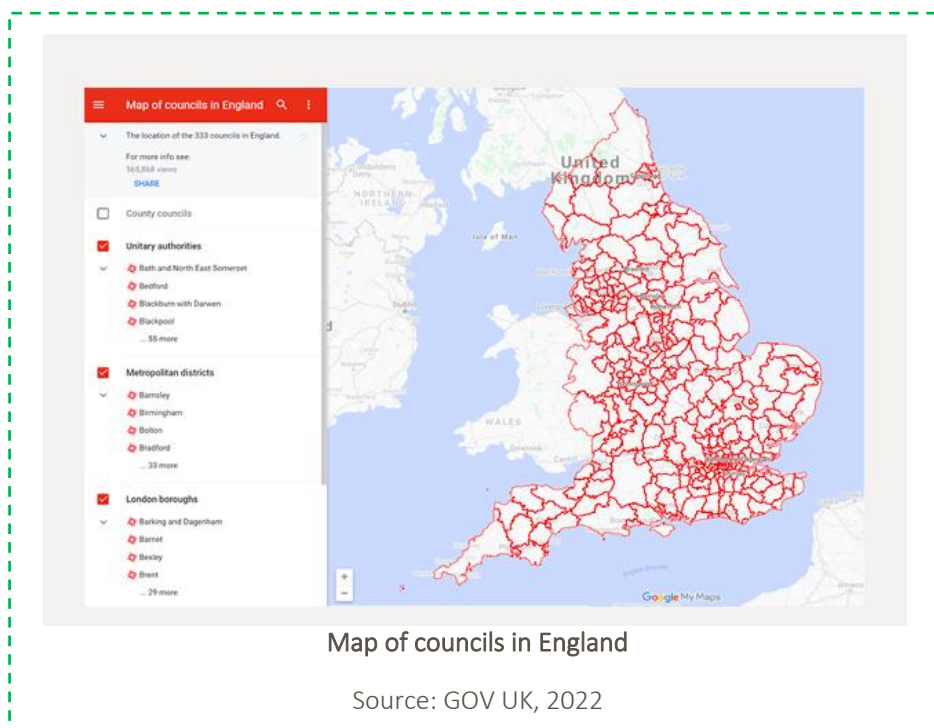
Source: Wikipedia, 2022

of making (GOV.UK, 2020). In general, each of them is ready to undertake necessary steps leading towards a circular future.

Each of these four administrations set their own budgets. The money comes from grants from the UK government, EU funds, income tax (GOV.SCOT, 2022). Since each of the administration set their goals independently, they decide what issue to support financially. For example, Scotland provided 70 million British pounds funding for manufacturing and circular economy projects (Scottish Funding Portal, 2022). Similarly, Wales distributes million worth funding programmes to achieve its programme goals (GOV. WALES 2020 & GOV.WALES 2021).

Municipal level

The UK system in case of power division is rather a complicated one—in total there are 333 local authorities made up of 5 different types (county councils, district councils, unitary authorities, metropolitan districts, London boroughs) (GOV.UK, 2022.) Therefore, this part of the paper provides the reader with only slight insight to their powers.



Local governments are responsible for a range of community services, including environmental matters, education, highways and traffic, social services, firefighting, sanitation, planning, housing, parks and recreation, and elections. They are also responsible for waste collection. Local authorities must run a balanced budget. They obtain money from government grants, council tax (property tax on residents) and business rates (property tax on business). (Atkins & Hoddinott, 2022)

With regards to the circular economy, local authorities may help to accelerate the transformation towards a circular economy. Implementing necessary steps and cooperation between the local authorities may be beneficial to these councils as well, since it could deliver economic, social and environmental benefits together with tackling inequality (Spindler, 2022). Essex county Council recognized the opportunity and created a Blueprint to Circular Economy Project with the aim to help local authorities to create waste management strategies while addressing social value and innovation (Local Government Association, 2021).

“The transition to a circular economy in Europe could be worth €1.8 trillion a year by 2030 but local authorities are either unaware of this opportunity or don't know how to take advantage of it.”

Local Government Association, 2021

Similar efforts towards cooperation between various local authorities can be seen in London, where London Waste and Recycling Lab decided to work with the Mayor of London and its boroughs to accelerate the transition to a circular economy (Circular City Funding Guide, 2022)

NUTS and LAU classification: the UK

The NUTS division system was abandoned after the UK left European Union and since 2021 it has been replaced by United Nation's ITL system (international territorial system). Currently there are 12 ITL 1 regions which is complementary with the NUTS 1 level, 41 ITL 2 (NUTS 2) regions and 179 ITL 3 (NUTS 3) regions. (Office for National Statistics, 2022).

NUTS I	NUTS II - territorial units	NUTS III – territorial and administrative units	LAU I - territorial units	LAU II – territorial and administrative units
12 regions (, England, Northern Ireland, Scotland, Wales + 9 statistical regions	40 regions (Northern Ireland, counties in England, groups of districts in Greater London...)	174 regions (counties, unitary authorities, districts...)	415 (lower tier authorities such as districts or individual unitary authorities...)	10400 wards

(Authors based on Office for National Statistics, 2022)

Summary of the institutional frameworks

Advantages versus disadvantages of decentralised systems

The institutional self-government frameworks reviewed above **differ** in terms of size (population and area), independence, and responsibilities of their self-governmental units. They range from a 3-level structure (state-region-municipality) in case of Slovakia and the Czech Republic to a France's 4-level structure (state-region-department-municipality) and UK's 4-level structure (state-region-counties-districts and boroughs). Consequently, each country has a different degree of decentralization in terms of political governance, closeness to citizens, or financial independence. Therefore...

The aim of the summary is to identify key positive and negative features that are linked to more decentralized systems in comparison to more centralized when it comes to implementing circular economy policies.

Advantages of a decentralized system

1. Economic benefits. More profitable business brings more finance to the local budget, such as financial savings from effective waste management or revenues from the reuse of waste. At the same time, it reduces the financial burden for waste collection and treatment. Local authorities can promote the creation of specific businesses (financial incentives) and sustainable modernization and territorial development.

2. Social benefits by creating new jobs and tackling social inequalities. The hierarchy is reduced, and there is no longer any need for the approval of a multitude of hierarchical superiors.

3. Political benefits. The idea of the state that is close to the citizens can be reinforced through local democracy, where citizens can have a direct impact on their territory thanks to the participation in the development of public policies and initiatives (Loncle & Rouyer, 2004).

4. Circular Economy efficiency benefits. Development and implementation of CE policies (communicate local needs by voting, participating in the call for projects, etc.). Decentralization makes it possible to consider the specificities of each territory (regarding the population, the temperature, the proximity to seas and oceans...) and to adapt the circular economy strategies to those characteristics. Better knowledge of the field and its constraints allow better consideration of local needs and, therefore, a quicker and more efficient implementation of the circular economy.

6. Transparency. Citizens can see the link between their tax money and the level of services provided locally. If the CE policies respond to the local needs, the citizens can more easily understand and appreciate the money spent.

7. Cooperation benefits. Strengthening the City council's position and strengthening communication between different actors could lessen the conflict potential and instead create a sense of broader community. Better lobby position.

8. It is easier to create **common values and beliefs** on a lower level than the national one. In a decentralized system – the local authority is closer to the citizens and can more easily create new values and beliefs, such as citizens being proud of their city becoming net-zero emission. This will facilitate the acceptance of changes (circular transition) and of the implemented measures.

Disadvantages of a decentralized system

1. Since the local authorities are **law– and decision–takers**, rather than makers, the sometimes slow legal and bureaucratic processes on the national level can negatively affect the speed of changes on the local level.

2. Fragmentation, lack of personnel, and financial resources for development planning. Local authorities have only limited power and budget, which prevents them from acting more efficiently.

3. Different visions of the future. The incentive for the circular transition must be nationwide, and in a decentralized system, we are risking that the State disengages from its sovereign responsibilities to set strategic goals in the circular economy. Consequently, there is a risk that local authorities will not consider the CE a key issue since they are each faced with different challenges. For one becoming net–zero could be a priority, whereas poverty and inequity for others.

4. Imbalance between the authorities. Compared to peripheral or smaller cities, the capitals generally have more success in raising taxes and funds needed to finance the economic and social development programs, including the circular economy. Because of their critical financial and political importance, capital cities have benefitted from the sustained investment in support of their infrastructure and services, often to the detriment of smaller rural communities. This can be partially offset by the EU Cohesion policy since less developed regions do get bigger allocations.

5. Unclear distribution of power. In the system of transferred powers and means, there may be an impression of confusion. The distribution of powers between the different decision-making levels may be

less clear, which can result in encroachment of the role of one on the other and give the citizens the impression of burdensome complexity (Baguenard, 2004).

6. Burden of bureaucracy. Since the local authorities' budget is in comparison to regional or national one rather negligible, difficult and lengthy administrative processes in case of, for example, funding application for a CE solution could negatively affect the speed of the transformation.

7. Reduced possibilities for metropolitan planning and inter-municipal cooperation. The cases reviewed above show that the municipalities with highly decentralized and fragmented institutional frameworks face challenges (see point fragmentation) that can be solved by metropolitan planning or intermunicipal cooperation. In the case of Slovakia and the Czech Republic, it is very difficult due to a lack of will from the central government to implement a metropolitan reform or incentivize inter-municipal cooperation further. The UK, a much less fragmented state, and France have both undergone metropolitan reforms. Equally, the French government financially supports inter-municipal cooperation. Consequently, this disadvantage of decentralized systems when it comes to metropolitan governing and cooperation can be overcome by changes in the legal framework.

Key takeaways

This overview can then serve as a basis for future policy planning. Elaborating more on each issue could **identify key obstacles that the local authorities are facing** across different countries which could make it easier to alleviate them. For example, in the UK, an initiative from Essex City Council, the Blueprint, could help other municipalities which do not have all the necessary resources to implement necessary steps towards circular economy without the need for strategy making. Another UK example of building on strengths of the decentralised system is the creation of Local Authorities Association, which comprises 329 (of the 333) councils and their aim is to strengthen the local governments' position on national level. Turning to France, the policymakers could inspire in their incentive scheme in support of the inter-municipal cooperation (see Chapter 5).

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Chapter 3

The third chapter provides an in-depth overview of the circular economy policies implemented in the cities across Europe. Each case includes background information on the context of developing the policy, the participating actors (both governmental and non-governmental), and the resources needed for the implementation. Furthermore, the results, the impacts of the policies, and the recommendations based on given policies are included. This enables Brno municipality to get inspired and evaluate whether these successful solutions could be feasible and beneficial to Brno and its surrounding areas.

International Case Study Review

The GreenStock Platform (Asker, Norway)

Actors: Loopfront AS, Asker Municipality, Municipality work centres employing people with disabilities (Solbrå), Circular Ways

Funding: Environmental Directorate's Climate Investment Fund (support scheme for municipal climate measures)

Norway is undergoing a municipal reform which resulted in Hurum, Asker and Røyken districts merging to create a new municipality built on the UN Sustainable Development Goals (Nye Asker 2020). These global goals were concretized into

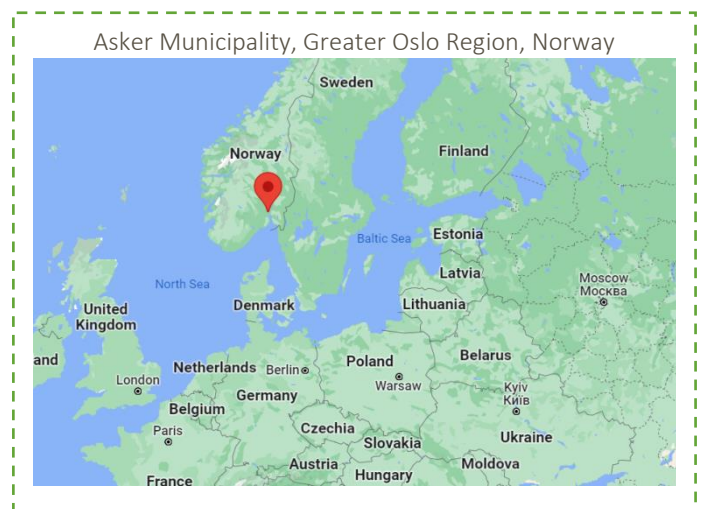
local initiatives and elaborated in the Municipal Master Plan, the municipal sub-plan for Climate, Energy and Environment 2018-2030 and the Master Plan for Recycling 2016-2025 (Skanche, 2022). In the plan, the municipality set a clear goal to reuse **80% of furniture and fixtures** (Skanche, 2022).

Asker municipality has responsibility in the areas that enable it to achieve the goals, specifically:

- Health services
- Education
- Housing policy
- Infrastructure
- Water management
- Waste collection and disposal
- Land management
- Measures reducing climate impact

(Nye Asker, 2020)

But it was the merger that created an immediate opportunity for a circular economy pilot project as 650 employees and around 25 buildings were affected by the relocation. The municipal project manager for reuse and increased material recycling explained that Asker aims to become a leader in the circular economy



which motivated the municipality to create a circular solution for the problem of staff relocation (Skanche, 2022).

“...a pilot project was initiated for the reuse of office furniture related to the relocation of departments and employees in connection with the merger with the former Røyken and Hurum municipalities. It was a natural opportunity to think new.”

(Anja Østerli from Asker commune (Skanche, 2022))

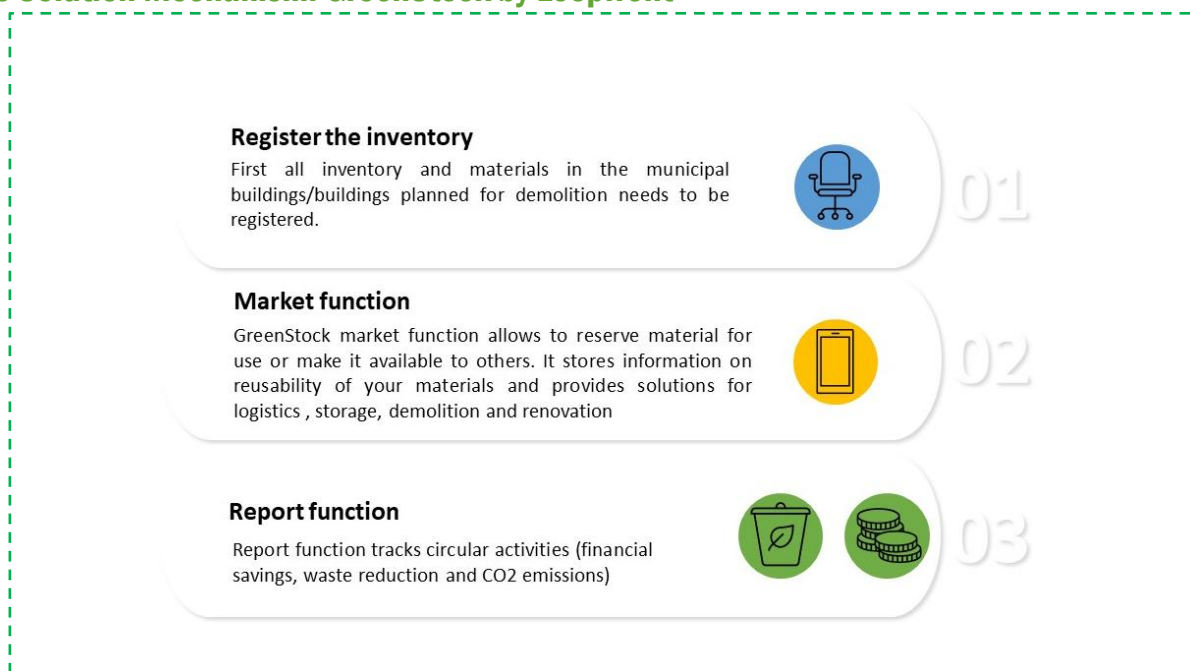
The municipality thus introduced the Project Recycle to avoid discarding the materials and the inventory of the building that could be recycled, repaired, or redesigned. For this purpose, they collaborated with the company Loopfront that designed a GreenStock digital circular platform. GreenStock allowed to map and digitally register all inventory, both the materials and furniture, in the municipality buildings. The digital platform in the form of application is accessible from desktop as well as phone devices. The app is also designated to calculate financial and building waste savings as well as GHG emissions (Hjorth-Johansen et al., 2021, p.46).

One of the aims of redesigning the inventory was to increase its value, but the municipality was faced with the lack of companies focused on redesigning. This challenge was tackled by partnering with both internal and external actors and sources, such as municipality work centres (Skanche 2022).

The design process involved cooperation of multiple actors (Nye Asker, 2020; Skanche, 2022):

1. The **municipality** responsible for registering the inventory
2. **Loopfront** responsible for developing a user-friendly solution.
3. Summer students from **REdu** collaboration digitalized the information about the inventory.
4. In the following phase, **local work centres** redesigned/repared the materials no longer usable for original purpose by sewing, painting etc. in cooperation with **Circular Ways**, an external partner tasked to produce redesign furniture solutions.

The Solution Mechanism: GreenStock by Loopfront



Results

Examples of reuse and redesign

Some of the concrete examples produced by the project are new prototypes of lamps, benches, coffee tables, and chairs made from old furniture, as well as upholstering acoustic panels, cleaning, and upholstering used chairs. Circular Ways produced a reception desk, wardrobes, and furniture designed for common areas of the municipality from the abundant surplus material (Skanche, 2022).

Financial savings

Activities resulted in 16 000 000 NOK saved by the municipality due to not buying new materials (Hjorth-Johansen et al., 2021, p.46).

Environmental impact

As of 2022, 50% of furniture, material, and fixtures were reused, with the final aim being 80%. Waste was reduced by 60 tonnes by extending the lifespan of material and objects, and CO2 emissions were reduced by 107 tonnes which equals the emissions from the energy supply for the whole Asker Municipality in 2017 (Skanche, 2022).

Social impact and cultural impact

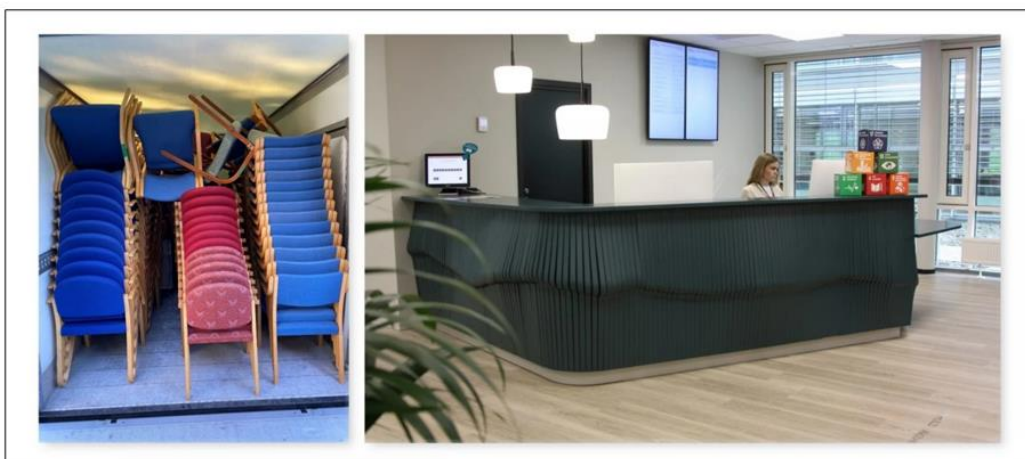
Municipality created jobs for disadvantaged people and people with disabilities by tasking work centers with redesigning and repairing materials. This way, it also provided training for people in the circular economy – redesign, repair as well as cleaning.

The project also resulted in a cultural change. Even though the pilot was designed to map the inventory of the departments that had to be relocated, the solution was later integrated into the municipal practices. This was achieved by active internal communications and teaching the employees about the cultural change, i.e., reusing materials and furniture rather than buying new ones. Consequently, the platform served as a learning experience for the municipality and the people and can be used in the future to serve purposes beyond the relocation (Skanche, 2022).

Global impact on the building industry

The building industry is responsible for more than 35% of waste and CO2 emissions globally (Loopfront 2022). EU regulations require 70% of the non-hazardous construction and demolition waste to be recycled, reused, or backfilled (European Commission, 2016, 38). A digital platform such as GreenStock provides an efficient, digital solution to put this EU circular economy package into action and can be easily used in different countries. There are still barriers related to legislation, safety, and quality of the reused building and the construction material. However, GreenStock removes some barriers to reuse and redesign and consequently empowers building owners, such as municipalities and construction industry, to shift away from the linear economy. As a collaborative platform, it also facilitates cooperation between many stakeholders with varying roles within property and construction.

In the future, solutions such as GreenStock can serve more purposes than the municipality's management of furniture and material. It impacts the whole real estate and building industry to make it more digital and circular.



Skanche (2022).

Municipality savings

Financial ↓	Emissions ↓	Waste ↓
1 500 000 EUR	107 tonnes of CO ₂	60 tonnes

Based on data from Skanche (2022).

Key takeaways

- Reuse and recycling are common for many products (from plastic bottles to clothes), but we rarely opt for reusing materials from buildings, in some cases, it is even illegal in Czech Republic. Often, no matter the condition or quality, the material ends up in a landfill or is burnt.
- Circular exchange system would enable the municipality to pay less for the waste management and treatment.
- By using the digital circular platform, municipality could opt for procuring used materials/furniture to refurbish school or other public municipal buildings.

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The Impact Factory - de Potterij (Mechelen, Belgium)

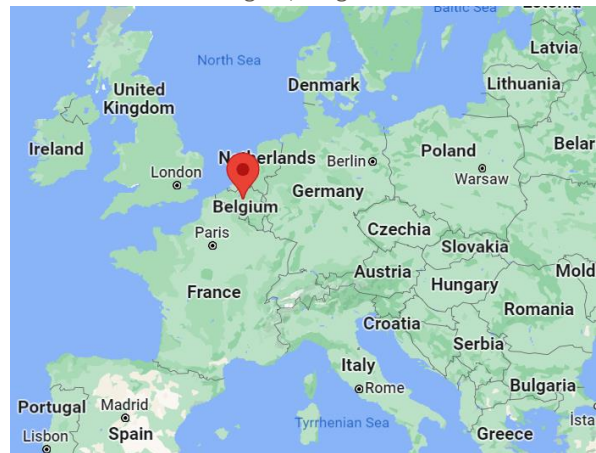
Actors involved: Mechelen Municipality (social, economic, and environmental departments), Regional Waste Agency IVAREM, Circular Flanders, Thomas Moore University of Applied Sciences, companies and citizens, Stadsmakersfonds

Funding: Stadsmakersfonds, citizens contributions, Municipality

The City of Mechelen has clearly defined circular goals and a strong potential for economic innovations and circular solutions. Firstly, for its 2019-2025 Policy plan, the municipality chose to focus on three priorities, one of them being

stimulating circular and innovative entrepreneurship. The city also aims to reduce its material footprint by 30% by 2030 to reach climate goals and keep its economy competitive. Mechelen, the third-largest city in Flanders regarding jobs in the circular economy, has strong biotech companies and engineering companies focused on repairing. In 2017, the city signed Green Deal Procurement and initiated circular economy projects. It participates in the Circular Flanders partnership of public authorities, companies, universities, and civil society to accelerate the transition. The city is also part of the **URBACT** Resourceful Cities Action Planning Network, focused on promoting urban resource centers for waste prevention, reuse, and recycling. As a part of the initiative, Mechelen elaborated an Integrated Action Plan which includes the development of de Potterij and other urban resource centers (Crowley, 2020, p.3, pp. 57-60). Ultimately, the aim of the city is to facilitate a transition to an economy based on the reuse of materials. To achieve it, the city is developing a circular economy laboratory - the Impact Factory or de Potterij.

Mechelen Municipality, Antwerp Province, Flemish Region, Belgium



Solution – de Potterij/Impact Factory

The process started in 2010 when the Flemish Public Waste Agency worked to eliminate the soil and water pollution resulting from laundry activities (European Union, 2019). City chose to transform the former abandoned laundry site, open square and the empty office building into a circular hub of 4500 m2 where you can find circular restaurants, workshops or start-ups.

The circular economy lab/centre will give the small businesses, entrepreneurs, and organizations the opportunity to work, produce and convene. The space is specifically designed to accommodate actors related to circular economy, sustainability, and innovation (HLN, 2021). To transfer these circular economy ambitions into practice more effectively, the Impact Factory will host researchers, government representatives and experts. Furthermore, a store where people discover circular products should be part of the hub.

In the process of developing the lab, the municipality collaborated with academia, businesses, and citizens - it set up a **citizen participative mechanism “Stroom”** to collect ideas and understand the needs of the citizens (European Union, 2019). However, the main partner and investor in the public-private partnership behind the project is Stadsmakersfonds, a cooperative development fund that invests in real estate development projects with maximum positive social impact (HLN, 2021). This partner chosen by the city has expertise with similar projects and offers space for CiLAB (circular fashion workshop) or Coflab (growing mushrooms from coffee grounds) (HLN, 2021).

At the moment, the Impact Factory is functioning, regrouping organizations and other actors with a focus on maximizing the reuse of products and materials and minimizing the loss of their value. In the future, the lab should extend beyond that, and into the areas of education, planning and culture. However, the renovation to create the circular hub will start in summer of 2023 and should last approx. 1 year while the Impact Factory will continue its operation (European Union, 2019).

Results

1. Environmental impact. The realization of the project involves cleaning a highly polluted site. De Potterij is a former laundry which required a complex process to remove the pollution (European Union, 2019).

2. The Circular hub meets multiple needs of the community

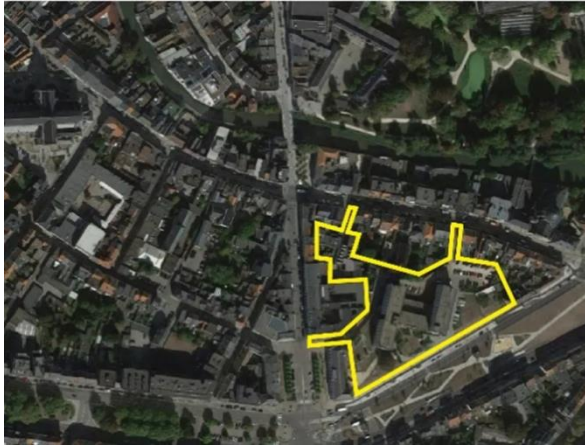
- Generates local jobs (150-200 workplaces expected)
- Urban development and urban agriculture
- Lessens pollution
- Stimulates symbiosis between the local actors – municipality, businesses and university were involved in the implementation of the circular economy hub
- A “tools library” is already placed and running in de Potterij

(Vansina, 2021; Vlaanderen Circulair, 2022)

3. Legislative change. The municipality adapted its legislation to promote the concept of a circular business hub (Vlaanderen Circulair, 2022).

4. Learning experience. The impact of the de Potterij on the municipal budget, waste production, or GHG emissions cannot be easily measured in indicators such as CO2 emissions or financial savings, but the project clearly enables citizens, public and private institutions to learn about the circular economy. In other words, it is not (yet) quantifiable, but it helps to create the much-needed **grassroots movement**. The circular economy is a production and consumption model that involves learning because it is highly dependent on consumers' and producers' individual choices. Without the knowledge of the existence of the phenomenon and the value it brings to society, it would be difficult to switch to a different economic model in a democratic environment.

De Potterij before the reconstruction and after (visualizations) (BUUR, 2022)



Key takeaways

Treating existing buildings and materials as a resource pays off.

The urban renewal on already “developed” land and in existing buildings that are underused effectively uses the already available municipal resources and space.

Increased potential for a circular future

Different governmental levels (regional and local), citizens, and other public and private actors were involved in the project. Setting up a network of various actors and providing them a place to work and meet creates a breeding ground for collaboration in the area of the circular economy. If the framework and network for circular solutions already exist, it may be more likely that actors will use it in the future and opt for non-linear solutions, for example extending the product’s life or looking for ways to regenerate and recover waste.

One-stop shopping experience

This initiative serves a similar function to the Brno Circular map in terms of providing access to shops, services, and organizations based on circular economy principles. But compared to Brno, this project regroups them in one site resulting in a “one-stop shopping/consuming” experience, which is a novel economic model. Consequently, people can eat, learn, shop, or have their old clothes and furniture repaired in one place, similar to the shopping mall experience.

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Public Procurement (Nantes Métropole, France)

Cities are shifting to a circular economy by using the public procurement tool in different ways. Since municipalities spend large amounts of money on public goods and services, they may choose to make them sustainable. A good example would be the case study on **Norway** above, which included the procurement of refurbished equipment and furniture. However, to achieve a more structural long-lasting change in the way cities decide to procure services and goods is through **adjusting the public procurement guidelines**. European institutions recognized green public procurement (GPP) as a tool for the transition to the circular economy. European Commission introduced GPP criteria and a *Public Procurement for a Circular Economy Brochure* to guide the authorities through integrating circular economy principles into procurement policies (European Commission, 2022). Circular public procurement equally plays a role in achieving the **SDGs**, specifically Goal 12, which includes the aim to promote sustainable public procurement practices (UNEP, 2022).

“ The purchase of works, goods, or services that seek to contribute to the closed energy and material loops within supply chains whilst minimising, and in the best case avoiding, negative environmental impacts and waste creation across the whole life cycle”

(Circular procurement approach definition by the EC (European Commission, 2022)

In addition to the EU GPP criteria and SDGs, many cities developed their circular economy guidelines and strategic documents to impact their public procurement practices.

Nantes Métropole, France

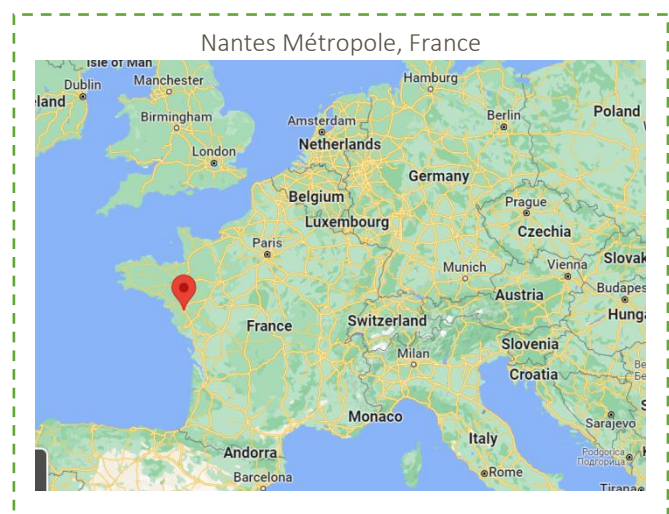
Population: 656, 275

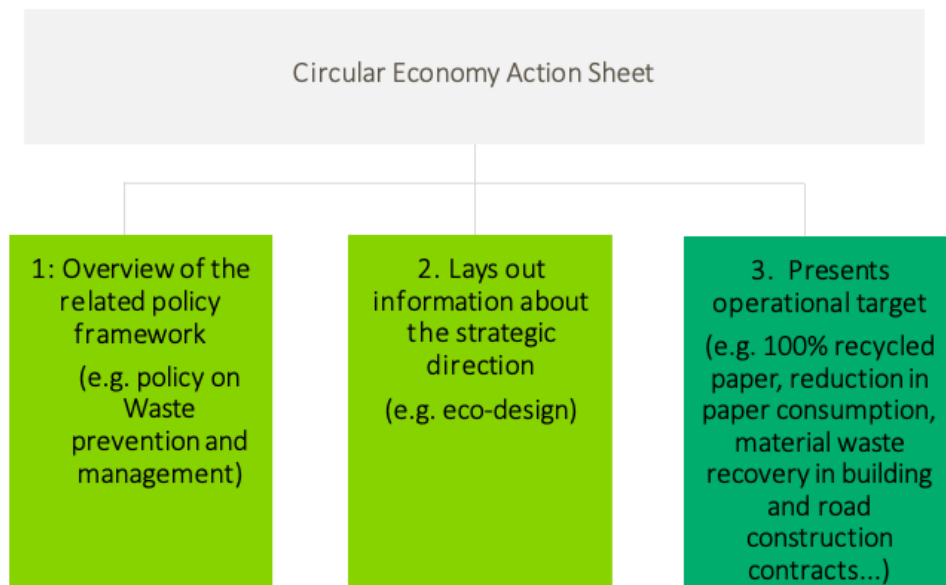
Funding: Not applicable

Actors: Metropolitan Council of Nantes, metropolitan directorates, Corporate Social Responsibility ambassadors,

Over the last few decades, the 24 cities that are part of the Métropole **transferred their competencies to the Metropolitan council**. This resulted in the metropolitan governance in the field of transport, energy, water and waste management, and economic development. To enhance efficiency, they also merged the public procurement which increased their budget significantly (GPP in Practice, 2017, p.1).

The **Metropolitan Council of Nantes** integrated circular economy into its existing procurement policy – the **Responsible Purchasing Promotion Scheme (RPPS)** adopted in 2017. They introduced 11 Action sheets, one specifically dedicated to the circular economy. The circular economy sheet states which areas should be targeted, provides direction, and targets in regard to incorporation of the CE into public procurement. It also defines the 2020 targets on performance, see the Circular Economy Action Sheet visualization (ICLEI, 2017, p. 7).





Authors' visualizations based on GPP in Practice (2017, p. 2-3).

To insure the RPSS scheme had an impact, the scheme included creation of multiple new posts (on dedicated to sustainable public procurement, one to environmental clauses and five to social clauses). The members of Metropolitan Council of Nantes Métropole decide which clauses to apply to new investments and evaluate the RPSS's impact while the public procurement team works with a network of Corporate Social Responsibility (CSR) ambassadors to support every metropolitan directorate in integrating the clauses into the purchases they make (GPP in Practice, 2017, p. 2-3).

Results

Nantes Métropole procures eco-friendly supplies and high energy performance products.

This includes cleaning products, food, vehicles, or PCs. Furthermore, the authorities cannot buy non-recycled paper and government employees' shirts and sweatshirts are purchased organic and fair trade.

Nantes Métropole introduced contract clauses targeting lower CO2 emissions from waste collection, street lighting or roadworks.

CSR clauses were also integrated into cleaning services and printing contracts. Contracts were given to organisations that adapted to the CE principles (GPP in Practice, 2017, p.3)

Key takeaways

Setting up a new GPP or incorporating the circular economy principles into the existing public procurement policy can be the first step to ensuring that the transition to a circular economy is a priority.

Nantes Métropole judged that it is essential to include the feasibility and measurability criteria into the new public procurement framework.

The ambition set by the authority must be reflected in the allocation of resources. The ambition should be reevaluated if necessary to reflect the resources that are available to the municipality. To enable this, the progress of the circular economy public procurement must be tracked (*GPP in Practice*, 2017, p. 3).

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Changing Local Food System (Milan, Italy)

Population: 1 350 680

Actos: The Municipality of Milan; Fondazione Cariplo; Milano Ristorazione, food industry actors, AMSA the regional operator of waste

Funding: The Municipality and other means

Why food?

About 1/3 of food produced is wasted (Food and Agriculture Organization of United Nations, 2014). A recent report by Ellen Macarthur Foundation (2019) estimated that every second six garbage trucks of edible food are wasted globally. The report also concludes that the modern system is degrading for the nature and unhealthy for the people. Food production is labour- and capital-intensive industry which negatively affects the soil and water. Every stage of the process is responsible for the creation of emissions. Especially, the last stage when the food is not consumed and rather thrown away which alone contributes to 8 % of global emissions (Drawdown, 2021).



“For every dollar spent on food, society pays the equivalent of two dollars in health, environmental, and economic costs” (Ellen Macarthur Foundation, 2019)

The average consumption of food per person tends to be higher in cities due to higher incomes and other factors and it is estimated that 80 % of all food will be destined for cities (ibid). Within the context of global urbanization trend this issue becomes critical to the policy makers as they have power to implement strategies mitigating the consequences and changing the system.

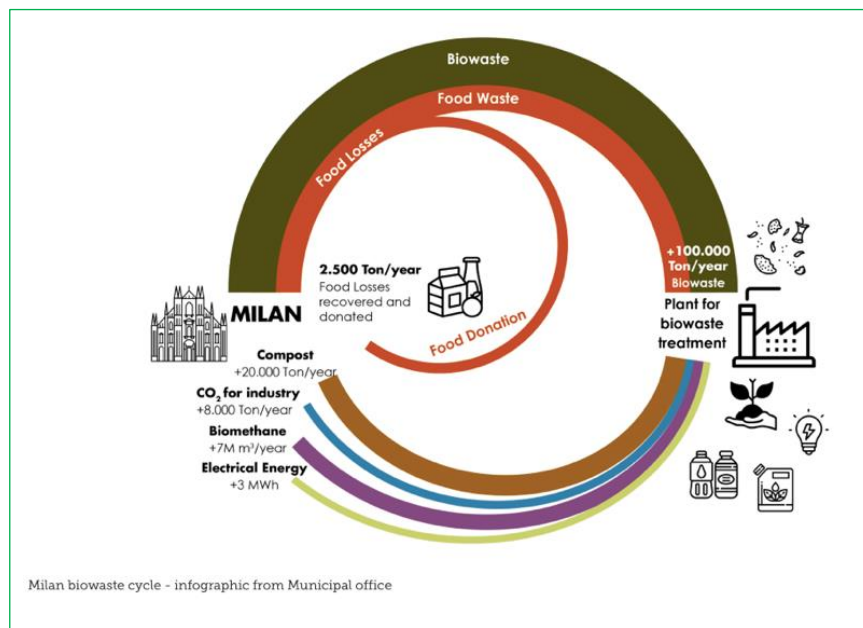
The origins of Milan Food Policy (MFP)

Milan is the capital city of Lombardia region, being a centre of the most urbanized area of the country and with strong food culture (Ellen Macarthur Foundation, 2022). In 2014 Milan hosted Universal Exposition, campaign which has been led for 6 months raising awareness about sustainable nutrition (The Guardian, 2016). After the Municipality of Milano and charity organisation Fondazione Cariplo signed an agreement to promote and implement comprehensive local food strategy, known as **Milan Food Policy 2015–2020** (Ellen Macarthur Foundation, 2022). Collecting data about city food system have been collected and analysed by food experts and other stakeholders, from which the document providing goals and guidelines emerged. For example, the data showed that 54 kg of organic waste is produced per capita in Milan which in total makes 5,5 million tonnes per year. The Municipality established a **Food Policy Office** which is responsible to coordinate efforts and monitor the process. In the Policy Guideline several steps on how to achieve each goal were set. The main goal is to achieve **50 % reduction in food waste by 2030** and the five focus areas can be identified as:

- 1** Inform and educate citizens and local stakeholders on reducing food losses and waste
- 2** Recover and redistribute food waste
- 3** Create local partnerships such as among charities food banks, supermarkets and municipal agencies
- 4** Improve and reduce food packaging
- 5** Strive for a circular economy in food system management

(Milan City Resilience Department & Food Policy Office, 2021)

The Initiatives under the MFP



(Ellen Macarthur Foundation, 2022)

1. Local food waste hubs

Under this initiative the edible food that would be thrown away is collected and then redistributed to charities that organizes distribution to the beneficiaries. The food waste hubs are located in local municipality–owned warehouses and the food is collected from supermarkets, street markets and company canteens. The action was supported by the Fondazione Cariplo with implementation of **the project Qubi**. According to their official site:

“We have opened 2 hubs for the collection and distribution of donated food in collaboration with the Lombardy Foodbank and the Milan municipal administration Food Policy program. The two hubs supply 6 solidarity emporiums and 3 solidarity shops of Milan Caritas and provide food to hundreds of disadvantaged families”

2. Awareness raising in schools

Milano Ristorazione is the municipal food agency that manages all school catering in Milan. Campaign with the aim to educate children about the consequences connected to wasting food was run in 85 schools. Before this campaign children tended to waste fruits that is served at the end of their lunch. They were encouraged to take the fruit as mid-morning snack. For these purposes, they were provided with reusable doggy bags. The campaign was successful since **17 % of food waste was reduced**. (Ellen Macarthur Foundation, 2022).

3. Fiscal Measures

To further encourage markets, school canteens, restaurants, and many others, in 2018 the Municipality of Milan introduced a **20 % reduction on municipal tax** for any organisation that donates to food charities or food banks. (Ellen Macarthur Foundation, 2022).

4. Creating a biogas station and food waste recycling

The most remarkable initiative was created in cooperation with the regional operator of waste AMSA. In the introduction phase, AMSA distributed equipment necessary for food waste collection, such as bins and

biodegradable see-through bags. The households were informed via leaflets, newspapers, billboards or TV advertisement; mobile app and website have also been created in order to further distribute information and thus achieve greater effect. Nowadays, AMSA collects this waste all over the city using trucks powered by biodiesel transporting it to the **anaerobic digestion and composting plant** of Montelo. Even though reprocessing can be quite expensive, the revenues from production biogas are reducing these costs. The production of high-quality compost is used for soil remediation in agriculture and the biogas serving several purposes reduces the use of fossil fuels, since it represents a clean alternative to them. (Pocacito, 2022)

“The main purpose of the separate collection of organic waste is to redirect this material from incineration and send it to an anaerobic digestion plant with energy recovery (biogas) and production of good quality soil additives.”

The results of this initiative are remarkable: The overall recycling rate have risen from 35 % in 2011 to 50 % in 2014. The amount of recycled organic waste is 90 kg per capita/year. This have resulted in reduction of 8 760 tonnes of CO₂ per year in 2014. It contributed to the creation of new jobs. (Pocacito, 2022)

Results

“The success of the Milan Food Policy is partly due to its multilevel governance approach, bringing together the municipal, metropolitan, and regional authorities”

(Ellen Macarthur Foundation, 2022).

Decreasing the amount of food that is wasted reduces the GHG emissions as well as the costs of the Municipality for disposal treatment. The city of Milan is surrounded by agriculture lands, thus creating compost material helped to regenerate the land which leads to higher productivity of these farmlands. Creating awareness of the issue and the communication to the citizens may empower them to be part of the change which can further lead to greater results and to adoption of healthier diets and new habits. Also, on the basis of the Milan Food Policy an international organization known as **Milan Urban Food Policy Pact** emerged with the aim to create a framework for the development of urban food policies. To this date 225 cities around the world take part in this project. (Ellen Macarthur Foundation, 2022)

120 tons of food per year recovered 2019-2020 with a value of 500 000 EUR	240 tons of CO ₂ avoided for production and disposal
96 million litres of water and 81 hectares of land to cultivate the recovered food saved	In 2018 alone, 130 000 tons of organic waste was processed and avoided 8 760 tons of CO ₂ equivalent
140 tons of food surplus rescued for donations every year	19 000 children per year involved in the mid-morning fruit program

(Authors, based on Milan City Resilience Department & Food Policy Office, 2021 data)

Recommendations

Develop **multi-stakeholder partnership**. Include **local data**. Create **new governance**. Create **Awareness**. Achieve multiple benefits because tackling food waste is not enough → **multi-agenda** such as reducing GHG emissions, improving public health, increasing social equality. (Milan City Resilience Department & Food Policy Office, 2021)

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Business and circular city (Glasgow, UK)

Population: 635 640

Actors and their roles: Glasgow Chamber of Commerce (initiation); Zero Waste Scotland (funding); Glasgow City Council (data); Circle economy (report)

Funding: Zero Waste Scotland provided 73 million libras gained from the Scottish government and European Regional Development Fund. Later funding comes from the Resource Efficient Circular Economy Accelerator Programme Strategic Intervention.



The origins of Circular Glasgow and why business?

In September 2015, Glasgow Chamber of Commerce which purpose is to promote business, community growth and development through various programmes partnered with Zero Waste Scotland, non-profit environmental organisation funded by the Scottish government and EU Regional Development Fund. Together they commissioned Circle economy, another non-profit organisation, to carry out a city scan with the aim to identify potentials of the Glasgow city for implementing circular economy strategies. The report known was published in 2016 and on this basis a project called **Circular Glasgow** was launched in 2017. (Ellen Macarthur Foundation, 2019)

“This pioneering study of Glasgow’s economy, identified leading industries through which the city’s economy can become more ‘circular’ and defined implementation strategies and opportunities for the region’s business community”

(Circle Economy)

This so-called **Circle City Scan** shows the importance data collection and analysis because this process highlights the areas in which the city can benefit the most. As the Senior Director of Glasgow Chamber of Commerce highlighted: *“The Circle City Scan has brought into focus how we can support local businesses and become a champion for the circular economy in the city”* (Circle Economy, 2016, p. 4). Business is an important part of both state and global economy, and it is in hands of the government to model suitable conditions for them to thrive. Circular economy then offers opportunities for innovation, increasing competitive advantage, cutting production costs, avoid losing profitability due to fluctuations of price on global markets and decreasing import dependency and dependency on scarce natural resources. (Circle Economy, 2016)

Key focus areas of Circular Glasgow

Circle economy identified three main focus areas that are economically significant for the city. This has been done successfully through City Scans for which data collection is necessary. It revealed significances on which basis can be future policy built.

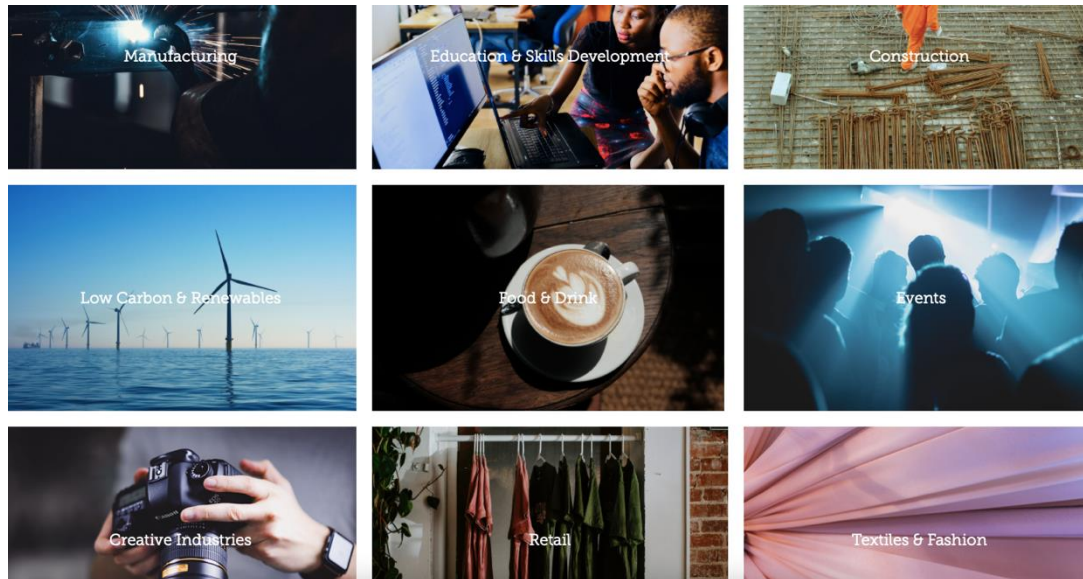
The healthcare sector which provides jobs for 67 700 people, consumes electricity equal to 40 000 households per year, generates waste equal to 800 trucks and emits GHG equal to 38 000 cars. **The education sector** which provides jobs for 30 000 people, consumes electricity equal to 20 000 households per year, generates waste equal to 1 200 trucks and emits GHG equal to 30 000 cars. **The manufacturing sector** which provides jobs for 18 000 people, consumes electricity equal to 112 000 households per year, generates waste equal to 3 400 trucks and emits GHG equal to 110 000 cars. And lastly, **the sub-sector food**

& beverage which provides jobs for 5 000 people, consumes electricity equal to 17 000 households per year, generates waste equal to 2 000 trucks and emits GHG equal to 17 000 cars. (Circle Economy, 2016)

The proposed potential steps for food& beverage industries are reflected for example in the **Bread-to-Beer strategy**. It aims on reusing the surplus and leftover bread to create beer by connecting two companies–Jaw Brew and Aulds the Bakery. (Circular Economy Route Map for Glasgow 2020-2030)

Later areas of focus were broadened to the construction industry, finance sector, tourism, and creative industries (Ellen Macarthur Foundation, 2019).

Initiatives to inspire



(Source: Circular Glasgow stories, 2022)

On the website of Circular Glasgow, one can find many business initiatives that have been implemented so far not only in the UK but around the world to inspire others. To this date, 650 businesses has engaged in Circular Glasgow. For the purpose of this project, several of them have been chosen.

1. Instock= restaurant menu using only surplus food

Instock is a restaurant, product and catering service based in Amsterdam and 80-100 % of the meal is made from waste food. This has successfully created a zero-waste restaurant. They use blemished fruits and vegetables, one-day old bread, meat, and fish. They have also started to make their own brand products such as bear made from rescued bread and raspberries. For transportation and collection of the ingredients they use electric buses.

2. Revive Eco= transforming coffee waste into high value products

Every year tremendous amounts of coffee waste are produced in the UK. However, within the coffee ground natural oils can be found which can be used for further utilization– for example in cosmetics, pharmaceuticals, or food & beverage. They collaborate with brands as well as with the University of Edinburgh. In 2020, Revive launched a small coffee ground processing plant that allows them to collect and convert 2.5 tonnes of coffee grounds per week. Zero Waste Scotland’s Circular Economy Investment Fund provided the company with funding worth 200 000 libras.

3. Too Good To Go= connecting customers to restaurants and businesses

It is a mobile app with the aim to connect several entities within the area to trade surpluses and unsold food that would be thrown away. The excess food is sold at discount price. It was created in 2015 in Denmark,

and it is estimated that Too Good To Go saved 98.6 million meals going to waste since 2016 with 20 527 businesses have joined this initiative so far.

4. Save Your Wardrobe= on a way to slow and sustainable fashion

The initiative of the University of Glasgow created an app Save Your Wardrobe in order to move from fast-fashion trend that contributes to the climate change due to producing tremendous amount of GHG emissions. It encourages consumers to think consciously and provides services such as donation and clothes repairing. By using this app, customers can see what they have in their wardrobe.

5. Glasgow Tool Library= from ownership to sharing

It is an online, community-run library where you can borrow tools for woodworking, metalworking or gardening. They aim at changing the relationship that people have with owning items. They have collected tools from the people who no longer use them and now offers them to others—for as long as they want. The benefits can be seen in community ties building, saving money and reducing waste.

6. DGLT= the world's first circular music festival

Before the event, they created an analysis of material flow with the input-output data which then helped the managers to build the circular model. The food is made up from rescued food and imperfect products and after the festival, all food is turned into compost later used by farmers. As their aim is to be energy- and emission neutral, they plan on using renewable energy for power generation and the City of Amsterdam is ready to help them to achieve that. They also use ecological composting toilets.

(All examples cited from Circular Glasgow Stories, 2022.)

Further Initiatives

Construction accounts for about 50 % of all waste in Scotland therefore it is a major source for waste. Glasgow became the first local authority in the UK to adopt minimum-required waste recycled for buildings in 2005. The **case study of Kenoteq**, Scottish start-up company, demonstrates a successful story towards circular economy in the construction industry. They have developed a K-Briq, which is a more sustainable building brick that is unfired (meaning that it does not require high temperature firing) and made of construction waste (at least 90 %). It looks and weights the same as a normal brick, however, offer better insulation properties. The production facility is located in Edinburgh which further decreases the emissions. Moreover, the production requires only 1 kWh of energy, compared to 11 kWh for other bricks. (Colophon, 2022, p. 13)

Textile industry is also among one of the top contributors to world's GHG emissions. In the UK the waste from processing and production is estimated to amount over 800 000 tonnes. The waste also comes from the customers themselves as they decide to no longer own the purchased goods, when 1/3 of waste from residuals (921 000 tonnes) comes from the textile industry. Glasgow's textile manufacturing then contributes 6 % to the textile sector in the UK. The case study of **Sheertax: durable and resistant tights** shows a good practice of circular economy in textile. Every year approximately 8 billion of tights, made of nylon and elastane, are produced and thrown away globally and to this date any technology allowing them to recycle has not been discovered. Sheertax tights are made of ballistic grade fibres (often found in bullet-proof vests) and they are designed to last 10 times longer. Moreover, if there is any damage to the tights, it can be easily repaired. The recycling programme is under development. (Colophon, 2022, p. 19)

It is estimated that 990 000 tonnes of food & beverage are wasted in Scotland annually. Household and food manufacturers are important actors that contribute to food waste significantly. Moreover, food service and hospitality companies alone discard 106 million of meals every year. Meanwhile 38 000 Glasgow children live in poverty. **The case study of Ship inn**, Glasgow's local pub, further demonstrates the significance of the

issue. The pub concluded that they were throwing away as much as 2.8 tonnes of food annually. This negatively affected their expenditure—since energy, staff, water and waste disposal is required for running the business. Only on the management of food waste 6 040 libras was spent. In order to reduce waste, the pub adopted some useful management techniques with the aim to analyse the nature and amount of waste. For this purposes Food Waste calculator was used. After implementing these measures, between one week and fourth week of the month total amount of waste was reduced by 72 % with estimated savings of 2 454 libras. (Colophon, 2022, p.10)



(Source: Colophon, page 13, 19, 10)

The potential of bright future

The efforts of Glasgow were further implemented on **regional sphere** in order to facilitate development in other cities at the region as well with city of Glasgow as the leader. Scotland's Circular Economy Strategy from 2016 know as *Make it last* focus on food & beverage, bioeconomy, energy infrastructure and manufacturing. Zero Waste created an initiative Circular Cities and Regions to provide financial support in the whole region and in the future, they plan on building a toolkit for the cities to implement circular economy steps more easily. (Ellen Macarthur Foundation, 2019)

In 2018 built on the **Circular Glasgow route map for 2020-2030**, the city created a roadmap for further development especially in the following area:



(Ellen Macarthur Foundation, 2019)

Because there is a lack of methodological consensus on how to measure achievement of the Circular Glasgow initiative, no raw data have been provided so far. Nevertheless, the example of Glasgow was supposed to **highlight the importance of cooperation** between the policy actors and businesses and how **funding can facilitate the transition** towards circular economy. City is no capable of controlling every aspect of the successful transition towards circular economy, moreover it would be a tremendous liability in the matter of time, money, and other resources. Therefore, providing a convenient legal framework and finance under which the businesses could thrive, can be enough to spark a change with significant results.

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Smart City (Málaga, Spain)

Population: 577 405

Actors: differs for every project, more to be found in the text below

Funding: differs for every project, more to be found in the text below

The origins: ZEM2ALL

Zero Emissions Mobility to All or ZEM2ALL is a programme of cooperation between Japan and Spain that was initiated in 2011. It was supported by other actors such as centres for technological innovation NEDO and CDTI; energy company Endesa; telecommunications company Telefónica; business consulting company Ayesa; Mitsubishi Heavy Industries and the city of Málaga. The aim of this project was to test mass deployment of new e-mobility services such as 200 electric vehicles, 220 conventional-charging and 23 rapid-charging points, which were given to private and company entities. The users of electric vehicles are interconnected with an app, so they are provided with information for example about the nearest charging point. It has been active for four years (2012–2016). The data shows that 4.6 million kilometres have been travelled without emissions, with over 100 000 charges, which resulted in saving of 330 tonnes of CO₂ (the annual consumption of 50 households). 94 % participants have been satisfied with the project and 85 % decided to keep the electric vehicle. The City of Málaga was chosen because of their programme called **Smart City Málaga**. (Endesa, 2016.; Proelectrotechniky.cz, 2014)

Smart City Málaga

It is a project funded by the Centre for Technological and Industrial Development with the aim to promote energy efficiency, use of renewable energy and advanced electrical networks with storage capacity. It was



led once again by the energy **company Endesa** together with 9 companies, research centres with budget of 31 million euros. It started in 2009 and was completed in 2013. By bringing generation closer to consumption through installation of PV panels in public buildings, usage of microgeneration in hotels and development of mini– and micro–wind systems in the area. This initially impacted 11 000 residents, 900 services and 300 industrial users. (Málaga Smart, 2022; Smart city v praxi, 2015)

Further results can be summarized as following:

Saving of more than 25% in the electricity consumption of the area of implementation thanks to the use of energy monitoring systems monitoring and the active management of the demand for industrial and residential users.

In the case of residential collaborators, a 42% decreased energy consumption by more than 10% of the users thanks to the use of domestic energy efficiency kits that allowed them to manage their spending from anywhere in the world through a smartphone.

In addition, 4,500 tons of CO2 emissions per year have been avoided.

(Málaga Smart, 2022)

Advantages of the smart grid

Smart grids show information on supply and demand, and they are highly beneficial for the implementation of renewables to the grid since the stability of the infrastructure may be a key issue. It contributes to the system of decentralized grid, in which customers acts as both consumers and produces of electricity what can later on positively affect the amounts of electricity produced and the decline in the final price. Together with management techniques such as smart metering measures, the smart decentralized grid can positively contribute to transition towards more sustainable energy systems, especially for the cities. (European Commission, 2022)

Second Life Battery Energy Storage system

This initiative come from once again from the Endesa energy company with collaboration with Nissan automobile company. It is based on the reuse of batteries from electric vehicles. As a storage system installed in Melilla thermal power plant, located in the city of Melilla in the province of Málaga. This project gained international recognition as it is the winner of BASF awards for the best circular economy practice in Spain. The company Endesa has other similar initiatives such as Carboneras thermal plant, which is based on 20 MW lithium–ion batteries with a production capacity of 11,7 MWh. (Endesa, 2020)

The main according to Endesa (2020) advantages are:

It is a cheaper alternative to stationary power storage batteries and, above all, a **more sustainable application**, since it, re-employs batteries already used previously in electric vehicles, thus giving a second life to batteries and solving their recycling.

It will contribute significantly to solving generation loss imbalances in the electricity system and to **improving the quality of supply**.

It will **extend the life of spent batteries** that have been used in electric vehicles with an average life of about six years, depending on their use.

eCity Málaga

Further initiative broadening the previous ones called eCity Málaga has emerged recently. It is a public–private collaborative economy initiative that will be developed in the Málaga TechPark with the aim to create an urban benchmark for sustainability and circularity with regards to energy, transport and building resources. The actors involved are Málaga City Council, Málaga TechPark, Endesa and other entities. Endesa provided funding with budget worth at least 30 million euros. (Endesa, 2021; Málaga Techpark, 2021)

“Málaga TechPark will become the first sustainable urban space to implement a Circular City of the future model in a real environment that will be sustainable, eco-efficient, 100% renewable and digital in 2027.”

(Málaga Techpark, 2021.)

Energy: It will be the first urban prototype that applies **circular energy** in which generation and consumption will become benchmarks in efficiency thanks to the use of locally distributed resources, the development of renewable energy, greater electrification and flexible platforms that promote local energy communities.

City: Street furniture plays an important role. The daily elements will give information on their behaviour and will be tools to improve the efficiency of the city. Mobility will be sustainable. The current fleet of vehicles is planned to be renewed with zero-emission vehicles and a plan for car parks and charging infrastructures.

Ecosystem: The treatment of **raw water for irrigation** will be modernized. Waste will be monitored with the aim of reducing it by 50%.

Digital: Intelligent management of a city, applying an **Open Data philosophy**. Firstly, digital platforms will integrate services such as public lighting, with later on applied on operational processes, logistics, air quality and connected vehicles for traffic management. The use of Transactive Energy systems will incorporate the advantages of blockchain technology and smart contracts on the integration of the park's distributed energy resources.

(Málaga Techpark, 2021.)

Key Takeaways

The example of Malacca demonstrates a **snowballing effect** in which one positive change could immediately lead to others. Thanks to city's early implementation of smart grid measures due to the project of Smart City Málaga, other initiatives such as ZEM2ALL followed. Furthermore, due to ZEM2ALL initiative, massive amounts of electric vehicles were deployed and later on, when it was the end of their service, recycling initiative in which batteries are used for other purposes emerged. This case study also showed **the importance of a regional energy provider**, such as Endesa (part of Enel's structure), with whom the city can actively collaborate on diverse range of issues. The company providing the initial funding can then in turn make their business more circular and profitable and circular.

“Smart City Málaga Living Lab is the key to Enel's Open Innovation process, because it quickly, systematically and securely provides the necessary conditions to create, validate, test and show the results of innovation in a real environment.”

Jorge Sánchez Cifuentes, Head of New Technology (Endesa, 2018)

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Identifying and exporting the circular economy (Occitanie, France)

Population: 5 924 858 (Taullele, 2017)

Actors: Occitanie Region, Circular Economy National Institute, CIRIDD

Financing: Occitanie Region, ADEME

The Occitanie Region is focusing on the fight against waste and the promotion of the circular economy on its territory. To support its desire, it is developing a Regional Waste Prevention and Management Plan (PRPGD) which also includes the **Action Plan for the Circular Economy (PRAEC)** in accordance with the missions defined by the NOTRe law of 2015 (Région Occitanie / Méditerranée, 2021). This awareness document aims to limit the waste of natural and energy resources by mobilizing the regional community and the actors of the territory.

Region Occitanie, France; Capital cities Toulouse, Montpellier



The Occitanie Region supports exemplary projects by mobilizing all policies to:

- Encourage a return to the soil of organic matter in order to meet the needs of the agricultural world;
- Promote efficient use of the territory's resources;
- Implement an ambitious program of actions in favor of the circular economy for better competitiveness and attractiveness of the territory;
- Develop the economy in favor of organizational innovation (social and solidarity economy) or technological (new sectors);
- Promote local employment (new services, functional economy, local loops); pool structuring equipment (sorting/treatment) of public and private operators for balanced management at the scale of the territory.

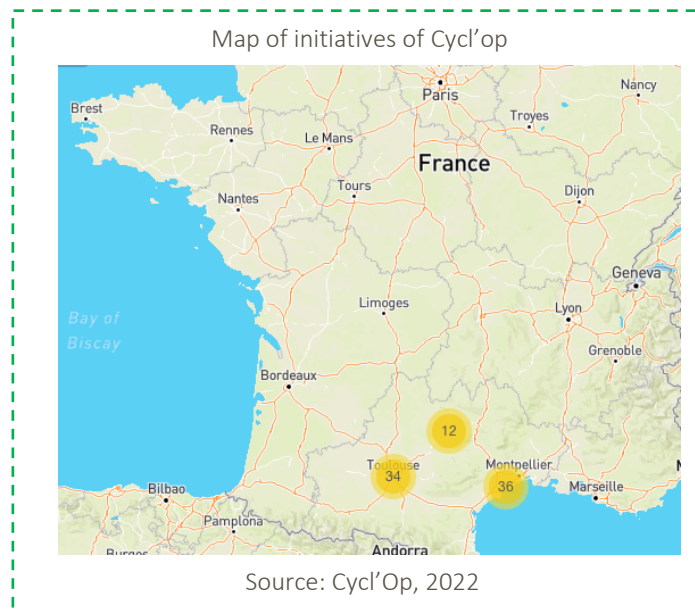
The Cycl'op platform, a project supported by the region as part of the PRAEC

Cycl'op is a tool for circular economy players in Occitanie who want to keep an eye on the news and bring a common culture to life (Cycl'op, 2022). They can enrich themselves (by accessing resources) and enrich it (by contributing to them). The Cycl'Op platform is part of a network of platforms dedicated to the circular economy in France and internationally, which allows the dynamics and initiatives in Occitanie to shine beyond the regional dimension.

It makes it possible to follow news and events of the circular economy and identify opportunities, promote the actors on a local & international scale, identify the actors via the directory of the circular economy in Occitanie, integrate the network of actors to forge partnerships and participate in project communities or thematic working groups, access a documentary fund and tools and methodologies, share actions and experiences in order to disseminate good practices and promote exchanges between actors, find calls for existing regional projects and grants to help develop initiatives.

On the platform, there is an "initiatives" tab, in which is presented a map where all the existing initiatives in Occitanie are geolocated and which can be filtered by "favourite", "the most read" or even "the more

recent". These initiatives are also listed below, each specifying their date of issue and their author, their objective, the geographical area concerned and the level of progress.



Example of an initiative registered on the platform: Les Cycles-Re

Cycles-Re give a second life these bicycle intended for the scrap and thus prolong the life of the object. These bicycles are collected by voluntary contribution to the premises of the association, picked up from individuals, from trustees of co-ownerships, recycling centres with surpluses or various public services (lost objects, police stations, etc.) (Lallemand, 2022).



Bicycle recycling and repair process. Source: Cycles - re : Le vélo éthique et unique made in Toulouse. re.fr. (n.d.). Retrieved July 15, 2022, from <https://www.lescycles-re.fr/>

Les Cycles-Re is a non-profit association created in 2015. It offers an integration and qualification path for people who are out of work by recovering and then re-manufacturing broken and/or abandoned bicycles in the Toulouse conurbation.

(Les Cycles Re, 2022) – bicycle recycling and repair process

By buying locally in a reuse structure, the consumer engages in an alternative way of consuming and participates in a project that aims to save resources and avoid imports from foreign countries. From recovery to design, the entire manufacturing process is carried out in Toulouse. This short-circuits production makes it possible to limit travel and reduces the environmental impact linked to any manufacturing process. The association is recognized as a local actor capable of raising citizens' awareness of the challenges and solutions of soft mobility (Les Cycles Re, 2022).

Concerned about developing the circular economy and supporting innovative operations, the Occitanie Regional Department of ADEME supported the creation of the Cycles-Re repair and re-manufacturing workshop. The agency awarded a grant to the association after examining its application file submitted as part of the call for expressions of interest for a circular economy.



Photos of refurbished bicycle in Toulouse, Occitanie (Les Cycles Re, 2022)

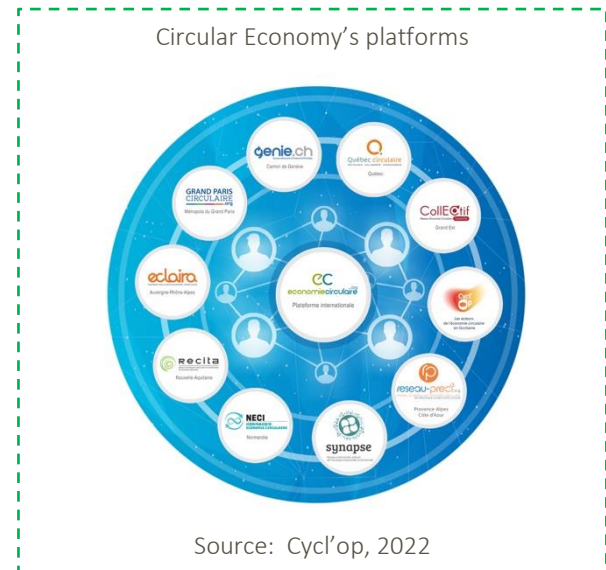
On each of the initiatives presented by the Cycl'op platform there is a graph representing the different **pillars of the circular economy** and whether or not they are at the heart of the strategy of the initiatives in question.



- **Green:** responsible consumption
- **Orange:** industrial and territorial economy
- **Pink:** recycling
- **Yellow:** eco conception
- **Brown:** sustainable supply
- **Grey 1:** extension of the duration of use
- **Grey 2:** economy of functionality

In addition, the Cycl'op platform offers a "news" tab, listing all the news around the circular economy in the Occitania region and related events. the community tab allows you to find out about the directory of existing members, organizations and working groups related to the circular economy.

The *EconomieCirculaire.org* platform is a gateway to many local versions of circular economy collaborative platforms, including Cycl'op, which brings together more than 18,000 members and promotes nearly 1,200 feedbacks (Cycl'op, 2022). Its knowledge ecosystem acts as a real social network at the service of projects and multi-actor cooperation in the territories.



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Thinking about the energy transition from the angle of circular economy (Grenoble, France)

Population: 159 089

Actors: Aquapôle, GEG EnR (electricity and gas supplier), Suez Group, Degrémont Services, Aquabiogaz, Grenoble-Alpes Métropole, Rhône-Alpes Region, Water Agency

Financing: the same as the actors

It is among the 18 European cities that Grenoble was chosen to embody the European urban project in 2022. The metropolis won the **European Green Capital prize** thanks to the transversal and pioneering nature of its actions in favour of ecological transition. The quality of



mobility, energy performance and sustainable use of the territory draw an impressive balance sheet.

“If we want to be virtuous, environmentally and economically, we must also change production”

Yann Mongaburu, president of Joint Syndicate of Public Transport

The city has undertaken several steps so far to achieve its goals:

- 30 kph speed limit thorough the city making Grenoble metropole largest low emission zone in France
- Development of cycle lanes. So far 475 km of cycle lanes have been added with 25 km of cycling highways to encourage bicycle commuting
- The metropolitan heat network uses 80 % renewable energy

(Green Grenoble, 2022)

From wastewater to biogas

Among the other measures taken by the city in the face of the challenge of climate change, land pressure, mobility, air quality, water, and life in general, Grenoble Alpes Métropole has set up the station **Aquapole metropolitan wastewater treatment plant** (Grenoble Alpes Métropole, 2022). Since 1989, this station has collected almost all of the domestic, rainwater and industrial water from the Grenoble conurbation which comprises of 54 municipalities ((approximately 475 000 inhabitants).



Source : Grenoble Alpes Métropole, 2022

“Every day, between 200,000 and 400,000 cubic meters of wastewater enter Aquapôle, where the complex systems of grids, settling ponds, nitrification and flocculation zones attempt to depollute wastewater as much as possible before discharging it into the river Isère”

(ici Grenoble, 2022.)

The pollution extracted from the wastewater is then concentrated in the form of sludge. However, since most of this sludge has been burnt and further disposed to landfills, which was heavily criticized by many environmental protagonists, the municipal actors decided to change this system of linear economy into more circular one (Ici Grenoble, 2022). Between 2010 and 2016, Grenoble-Alpes Métropole launched a vast modernization program for the **Aquapole bus station** which is part of a sustainable development approach.

This project responds in particular to the zero-diesel objective thanks to the **production of biogas**, which in the case of Grenoble and Aquapole station can be made of the sludge. Since 2016, the metropolitan station has been equipped with a biomethane production unit, from sludge from water treatment, generating 20 million kWh, i.e., the equivalent of the energy consumption of 2,500 homes (Grenoble Alpes Métropole, 2015). The novelty therefore lies in the mode of production of biogas, which until now could be imported from abroad or come from palm oil and is now the result of the treatment of local waste (Février & Weiss, 2015).



“Aquapole produces enough biogas to run more than 125 buses in the Grenoble urban area on BioNGV every day”

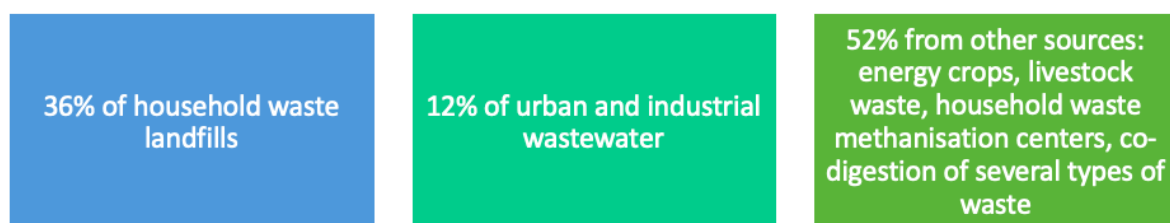
(Green Grenoble 2022)

Why biogas?

Biogas, also known as biomethane, is environmentally friendly, renewable fuel that is produced by the breakdown of organic matter (food, animal waste, sewage sludge) (National Grid Group, 2022). It can be used for the same purposes as natural gas, moreover it can serve as a road or maritime transport fuel. Biogas is part of circular economy, and its usage could help to reduce life-cycle emissions by up to 90 % in comparison to a fossil fuel (Gasum, 2022).

In 2009, European biogas production amounted to 8.3 million tonnes (mmt) of oil equivalent. 1.7 mmt in the UK, and biogas came mainly from landfills, 4.2 mmt in Germany, mainly from energy crops and 0.5 mmt in France. (Vernier, 2012)

In 2009, recovered European biogas came from:



(Vernier, 2012)

However, in comparison to production of other fossil fuels this is only a negligible amount– for example in 2020 global crude oil production came out to 4,2 billion metric tonnes (Sönnichsen, 2021).

“In the global pursuit for sustainable transport, biogas represents a great opportunity for countries to address climate change while harnessing local economic benefits in the rural sector and tackling environmental challenges such as waste management”

Dolf Gielen, director of IRENA's Innovation and Technology Centre

Key takeaways

Key figures illustrating the deployment and results of this solution

- Cost €13 million excluding tax for the digesters, €3 million excluding tax for injection into the network
- 8,000 tonnes of dry sludge matter treated per year
- 22 GWh of biogas produced per year

Performances, impacts, and results

- **Environmental:** 1,800 tonnes of CO₂ less released each year (i.e., a 25% reduction in greenhouse gas emissions from the Régie Assainissement of the Grenoble metropolitan area)
- **Economic:** Creation of a local biomethane industry
- **Techniques:** Use of renewable energy from wastewater, injection into the gas network

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The world's first National Road Map to a Circular Economy (2016 – 2025) (Finland)

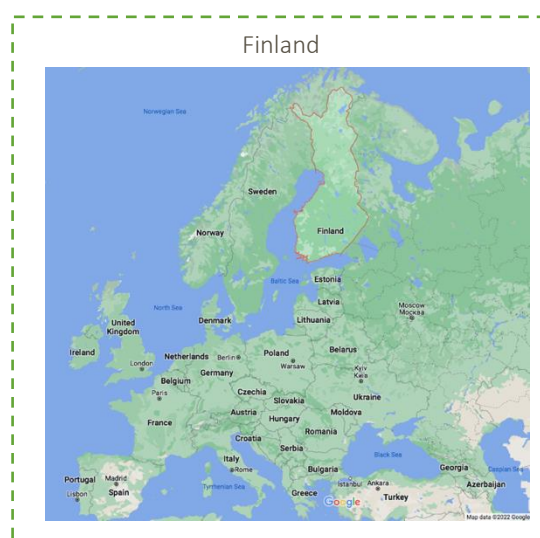
Population: 5 169 757

Capital City: Helsinki

Actors: Sitra, Government ministries, 50 representatives from the public, private and third sectors

“Finland aims to become a global pioneer in a world in which our economic competitiveness and well-being can no longer be based on the wasteful use of natural resources”

Sitra, Finnish Innovation Fund



Finland has seized the opportunity to shift the focus on competitiveness to a carbon-neutral circular economy and low-emission solutions by developing the first road map to a circular economy (Finland Toolbox, 2021). The project brought together government ministries, plus almost 50 other representatives from the public, private and third sector. The publication includes the most effective circular economy measures and solutions that Finland proposes in order to tackle the challenges of climate change, the depletion of natural resources and urbanization. The second edition of the **Road map (2019)** updates the solutions and hones the vision and strategic objectives (Sitra Studies, 2019).

According to estimates, the circular economy may contribute an annual added value of at least three billion euros to Finnish economy by 2030

Knowing that **“municipalities enable the important moves in the circular economy”** (Sitra, 2019), because they activate and encourage enterprises, communities and resident to participate in the circular economy principles, a key role is given to the Helsinki Metropolitan to carry the circular economy implementation.

Between March and September 2016, Sitra made a synthesis of the views central actors in society had on the needs for change and the required measures. As a result, the national road map to a circular economy includes four key topics and dozens of pilots which will begin Finland's transition towards a circular economy. These projects are based on Finland's traditional strengths, including a sustainable food system, forest-based loops, technical loops, transport and logistics and joint actions.

Towards a Regional Sustainable Food System

Objectives

Goals

- Create and implement a regional sustainable food system model based on circular economy principles and innovative practices;
- Increase consumers' understanding and appreciation of food production;
- Enhance food producers' awareness of consumer needs and values;
- Ensure all those involved in the sustainable food system have a greater understanding of sustainability and the impacts of food on the regional economy
- Production will become more transparent, and consumption will emphasize alternatives that save natural resources and reduce climate emissions.

Actors

Ministry of Agriculture and Forestry, Local producers, the central union of agricultural producers and forest owners, provinces towns and cities, joint municipal authorities, Ministry of the Environment

Policy actions

Create a market for organic recycled nutrients, minimize food waste by eliminating barriers and creating incentives, supporting biogas systems and other renewable energy solutions to replace fossil fuels in agriculture

The creation of a circular economy in Finland requires the establishment of a Sustainable food system where **biowaste** from the production chain and consumption **will get a new life as biofuels and biofertilizers**. Therefore, the life cycle will continue in a new loop. But how? The Finnish roadmap to a circular economy indicates several expected results that stem from the action of various sectors. On the consumer side, sober and responsible behaviour is advocated so as to consume only what is necessary while adapting to the sustainable and responsible ecological alternatives made available to them. Thus, consumers limit the production of waste and overconsumption, in particular thanks to the support of companies that actively seek to offer these sustainable alternatives in their product offerings (responsible packaging, eco-responsible transport in a low-emission manner, use of recycled fertilizers and natural resources on the food growth). In addition to the quest to reduce waste, the remaining waste will then be collected, treated and revalued in a circular logic. (Sitra Studies, 2016)

Concrete steps

1. Use: we will consume the calories we need – food will not be left over as waste and biowaste will be recycled

2. Consumer: diets will be based on more ecologically sustainable alternatives, for example, seasonal and vegetarian foods.

3. From company to company: food industry will actively offer sustainable alternatives and use all raw materials to avoid generating waste

4. Retail: customers will be offered sustainable alternatives and retailers will minimise their food waste

5. Distribution: the environmental footprint of a food product's life cycle will be reduced: food freight will be pooled and transported short distances in a low-emission manner

6. Manufacturing industry: the food industry will use raw materials carefully in its manufacturing in order to avoid generating food waste. Products will be packed in an energy-efficient manner.

7. Material processing: when food products are made from raw materials, their nutritional values will be retained as much as possible.

8. Primary sector: recycled fertilisers and the wise use of natural resources will be a focus of food growth. The use of unfarmed fish will be crucial to food production.

(Sitra, 2019)

Example: Thermal sludge processing and construction of the related pelleting plant

As one way how to achieve their goal to build regional sustainable food system the Road Map introduces project of thermal sludge processing as a form of nutrient recycling.

“Processing sludge thermally and then mixing it with the ash from burning biomass provides a suitable mix of growth nutrients for agricultural and forestry use. Pelleting the mixture produces fertilisers suitable for the existing spreading equipment.”

Sitra Studies, 2016

Accelerating the transition to a smart and clean capital region (Helsinki, Finland)

Population: 650 100

Actors: Sitra, Helsinki, Espoo and Vantaa, the Uusimaa Regional Council, the Ministry of Employment and the Economy, the Ministry of the Environment, the Ministry of Transport and Communications and the Climate Leadership Council.

Project co-ordinated by Sitra and Greater Helsinki promotion

“Cities generate 80% of global carbon dioxide emissions; so, they are at the centre of the search for solutions to adapt to climate change” (Sitra,2017).



Helsinki, Uusimaa province, Finland



Therefore, the purpose of the project is to prepare a plan for turning Helsinki Metropolitan Area into an internationally important reference area for ecological and smart solutions and to showcase the best products and services of both Finnish and international companies (Sitra, 2017).

The Helsinki Metropolitan Smart & Clean project creates export concepts based on **smart low-carbon transport** that exploits open data.

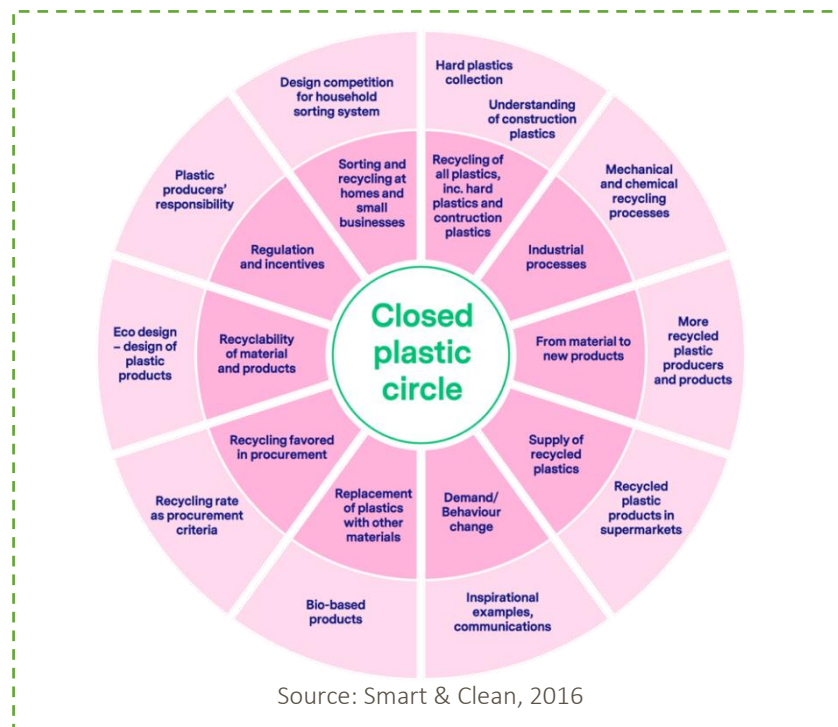
Smart & Clean have initiated seven concrete change projects (ecosystems) during 2016–2019. These projects involved Helsinki region cities, more than 150 companies, and universities & research institutions in accelerating the transition to smart urban energy, emission-free mobility, the circular economy, urban resource wisdom and a sustainable built environment.

Towards Closed Plastic Circle

Taking plastic circulation in the Helsinki metropolitan area from 6% to 60%

Smart & Clean flagship project was Closed Plastic Circle, where the goal is to comprehensively cover the entire life cycle of plastic, from product design to collection and reprocessing into new products. The CPC is an example of a regional project for which the ecosystem produces solutions.

The fact that the recycling potential of plastic waste is not fully made use of is a major problem. According to the Ellen MacArthur Foundation, up to 120 billion dollars worth of plastic is discarded each year. The main goal of the CPC project is to get 60-70% of the plastics in the Helsinki metropolitan area to circulate instead of the 6 current percent figure (Smart & Clean Foundation, 2016).



Objectives

Context

If plastics were recycled into material, the carbon dioxide emissions caused by burning them would be reduced by 336,000 tones in the Helsinki metropolitan area; this is an equivalent amount to the yearly emissions of about 80,000 people in the capital.

Goal

Strengthen the market for recycled plastic products and increase the carbon handprint of actors in the Helsinki metropolitan area and Lahti

Actors

Cities (Espoo, Helsinki, Lahti) and businesses (HSY,VTT, Fortum, Lassila & Tijojoja, Siemens) are working together to develop solutions for reusing the plastic used in the Helsinki Region and Lahti

Measures

All recyclable plastics can be circulated through ten measures and projects under them listed in the figure

Examples of ongoing projects

- CPC in Schools campaign
- Piloting a multi-bin collection
- Service design for the shared collection of detached and semi-detached houses
- Study of the city's potential to reduce and recycle plastic in construction sites

➔ However, more measures to promote and influence the recycling of plastics are needed.

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Summary of international case studies

In the international case studies provided in Chapter 4 several examples of circular economy implemented in cities and metropolitan areas have been shown to demonstrate numerous advantages in several areas, such as food, waste management, construction industry and many others. The most important common factors can be summarized as follows:

1. Any Circular Economy project or policy was preceded by a municipal strategic plan or a document of similar nature that set goals and monitoring criteria. In other words, **setting policy goals publicly is key for success!**
2. Municipal projects required cooperation with other actors to raise sufficient funds and other resources. **Cooperation is important and can facilitate the whole process.**
3. **Local authorities** play a significant role in the territorial implementation of the circular economy (dedicated budgets, specific skills, expert players)

4. Digital platforms relating to the circular economy are important for *raising awareness* about the subject and for exporting and promoting its principles around the world (technology as a challenge of tomorrow)
5. The circular economy, in addition to having a set of positive impacts on the planet, contributes to the influence of the countries that implement it. It creates a virtuous competition between states, encouraged to race for the implementation of circular economy initiatives. *Healthy competition among actors facilitates the change.*
6. Circular economy does not only reduce the negative environmental impacts, but it can also save a lot of money which can be later used for other purposes as well. Also, new jobs can be created *It brings social, economic & environmental benefits!*
7. *The Spill-over effect.* Building on one project can inspire others.

Chapter 4

Chapter 4 specifies the self-governmental and NUTS system in the Czech Republic. Both the administrative and non-administrative units are thus taken into consideration. The overview maps the competencies and agenda of the Czech administrative units, focusing on the Brno Municipality and their competencies in the sustainability and climate agenda. The initial overview allows us to identify possible difficulties resulting from the Czech institutional framework – namely the fragmentation – and formulate recommendations for overcoming it by cooperation and metropolitan planning.

Background of the Czech Institutional Framework

Introduction

The Czech institutional framework is characterised by decentralisation, which means that power is divided and shared between various actors with different competencies. In this chapter a detailed overview of the Czech institutional system is provided.

In order to achieve compatibility within the European Union, a uniform system of classification of territorial units called NUTS (**Nomenclature of Units for Territorial Statistics**) has been created. The purposes are according to Ústav územního rozvoje (2020) as follows:

- the collection, compilation, and harmonisation of EU regional statistics
- socio-economic analysis of regions
- delimitation of EU regional policy
- easier financing from the EU funds

The CZ-NUTS classification is an integral part of the European NUTS classification, and it describes the territorial units of the Czech Republic according to the rules given by Regulation 1059/2003. The update of CZ-NUTS classification was implemented via Communication No. 228/2004 coll.

The classification is divided as follows:

- NUTS-0 the Czech Republic (administrative unit)
- NUTS-1 the area of the Czech Republic (non-administrative unit)
- NUTS-2 cohesion regions (non-administrative unit)
- NUT-3 regions (administrative unit)

Until 2008 regional districts were part of the NUTS system, after 2008 these districts were transferred to the LAU (Local Administrative units) system, which is further divided into:

- LAU-1 districts (formerly NUTS-4)
- LAU-2 municipalities (formerly NUTS-5)

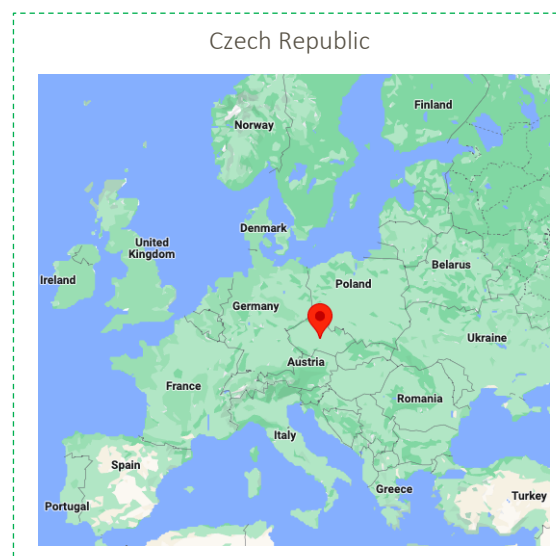
NUTS 1	NUTS 2	NUTS 3
Czech Republic	Prague	Prague
	Central Bohemia	Central Bohemian Region
	Southwest	South Bohemian Region
		Plzeň Region
	Northwest	Karlovy Vary Region
		Ústí nad Labem Region
	Northeast	Liberec Region
		Hradec Králové Region
		Pardubice Region
	Southeast	Vysočina Region
		South Moravian Region
	Central Moravia	Olomouc Region
		Zlín Region
	Moravian-Silesian	Moravian-Silesian Region

(Authors based on Ústav územního rozvoje, 2020)

The Czech Republic – National level NUTS-0, NUTS-1

The Czech Republic was established 1st January 1993 by the division of the former Czechoslovakia republic. It is located in central Europe occupying the area of 78 886 square kilometres and accounts for a population of 10 561 707 (Český statistický úřad, 2022). Since 2004 the Czech Republic has been a member state of the European Union.

The Czech Republic is a parliamentary republic respecting the democratic values. Therefore, the power is divided into three branches – legislative, executive and judiciary. The parliament is responsible for the legislative power and is further divided between two chambers – Chamber of Deputies and Senate. Every four years elections are held for the Chamber of Deputies and every two years for one third of the Senate members. The executive power is represented by the president and prime minister, who acts as a leader of the government which is appointed by him and is accountable to the parliament. Presidential elections are held every 5 years. Nevertheless, the president is more of a representative figure and has little impact on direct policy making, therefore further information is less of an importance to this paper. The same applies to judiciary power which is an independent institution.



The important actors that are responsible for direct policy making are the government and the parliament. In the Chamber of Deputies legislation is discussed, made and through legislative process approved⁴. Proposals for legislation are filed by the members of the parliament or the government. Also, the Chamber of Deputies is eligible to approve the yearly national budget which is designed by the appointed government.

⁴ Legislative process is quite difficult to understand, and it often differs, however it might be summarised as follows: Chamber of deputies – Senate – President

Defined amounts of money are then assigned to ministries and other state institutions. The government is divided into several ministries, each represented by a single figure, and administered by various administrative workers and boards. For the purpose of this paper the most important ministries are the Ministry of Regional Development, Ministry of Finance, Ministry of Industry and Trade and Ministry of Environment.

The Ministry of Regional development then financially helps the municipalities to support the development and increase the quality of life of their inhabitants. They also collaborate with the European Union which provides generous funding for selected programmes. (Ministerstvo pro místní rozvoj ČR, 2022)

The Ministry of Finance supports development and renewal of municipal infrastructure and civic amenities, development of areas of life of municipalities and regions, and fulfilling ecological liabilities of the Czech Republic. (Ministerstvo financí ČR, 2022)

The Ministry of the Environment is responsible for financing and fulfilling the plan's obligations as well.

The Ministry of Industry and Trade provides finances to municipalities and regions for various areas such as energy, construction industry and transportation. A remarkable plan called ***National Plan for Recovery*** which is in line with European initiative Next Generation EU for the recovery and resilience of the Czech economy, whereas one of the pillars focuses on the green transition (Ministerstvo práce a sociálních věcí ČR, 2021). The Ministry of Industry and Trade then intends to invest in sustainable transportation and clean mobility, increasing energy efficiency of the public sector, supporting renewable energy sources and finally to support the circular economy. In the case of circular economy, the plan has been proposed as follows:

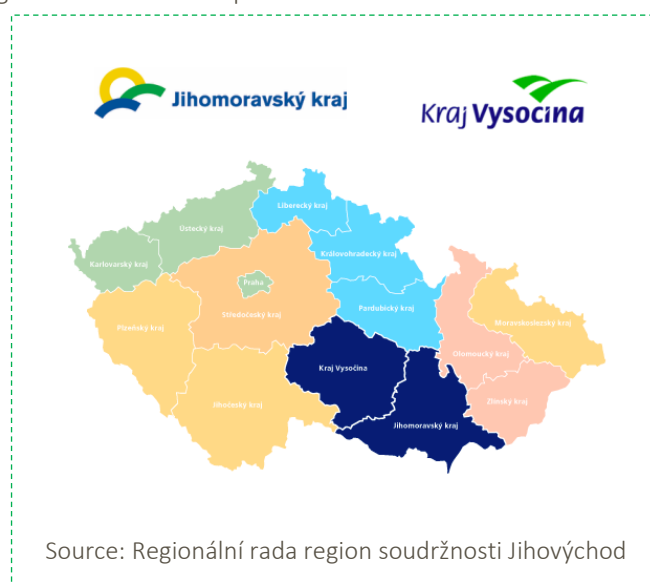
“To support the acceleration of the transition to a circular economy in the Czech Republic, to prevent waste generation, to increase recycling infrastructure and the content of recycled materials in products. ... implementation of the principles of the circular economy and the adaptation of the economy to climate change.”

(Národní plan obnovy, 2022)

To summarise, various ministries are obliged to provide finance and support to other sublevels of Czech governance system, especially the regions and municipalities which act as administrative institutional bodies. The actors on the national level can support the implementation of circular economy measures through various incentives, subsidies, and other programmes. At the same time, they are responsible for the legislative processes which can remove the barriers and other obstacles that prevent the circular economy's future.

Region Southwest – NUTS–2 cohesion region level

NUTS 2 cohesion regions are special bodies that were established by the law no. 248/2000 coll. to coordinate economic and social development especially for the purpose of financing from the EU Structural Funds. There are 8 cohesion regions in the Czech Republic.



The Southwest region consists of two regions—**Vysočina** and **South Moravia**. It is the most populous region on the NUTS–2 level with 1 685 220 inhabitants (Český statistický úřad, 2021) and the second largest area occupying 13 991 square kilometres (Regionální rada regionu soudržnosti Jihovýchod, 2022). The region is the second largest contributor to the national GDP with a share of 15 % (ibid). It is a non-administrative body, which means that this division serves the statistical purposes and the matter of finance distribution, therefore there are no institutional bodies responsible for the legislative or executive power.

The European Union pursues cohesion policy with seven years period (2007-2013, 2014-2020) and provides funding to these regions by the European Regional Development Fund, European Social Fund, Cohesion Fund and (sometimes) European Maritime and Fisheries Fund. The aim is to reduce disparities between the level of development of EU regions and EU member states. Municipalities, regions, ministries, entrepreneurs, owners of the infrastructure, non-profit organisations, schools, research centres and more can apply for the funding of various programmes of their design. (Regionální rada regionu soudržnosti Jihovýchod, 2022)

For the purposes of finance governance following institutions emerged. **The Regional Council of the South-East Cohesion Region** as the managing authority of the South-East Regional Operational Programme with different bodies:

- Committee (in Czech výbor)
 - 16 members (8 for each region) and is responsible mainly for approving financing of the programmes
- Chairman as representative actor
- Office (in Czech úřad)
 - informing the public, approving programmes, reviewing, monitoring etc.

During the 2007-2014 period the Regional Operational Programme was granted with 847 486 785 EUR. The priorities were transportation, development of tourism, sustainable development of cities and municipalities. (Regionální operační program NUTS-2 Jihovýchod, 2017)

In 2021 by the Act no. 251/2021 coll. The Regional Council of the South-East Cohesion Region was cancelled, and its liabilities were transferred to the Ministry of Regional Development and the Ministry of Finance.

South Moravian Region – NUTS–3 regional level

Due to Constitutional Act no. 347/97 coll. the Czech Republic has been divided into 14 regions, one of which is the South Moravian region with the county seat in Brno. The region is defined as “territorial community of citizens who have the right to self-government” (Act no. 129/2000 coll.) The region takes care of the versatile development of its territory, the needs of its citizens and protects public interests.



The legislative framework is set in the Constitution (Body Seven), European Charter of Local Self-Government and Act no. 129/2000 coll. All these documents set rules, principles, and competencies of the regions. In general, the functions of the regions may be defined as follows: integration, coordination, supervision, counselling, financing, crisis management and administrative. The region administers its power both independently, so called independent competence, and in accordance with state level, so called delegated competence. The institutional bodies are obliged to act in line with the legislation, government resolutions and directives. Thanks to the independent competencies the regional institutional bodies can issue resolutions and directives of their own which apply to the defined territory.

Actors that are responsible for these functions are Regional Council (zastupitelstvo), Regional Board (rada), Chief Executive of the region (hejtman) and Regional Office (krajský úřad).

- **The Regional Council** is elected by the inhabitants of the region for a four-year period and is responsible for approving the regional budget and generally binding announcements. They can also make a proposal of legislation on the national level which has to be approved by the Parliament. There are various other competencies and to put it simply, the Council acts as the Chamber of Deputies on micro level, that is the legislative body.
- As the executive body is considered **the Regional Board** in which lead stands the Chief Executive and its competencies are similar to the government on the micro-level. The Regional Board is accountable to the Regional Council. Individual councillors are assigned fields of competence

(councillor for property affairs, councillor for grant policy etc.). Regional Board formulates proposals for the Regional Council and supervises the performance of the approved resolutions.

- **The Regional Office** is then an institution which administers the governance on regional level. Their agenda is as follows: provision of information to the public and the other institutional bodies, cooperation with the media, management of the regional budget, provision of grants and subsidies etc.

South Moravian Region is the fourth largest region in the Czech Republic– with the area 7 187 square kilometres – and fourth most populous region– 1 181 216 inhabitants (Český statistický úřad, 2021; Jihomoravský kraj, 2022). The Regional Council is made up of 65 members and the Regional Board of 11 members including the Chief Executive currently Jan Grolich. The regional budget was distributed through various institutions such as schools, social facilities, culture facilities etc. and the areas of financing were agriculture, industry, transportation, culture, sport, security, environment protection, health care and others (Jihomoravský kraj, 2021). The important part of the regional corporation is the creation of the so-called micro-regions which is an important positive trend for the joint promotion of interests and intentions of the rural communities.

The regions collaborate with institutions on the European level as well as making bilateral ties with various countries or regions within these countries. For this purpose, the EU established an organisation called **European Territorial Cooperation (INTERREG)** which divides Europe into several regions.



Source: European Commission, 2022

The Czech Republic is part of the **Danube Region** together with southern parts of Germany, Austria, Slovakia, Hungary, Romania, and others (map above). The Danube region was established in 2011 and it aims to strengthen cooperation in 12 priority areas such as transportation, environment, energy, security, and social-economic development, and it should positively affect the living of the people (European Commission, 2022). The South Moravia region also establishes relations with other regions independently on the INTERREG through the executive bodies of the region, or through independent organisations. For example, further initiative of Czech–Austria–Slovakia origins called **Pomoraví association** aims at strengthening cooperation on less extended level (in comparison to the whole Danube region). **Pomoraví**, formerly known as the Association of Towns and Municipalities of South Moravia, brings together Weinviertel (in Austria), South Moravia and West Slovakia regions, all of which are characterised by intensive agricultural activity. It serves as a coordination platform for broader regional development in the economic, social, and cultural domain. The Statutes of the Euroregion declare main tasks including cooperation in transport infrastructure,

climate change, economic and commercial fields, and joint planning of regional development (Stanovy, 2022).

The regional institutions are also responsible for planning and strategy making and the cooperative activities can help and facilitate these processes. In the field of circular economy there have been few initiatives that are worth mentioning, such as the analysis of potentials regarding circular economy which is a document identifying key obstacles and opportunities in the South Moravian region and for some selected cities. There is also a document identifying tools that would help to establish the circular economy such as motivational, communicational, informational, and legislative tools. (Portál oběhového hospodářství Jihomoravského kraje, 2022)

District level – LAU-1

There are 91 districts in the Czech Republic (Business Info). The Southern Moravia region encompasses **7 districts**– Blansko (BK), Brno–město (BM), Brno–venkov (BI), Břeclav (BV), Hodonín (HO), Vyškov (VY), Znojmo (ZN) (Státní správa, 2022). The internal borders between the districts of the region were adjusted by Decree no. 513/2006 coll. .Before 2003 the districts played an important role in the administrative processes, however due to Act no. 320/2002 coll. the district authorities were abolished and their competencies were transferred to the level of regions (NUTS 3) and some to the level of municipalities (LAU 2) Nowadays the district has the right to organise police, courts, archives and provide administrative services to its inhabitants (Svoboda, 2020).



Municipal level– LAU-2

In the South Moravia region there are 673 municipalities divided into 21 administrative districts of municipalities of extended power.

According to the Czech Constitution, municipalities are defined by three pillars: area, inhabitants, and local self-government. Municipalities are legal entities that are allowed to own and manage their property. The Act no. 128/2000 coll. defines municipality as “a basic territorial self-governing community of citizens, which forms a territorial unit defined by its boundaries”. Municipalities are administrative bodies and have independent competencies and delegated competencies (the same as the NUTS-3). Each municipality is obliged to make and approve its own budget for a period of one-year.

- **Independent competencies** include matters “in the interest of the municipality and its citizens”. Local administrations exercise these tasks in public administration such as management of their property and taking care of the functioning of their territory.
- **The delegated competencies** do not include “own tasks” but tasks defined by law that local administrations are obliged to carry out and are financially compensated for, usually by state or in the case of municipal districts by cities.⁵

According to §84, §85, §102 of Act no. 128/2000 coll. to the independent competencies belong:

- Strategy making and planning
- Formulation, Adoption and Management of the municipal budget
- **Management of their property and the municipality itself**
- Establishment of legal entities
- **Approval of physical plans**
- Cooperation with other municipalities
- Issuing generally binding municipal ordinances (GBMO)

Municipalities are responsible for: (Zákon č. 254/2001 Sb.; OECD, 2018, p. 196)

- Local and urban planning
- Public transport, local roads, housing, land use and spatial arrangements
- Environmental protection and infrastructure (water management and treatment, urban heating, and waste processing), agriculture, primary health care and social services

The institutional bodies are as follows: the Municipal Council (zastupitelstvo), Municipal Board (rada), Chief Executive or Mayor (starosta), Municipal Office (obecní úřad). Depending on the number of inhabitants, there might be other institutions such as police.

- **The Municipal Council** is elected by the inhabitants for a four-years period. The number of members depends on the number of inhabitants—ranging from 5 to 55 members. The Council decides on the most important agendas, such as approving the development agenda for the municipality, approving the municipal budget, issuing GBMO, appointing the Mayor and the Board, issuing local referendum, decision on cooperation with other municipalities etc. In alliance with the Council several committees or boards can be established which then acts as advisory and supervisory bodies. For example, the financial committee supervises the activities connected to the financial budget.
- **The Municipal Board** is an executive body with the Mayor in the lead. The Municipal Board is appointed if the Council has more than 15 members (that is municipalities with a population greater than 500). It carries out tasks assigned by the Council and some of the competencies are given to the Board by the law. Therefore, it can issue GBMO as well.
- **The Municipal Office** in its independent competence fulfils the tasks that were assigned by the Council and assists the Board or committees in their activities.

In the Czech Republic the **financing** system is centralised, thus, to a great extent, municipalities rely on the central government for financial support. Local governments are financed mostly through shared taxes

⁵ It should be noted that the majority of municipalities have delegated some of their responsibilities to other municipalities. This results in a situation when municipalities with extended power elaborate territorial plans for the territories of other municipalities as well (OECD, 2018, p. 196)

(personal and corporate income tax and VAT).⁶ The rest comes from grants and transfers from the central government and fees for public service provision (OECD, 2018, pp. 210). It is also important to note that the amount of taxes redistributed to local governments is mostly based on the number of inhabitants. This can **disadvantage** smaller municipalities but can also serve as an **incentive** for municipalities to merge or develop and attract people. On the other hand, most regional revenues come from grants and transfers. Municipalities raise 1.2% of total tax revenue which, according to OECD report, is the second smallest share in the OECD countries. Consequently, municipalities rely on the national government to provide programmes, services, or infrastructure (OECD, 2018, p210).

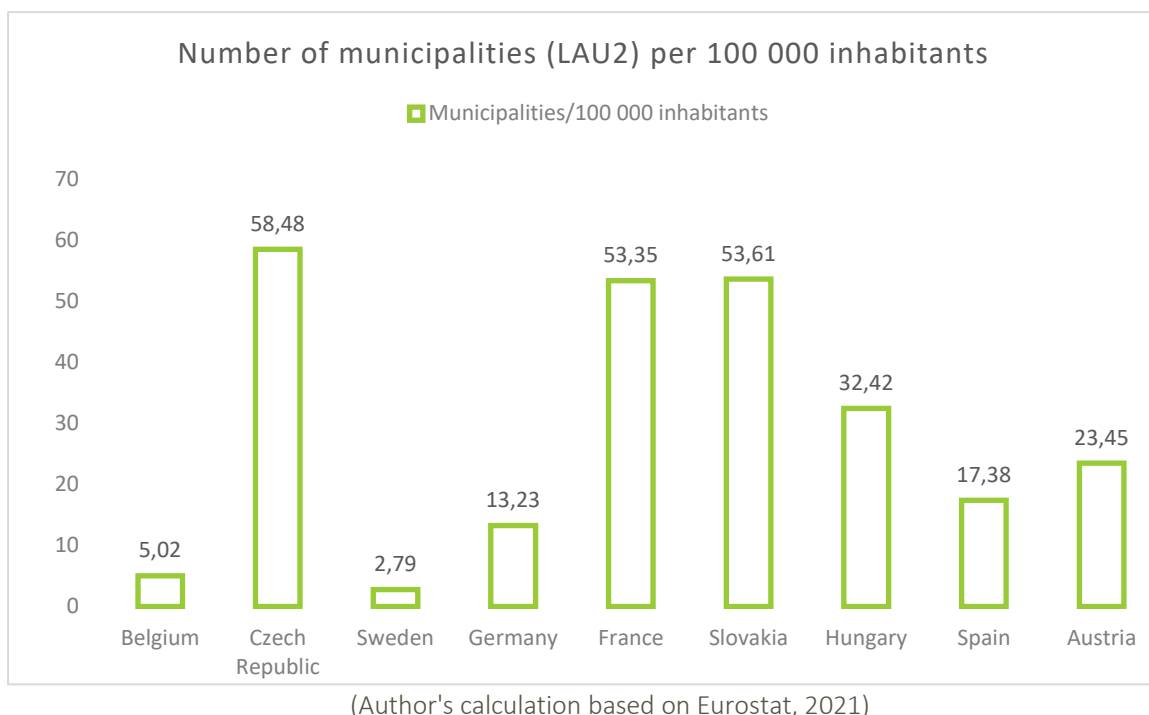
Municipalities have **greater spending responsibilities than regions** and their spending go mostly to the areas of education, economic affairs such as transport, general public services and environmental protection, e.g., waste and water management. However, their independent ability to spend is limited in practice as a result of multiple spending factors being centrally regulated. For instance, the national government sets the price of water and determines the salaries of the LRAs employees (OECD, 2018, 209-210). According to the CLRA report around 36% of the municipalities' income are used for fulfilling the delegated powers which leaves little room for the autonomy in spending (The Congress, 2012, p. 17).

On the national level several organisations with the aim to associate municipalities across the Czech Republic exist. One of them is the **Union of Municipalities** (Svaz měst a obcí) which is the biggest (2 775 municipalities – 45 %) and most important association in the Czech republic dealing with the agenda of national and international legislation and its impact on municipalities. For this purpose, it collaborates with several ministries and the government. However, the issue of **fragmentation** which poses an obstacle for fulfilling municipal agenda is still persistent issue in the Czech Republic.

Fragmentation

The Czech Constitution, Chapter 7, divides the country (NUTS–1) into basic territorial self-governing units – municipalities (LAU–2), and higher territorial self-governing units – the regions (NUTS–3). This two-level urban governance structure has no hierarchical link between the two types of self-governing units. According to Eurostat there are **6258 municipalities in the Czech Republic** as of 2021 (Eurostat, 2021). When compared to other EU countries' self-government institutional frameworks, the Czech Republic has the **highest number** of municipalities per 100 000 inhabitants. As the graph below indicates, the number of municipalities is comparatively high and signifies the fragmentation of self-governance with all the challenges it may ensue. High fragmentation is not inefficient per se, nevertheless it may pose disadvantages when it comes to developing, implementing, and monitoring environmental, or any other policies. One of the risks of fragmentation and lack of coordination at the higher level or between the municipalities that are inter-connected, such as metropolitan areas or agglomerations, is the lack of joint strategies that honour the public goods such as environment (forest, lands).

⁶ This makes around 77% for Brno City as of 2022 (Statutární město Brno, 2022).



The report of Congress of Local and Regional Authorities and OECD report state that the fragmentation of municipalities represents an obstacle when it comes to providing sufficient and cost-effective service in the territory of the local self-government units (The Congress 2012; OECD 2018, pp. 195-197). For example, without national support it is difficult to implement strategic development of clean energy sources when it comes to smaller cities, such as Litoměřice. The city found it difficult to implement its programmes and opted for the Municipal energy manager association to promote its interest in the area of sustainable energy and share information and resources with other local governments. Other cities including Brno or Hradec Králové are members of the association. (OECD, 2018,p. 194; SEMMO, 2022)

Overcoming the fragmentation

1. Local level

It is important to note that in order to overcome the challenges ensuing from the fragmentation the municipalities may opt for **inter-municipal cooperation** or may form associations, sometimes called microregions (Zákon č. 128/2000 Sb., o obcích). The activities coordinated by the formed associations may focus on providing public services such as management of lighting, greenery, waste management, water treatment but also tasks in the field of air protection or conversion to environmentally friendly sources of energy. An inter-municipal collaboration such as this helps municipalities to share costs and responsibilities.

- For instance, the Water Management Association of the West Bohemia Region groups 91 municipalities and 2 associations of municipalities. It is a horizontal type of cooperation with a governing body in which each municipality has one vote.
- Brno City municipality is a member of the Cyklistická stezka Brno – Vídeň association and its city district Bystrc –Brno is a member of Svazek obcí panství hradu Veveří. However, the majority of their activities are limited to either organizing social activities in the area of Veveří manor or the support of cyclo-tourism in case of the latter association (Stanovy, 2004, p. 2; Svazek obcí, 2022).

These forms of cooperation still allow for more cost-effective and coordinated solutions but are limited in their scope and thus impact.

2. Regional to national level.

At the state level, one of CLRA recommendations which may help Brno and other municipalities to overcome the challenges of fragmentation and influence units beyond their mandate is to **lessen the dependence of municipalities on the state**, increase their own independent powers and encourage associations between municipalities by providing incentives (The Congress, 2012, p.8). Government incentives can also serve as a powerful tool to support inter-municipal cooperation.

- For instance, we can refer to the inter-communality grant scheme used in France – a similarly fragmented country as the Czech Republic when it comes to self-government units. The central government used financial allocation to encourage the municipalities to form communities or agglomerations. This resulted in the majority of the municipalities forming collaborative structures, however this scheme generated many ineffective structures only driven by the prospect of receiving more funding (OECD, 2015, pp.23-24). This shows that action motivated purely by financial gains can result in temporary or ineffective co-operation and actors may go back to individualistic behaviour when the grants scheme ends.
- Another example of inter-municipal cooperation is the process of aforementioned metropolisation successfully achieved in Italy. The città metropolitane have a variety of competencies in the areas such as spatial planning and economic development and the municipalities still have liberty to decide the depth and breadth of the inter-municipal cooperation. However, the complex legal and political process took 2 decades due to the opposition of regional actors and required strong institutional action from the central government (OECD, 2015, p. 65).

In the case of top-down driven legal and institutional reforms, the power of Brno City is limited, however by reinforcing dialogue with the national authorities, such as the Ministry of Regional Development and LRAs associations, it may pressure the state to provide incentives for mergers, define metropolitan areas or agglomerations by law and thus plan the regional development accordingly. So far, these two terms are not anchored in legislation, which makes the joint planning for Brno and other centres of metropolitan areas such as Ostrava or Praha difficult compared to other European countries where these entities are legally defined. But recent developments at the ministerial level show a tendency to opt for defining regional policy of the central government by considering various types of territory including metropolitan areas (MRD, 2022).

Brno Municipality

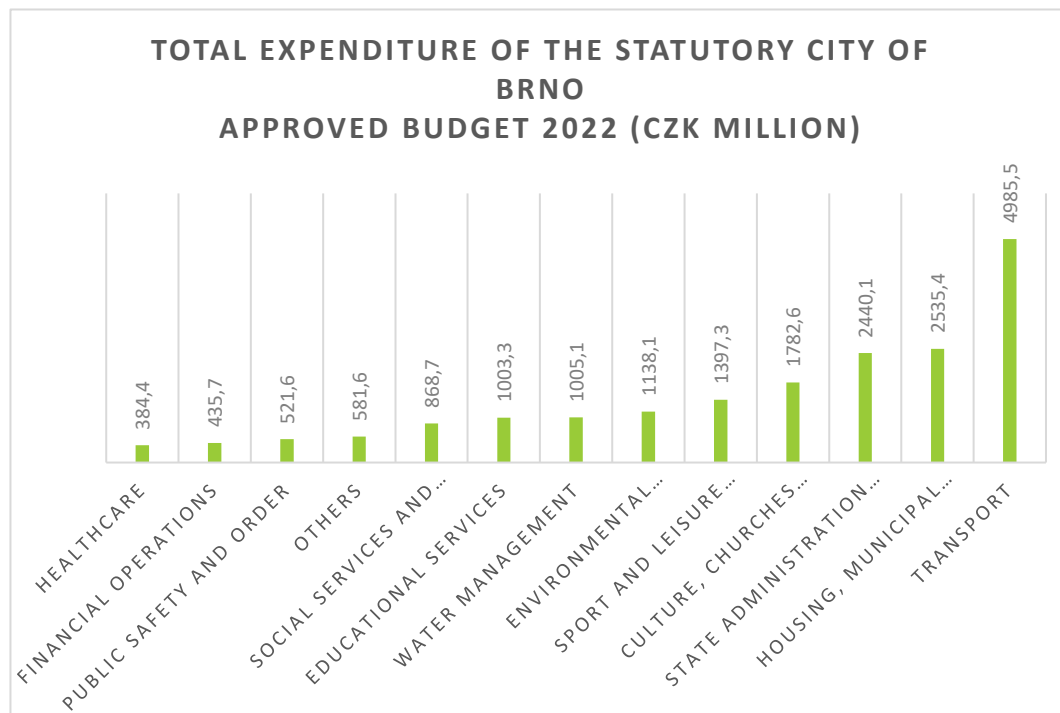
Brno City is a statutory city thus can be divided into city districts (Act no. 128/2000 coll). City districts are defined by their territorial boundaries within which they are operated by general assembly or other body elected in direct elections. However, the Chapter 7 of the Constitution defines self-governance only at the level of regions and municipalities which means these **districts are not another level of territorial self-government**, nor are they understood as separate legal entities by law. Their authorities may exercise the powers based on delegated competence excluding issuing generally applicable ordinances or regulations and the property of the statutory cities can be only lent to them. Nowadays there are 29 city districts in Brno which is illustrated in the photo below.



The law on municipalities no. 128/2000 coll. defines the City of Brno as a city governed by the independent executive body – Municipal Board headed by the Mayor and her deputies. The management of the municipality is divided into 5 sections headed by Deputy Mayors and a Chief Executive. Each one of them is responsible for departments within their section. For instance, Deputy Mayor for cultural and social affairs Tomáš Kolářný is responsible for the Education, Youth and Sport department, Cultural department etc. (Statutární město Brno, 2022).

The overview of the municipalities' roles (provided in the section Municipal level–LAU 2) highlight their importance for the transition to the circular economy. Cities are responsible, or delegated to manage, the areas that are key for the transition such as **waste and water management, urban planning, or transportation**. With regards to buildings and generally the construction sector, municipalities may regulate some aspects of the commercial and residential buildings and fully manage the public buildings (OECD, 2021, p. 32). They can also apply circular economy principles in other sectors such as improving the management of waste and water efficiency, manage spatial planning but also, being the closest to the citizens, encourage change in the consumption and production patterns of the citizens.

The financing responsibilities and where municipalities get their money from has been described earlier. The graph below shows the spending of Brno City in 2022 per policy area, but it does not show the degree to which this spending is centrally regulated.



Source: Statutární město Brno, 2022

Brno competencies in the Sustainability and Climate Agenda

Based on the role attributed to the municipalities listed above, we see that they are entrusted with a range of diverse competencies ranging from water treatment to transport infrastructure, have a clear territorial focus, and a close relationship to citizens. The aim of this subchapter is to define, in more detail, whether the local government, specifically Brno Municipality, has the potential and capacities to play an important role in the sustainable and climate agenda. This will be done by further describing and analysing the institutional framework and municipal competencies listed above in the context of sustainable and climate policies of the Brno City.

We will look at the characteristics of both the public organisation of Brno City and some of their public policies, and actors to define its institutional capacities to grasp the challenges of sustainable development, and propose alternatives to address the challenges, implement and evaluate them (Sancho & Salvador, 2021, pp. 2-3). For the analysis itself we will use the **framework of M. Salvador and D. Sancho (2021)** which focuses on four capacities:

(1)
strategic/leadership
capacity

(2) analytical and data
management capacity

(3) organisational
management capacity

(4)
collaborative/network
management capacity

1. Strategic capacity can be defined as an “ability to articulate a vision and establish a clear goal for the interrelated policies” (Salvador & Sancho, 2021, p. 3). Also, politicians/managers must prioritise allocating sufficient funds and connect the plans with management capacity at different levels of the organization.

- Brno has a clear strategy *Brno 2050* prioritizing sustainable development which indicates a solid competence to articulate a vision and set goals. Each strategic value with a set of goals has a so-called “guarantor”, in other words a specific person responsible for the given section. The strategy is accompanied by a medium-term horizon programme (10 years) that contains specific priorities and measures together with an Action Plan which is a short-time horizon plan with specific activities and projects to be implemented. The Action Plan clearly defines political decision makers and bodies responsible for the realization of the objectives. This aspect coupled with the “guarantor” function, the organizational structure of the municipality itself, where the first Deputy Mayor Petr Hladík is responsible for majority of the sustainable agenda (spatial planning, environment, forestry, water management and agriculture), clearly defines leaders explicitly linked to promotion of sustainable development. The final version of the Action Plan has not been published, thus the funding allocated for each action is not yet attributed. The strategic capacity is not complete without a direct link to resources; however, it is highly likely the budget will be specified soon (Brno, 2020; Brno, 2021a; Brno, 2021b).
- Another plan dealing with the sustainable agenda, the *Sustainable Energy and Climate Action Plan (2030)* also proposes the management structure, assignment of responsibilities to each municipal department (from environment to education and transport) and a creation of new working groups. However, it has the form of a proposal (approved by the city) and consequently does not include the final assignment of responsibilities and a budget allocated for the realisation of the plan (ENVIROS, s.r.o., 2019). On the other hand, the web page of the **Mobility Action Plan** already includes the information on funding and investors for the realization of each project/action (Plán mobility, 2022).

2. Analytical capacity enables organizations to develop actions based on data and evidence. Those with the capacity must be able to obtain, manage and use the data (Salvador & Sancho, 2021, p. 4).

- Based on the documents published as a part of the Brno 2050 Strategy, Brno City clearly values data as an asset and ensures its use when developing policies. The Brno 2050 Strategy lists the source of data for each indicator measuring each value (Brno, 2021b, p. 21). Many of those sources are citizen surveys done by the city itself or their own sources of data. This shows that Brno has the capacity to have their own sources of data managed by teams of professionals and actively sources data from its citizens. These are then made public on the city data portal *data.brno*. Furthermore, each action plan or strategy listed under the strategic capacity was preceded by a data-driven analysis of problems and opportunities based on the pre-defined indicators. All these documents are made public and accompany the published strategies and action plans. Thus, we can conclude that Brno has solid information structures and uses them to implement data-driven decisions.

3. Organizational and management capacities include the ability to define the resources needed for the development of sustainable action, including human resources, administrative structure, budget, and organizational dynamics. (Salvador & Sancho 2021, p. 4).

- Brno City’s organizational structures include positions and departments specialized in activities linked to sustainable development policies. The Urban planning and development department and the Environmental department explicitly list sustainability in the description of their roles and function. But, for instance the personnel of the Transport department, Department of land and

building management as well as many others are responsible for the agenda linked to sustainable development and climate impact reducing policies (Statutární město Brno, 2022).

- Within this capacity, the organizational processes should be adapted to promote the sustainable agenda of the city. With regards to instructions relating to public procurement, Brno recently updated its small-scale public procurement guidelines and added the obligation to comply with the principles of socially and environmentally responsible procurement and innovation. This is however a mandatory provision introduced on a central level (Tiskové středisko MMB, 2021).
- The coordination system managing the exchange of information between internal units is partially covered by the Brno City's organizational department which ensures cooperation and communication between the Statutory city of Brno, the Municipality of Brno and the city districts. However, there is no specific department dedicated to ensuring the cooperation between the departments to guarantee the conforming to different strategic sustainability plans and alignment of projects. Similarly, the organizational scheme visually represents cooperation links between the organizational units, but none are marked between the individual departments. That said, it should not be taken as proof that the relations/coordination system do not exist (Statutární město Brno, 2022).

4. Collaborative capacity is linked to competencies such as promoting networking and involving external actors when developing public sustainable development policies (Sancho & Salvador, 2021, pp. 2-4).

- Brno City has the capacity to engage both private actors, other public actors and the civil society. The Strategy Brno 2050 is partially developed with and by the citizens via applications "Map of feelings" and "That's the kind of Brno I want" to measure the inhabitant's appreciation of the city. The partners from universities (Masaryk University, VUT...), scientific research centres (NEXT Institute, CEITEC..), companies, NGOs (ANNO JMK...) and individuals from the civil society also partook on the development of the vision (#brno2050, 2022).
- With regards to the Brno Municipality management structure, the Cooperation and development department is dedicated to management of external networking, more specifically coordinating cooperation with universities and research institutions, and promoting innovative solutions of Brno City to the public. Furthermore, the municipality has a separate department responsible for enhancing citizen participation and the open participation mechanisms (Statutární město Brno, 2022).

The development of those four preconditions gives the local government the potential to generate policies in support of the climate and sustainable development. **Brno municipality developed all four competencies.** When it comes to strategic competency and organizational and management capacities some elements such as clear definition of interdepartmental cooperation and internal dynamics are missing. The financing of policies included in municipality's action plans is not made clear; however, this is partially due to the fact that more details are yet to be published.

Nevertheless, even though Brno fulfilled all the necessary capacities it is only one of many cities in the South Moravian region. And as it has been stated above the issue of fragmentation put some limits on extending Brno's capabilities.

Overcoming the Fragmentation in the case of Brno Municipality

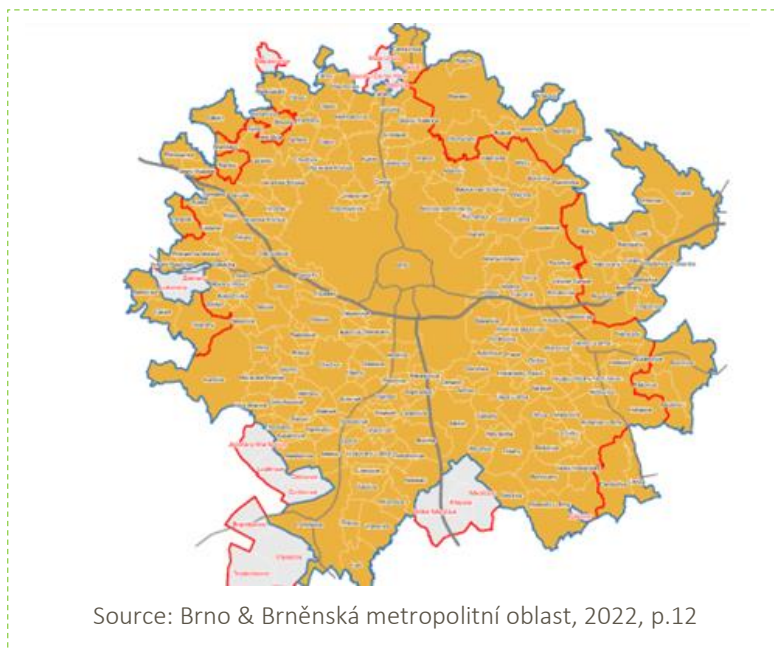
Brno Metropolitan area (BMO)

According to the OECD (2015), in order to reduce environmental impact and address other urban development issues such as transport infrastructure etc. the self-government units should act at the level that considers the central cities, in this case Brno-město, and the suburbs (hinterland) together. Metropolitan centres such as Brno City face pressure on their development and growth, reduction of green areas and do not have sufficient administrative capacity to provide public services in the whole hinterland. The central system of funding allocation to self-government units explained in the previous chapter highlights this point.

A document drawn up at the request of the Ministry of Regional Development of the Czech Republic includes the definition of the process of metropolisation and defines **the Brno metropolitan area** (Ouředníček et al., 2020). The strategy itself includes an objective to create internationally competitive metropolitan territories adapted to economic, spatial, and population growth.

BMO is an organic functional unit comprising the city of Brno and its natural background. This area is defined based on **intensive daily ties** (commuting, accessibility) and changes over time. It is a typical example of a monocentric metropolitan area - this area has **one core** (city of Brno) which is the strongest centre of services, jobs, education– and **hinterland**. Within the Czech Republic, BMO is one of the most developing regions, whose balanced development is needed to be coordinated systematically. However, until today there has been no legislative framework that would regulate the management of the metropolitan area, so the coordination of activities in the area is based on the **partnership principle** and thorough communication of the city of Brno with falconry municipalities. (Brněnská metropolitní oblast, 2022)

In the Czech Republic, a total of three metropolitan areas and 10 agglomerations are defined according to *the Regional Development Strategy of the Czech Republic 21+*.



Source: Brno & Brněnská metropolitní oblast, 2022, p.12

Brno City is aware of the functional links between the core (Brno City) and surrounding municipalities, i.e., beyond the administrative boundaries of the Brno Municipality, which makes planning and administration

of the territory difficult. Despite the legal conditions defining the Brno competencies and responsibilities only within its cadastral area, the Brno City has taken steps towards metropolitan planning.

“Cadastre is not a wall. And the time when it was enough to think within its boundaries is long gone. The Brno Metropolitan Area (BMO) includes a total of 184 municipalities with approximately 700,000 inhabitants. What one does in it will affect everyone. It would therefore be a mistake to look at the challenges and opportunities within the metropolitan area in isolation from others and to want to address them individually.” (BMO, 2022, p. 8)

Brno reflects this ambition both by including it in its *Brno 2050* Strategy and by drawing up a Brno Metropolitan Area Development Strategies. The planning at the level of BMO is mainly important to:

- Achieve balanced development of the whole area
- Effectively use the funding from the ITI (Integrated Territorial Investments) instrument

Since 2014, the European Commission has assigned an important role to metropolitan cities and municipalities in their hinterland when it comes to obtaining funding from the EU. Applicants from BMOs can use the ITI instrument to obtain funds and use funds from several sources to address one issue. The ITI without a metropolitan area planning is not sufficient on its own because it only focuses on the individual projects (Brněnská metropolitní oblast, 2022).

It is important to note that planning at the level of BMO is of interest both to the core and the hinterland, and not only when it comes to obtaining the EU funds. It has been shown that a higher share of educated inhabitants benefits not only the city by rendering it more productive, but also raises the productivity levels of the less educated that may be found in the hinterlands (OECD, 2015, p. 190).

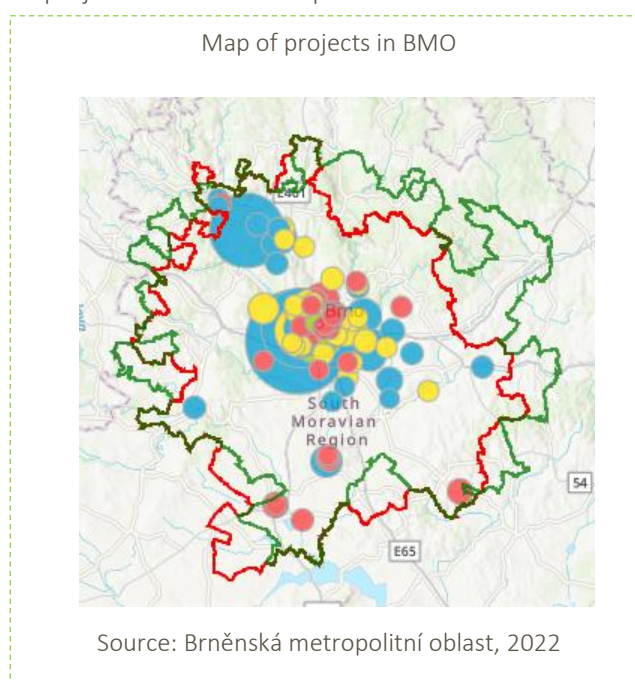
In the first half of 2019 new strategy **BMO 2021+** has been approved. This follows a previous initiative the **BMO 2014-2020** and aims at solving issues that are considered as priorities for other municipalities within the territory of BMO. The strategy part of BMO 2021+ is summarized in following categories:

- Vision of development
 - Common visions have been formulated based on a discussion between working groups comprising significant actors of BMO
- Four development areas and their goals
 - Mobility, environment, public services, and coordination of development– are the four areas for each a working group has been established
- Practices to achieve the goals
 - Practices has been specified by the working groups for each area of development
- Measures
 - Based on the Integrated strategy = solution based on one or more strategic projects which are compatible with each other to achieve greater results

(BMO 2021+, p. 39–40)

This document then provides the BMO actors with a detailed plan for the following years with the aim to efficiently achieve common goals and thus help the metropolitan area become more sustainable, equal, coordinated, and comfortable for life of the inhabitants.

The tools with which Brno can influence the metropolitan areas are clear: the main instrument lies in **cooperation**. By cooperation, the City of Brno City can influence other independent municipalities either functionally connected with Brno City or sharing mutual interests. Creating a common strategy and working groups is only one component of the whole process. Annually, metropolitan conferences are held in Brno, which bring together not only the BMO actor but others as well, such as politicians active on national level, non-governmental organisations or academic actors. Moreover, analysis and other documents in order to update the public or report about the progress are regularly issued – for example in the form of an interactive map of successful project as shown in the picture below.



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Chapter 5

The first part of the chapter describes the current vision of the circular Brno and the city's main strategic goals in the field of the circular economy. Based on what is envisioned by the city and the successful circular practices implemented by other European municipalities, we propose a concrete set of steps and recommendations for Brno City. These recommendations address crucial aspects that will serve Brno on its way to circular transformation.

Proposal for the City of Brno

Vision of Brno

Brno has a clear vision of its future development that includes the circular economy, and it is partially supported by the central government. So far, the Czech Republic has not dedicated much effort to this theme, but recently they did prepare a Circular Czech Republic 2040. In its own strategies, Brno implements a very systematic citizen inclusive (see subchapter Brno City Competencies in the Sustainability and Climate Agenda) vision of its future development, both long-term and short-term. The “Clean and Circular Brno” value is a part of the city's long-term vision with the main goals being:

1. Enhance **the cleanliness** of the city and make the most of the potential of the residual material.
2. **Reduce waste production** and make waste collection more efficient.
3. Increase the city's **self-sufficiency** in the area of energy and other resources.
4. Encourage and implement systemic changes in the field of sustainable development.

(Brno, 2020, pp. 64-65)

Majority of these goals are projected to be achieved both in the city and its metropolitan area, which is also partially the aim of this study – propose steps to be implemented by the City of Brno (core) that include cooperation with the hinterland and may be implemented throughout the whole metropolitan area in the future.

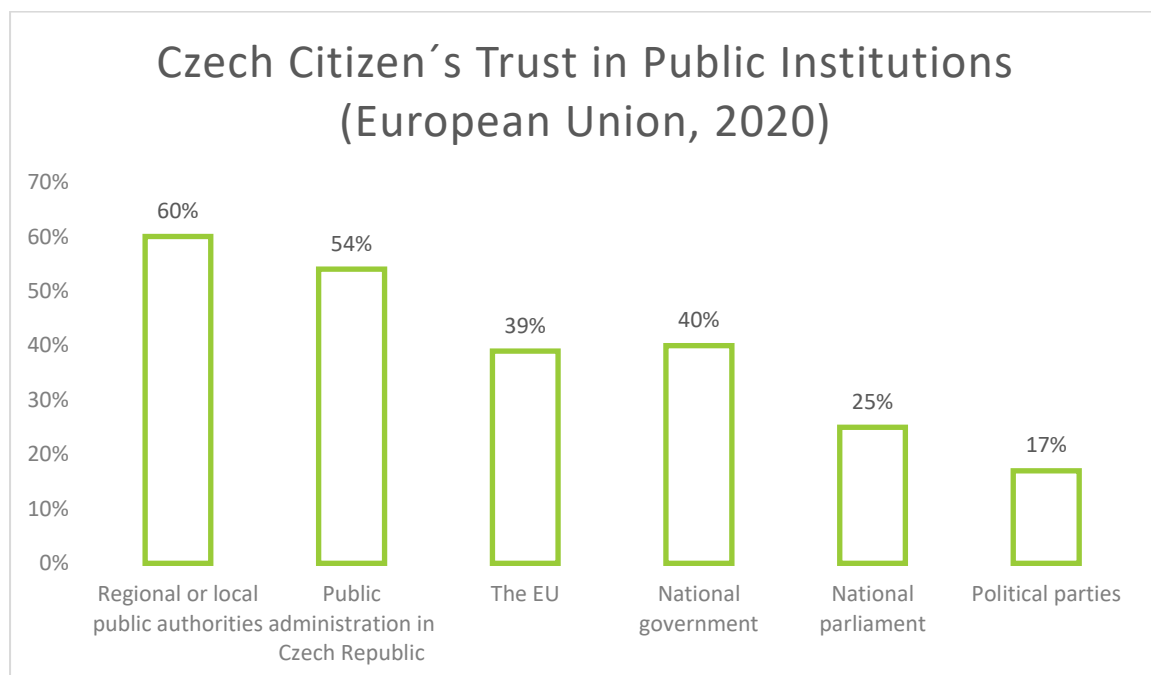
Furthermore, the document clearly states why circular is beneficial, defines goals and criteria to measure the achievements. What is more important, in its 10-year vision Brno defines the departments and actors responsible for each priority including regional authorities, businesses, waste management companies, schools and municipal departments (Brno 2021a). This already points to a great intent to create local symbioses with both private, public, local and regional actors. Among the concrete set of policies proposed in the Brno Action Plan, that is short-term vision are: the waste reduction, heat and electricity production from renewables, increased use of biowaste and realization of composting and restaurant food waste study (Brno, 2021b).

Based on its programmes, plans and strategies, it seems that Brno is not lacking in its vision, and to put it efficiently in practice **we propose multiple steps inspired by other municipalities** on their journey towards the economic transition.

We believe that **cities are important actors** in undergoing the economic transition **(1)** due to the public services they provide, where they can apply new business models and solutions and **(2)** they are in the position to inspire others. To make Brno a circular city, it needs to do both and use its human and material resources to do that.

With regards to the first point, Brno has strong potential for innovations and research and a very good network of universities and businesses that are partially already linked to the city. This boosts its ability to apply those circular economy solutions.

Regarding the second point, Brno City as a local authority is the closest to the citizens, it can connect more easily with them and have a large impact on creating valuable learning experiences to change their behaviour. When we talk about using human potential and resources, we also talk about citizens' trust as a resource. As mentioned, Brno City is well positioned in terms of closeness to citizens, but also trust. When considering the trust in institutions in general, local and regional authorities are in a better position when compared to national governmental institutions. In the Czech Republic 60% of citizens trust their regional or local authorities, while only 25% trust their national parliament and 40% the national government (See the graph below) (European Union, 2020, p. 60). This valuable resource should be tapped into as it may manifest in citizens' trust in the circular solutions and policies implemented by their local authority. However, and mainly compared to other countries discussed in this study and based on existing research, circular economy is not something that people are aware of or that politicians deem a worthy priority to discuss publicly and put in practice. Brno does invest in multiple CE solutions, such as turning the bio waste into biofuels, incineration of waste to create heat and electricity, but the question is how many people know of these solutions. Brno introduced a map to show people what to do to be circular rather than linear but does not show them enough why doing that is important.



(Source: European Union, 2020, p. 60)

Our proposal for the Brno is to become a **city that inspires**, not only the citizens but also businesses, other cities and regions and the central government, to take steps, such as adjustment of the legislative framework of financial tools, or budgetary changes to allow the circular transition to happen. Through implementing and then communicating its practices and successful solutions, Brno may set new standards for the other cities in Czech Republic to follow. To achieve this, Brno should use the full potential of its resources both human (citizens, NGOs, universities, and research centres) and material (waste, existing buildings etc.). This idea and the following steps are in line with the goals Brno is proposing and should help the city achieve them.

Critical Goals Regarding the Phenomenon

Since Brno wants to "develop systematically, with a clear vision of its future, together with its inhabitants", the city sought to provide answers to the following three questions:

- Where should Brno be by 2050?
- What basic goals should we set for that?
- How do we want to reach those goals?

In the previous part, the vision of Brno 2050 was introduced. In this chapter, now we have a look at the important objectives which are aimed to be achieved regarding the circular economy by going through the parts "strategic part", "programme part" and "action plan" contains specific priorities and measures over a longer and a shorter period.

6 objectives guide Brno's strategy

1. Attractive: The city aims to create the conditions for the personal and professional development of its inhabitants by offering them opportunities on all levels in order to build and strengthen an identity that is specific and appreciated by its citizens.

2. Developing: Brno values knowledge and experience, fresh innovation, and bold technological solutions. With its recognition in the field of scientific research and its investment in development, Brno is a prosperous city, attracting new talents, experienced staff and scientists and achieving excellence in specific areas of research, development, and manufacturing.

3. Vibrant: Brno is an open, tolerant, and socially cohesive city. It supports equality and mutual respect between all its citizens and new-arriving people.

4. Harmonious: The city promotes a unique balance between its urban and natural landscapes and creates a healthier environment for all.

5. Sustainable: Brno deals carefully and efficiently with resources and energy, its system and technological solutions are environmentally friendly and robust at the same time.

6. Well administered:

The administration of Brno wants to be simple and understandable for its inhabitants so that citizens take part in the development of the city.

OVERVIEW OF THEMATIC AREAS AND STRATEGIC VALUES

QUALITY OF LIFE			RESOURCES	ADMINISTRATION
ENVIRONMENT	PROSPERITY	SERVICES		
Compact and balanced city	Prosperous city	Healthy people in a healthy city	City with efficient water management	Shared vision and good name of the city
Architectural face of the city	Central European centre of research, development and innovation	Cohesive and respectful city	Energy-saving, independent and resilient city	Functioning Brno Metropolitan Area
Nature in the city	Educated university city	Cultural city	Clean and circular city	Efficiently functioning electronic administration and open data
City with affordable housing	International city	City of sports		Participation of the public in the administration of the city
City with efficient and sustainable mobility	Globally accessible city	Safe city		
Healthy living environment				

(Source: Brno, 2020, p. 11)

The broadest area of Vision 2050 is represented by quality of life, which encompasses a wide range of key topics. Among them is the **clean and circular city**: cleanliness is a natural part of the quality of life in the city and, to a large extent, a sign of the cultivation of society.

“The waste collection system in the city is as comfortable as possible, motivating, economically efficient, and respects the principles of a circular economy, while the emphasis is on the reuse of secondary raw materials from the region in the region. [...] In 2050, therefore, it supports the use and circulation of materials and nutrients in the city for as long as possible in the highest possible quality and their return to circulation.”

(Brno, 2020, p. 64)

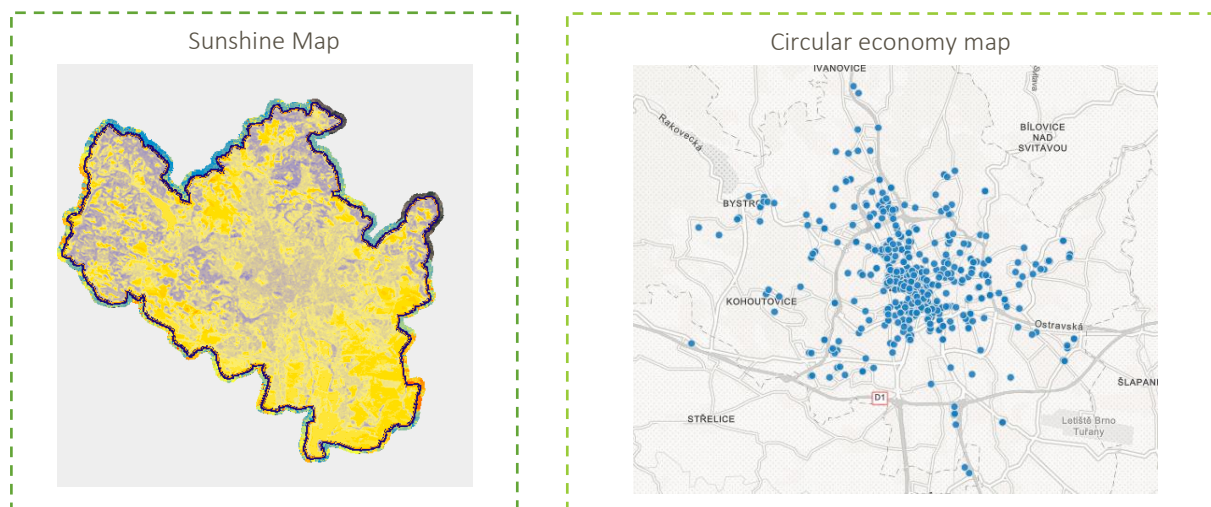
Benefit of a clean and circular city for Brno: The maximum possible use of materials within the city brings self-sufficiency to the city, development of the local economy, the creation of new jobs, and especially the creation of a healthy space in which the inhabitants of the city are actively involved.

Application Objectives and Recommended Steps

OBJECTIVE 1: COLLECTING DATA

Collecting data is an integral part of creating a strategy. It provides the policy planners with a robust summary of the current situation and reveals some issues that have been so far hidden. It may also help with targeting since every city is unique and has different issues. Therefore, being inspired by other cities' programmes and implementing the same steps and strategies may not be as efficient without collecting city-specific data.

Brno municipality already has some experience with collecting and analysing data, which can be seen in the **BMO 2021+ document**. Conceptualization of demographic indicators, such as the age, gender, occupation was prior to making a strategy. The document also provided data about some of the key common issues such as transportation, installed energy capacities or waste management (see BMO 2021+ strategy). With regards to the Brno 2050 strategy, a website **Data Brno** has been created, which provides information about several fields of interest such as–economy, environment, transportation, housing, education, health, and security. On this website several analyses are provided as well. As part of this initiative, the municipality has created an **interactive Circular economy map**, thanks to which one can see projects that has been executed so far. The city of Brno has also created an interactive **“Sunshine map”** (Mapa slunečního svitu) aiming to help the citizens and other entities with implementing photovoltaic panels onto the building roofs in order to utilise the solar energy. This strategy can be considered as data collection as well since it provides a detailed insight to the city's solar potential.



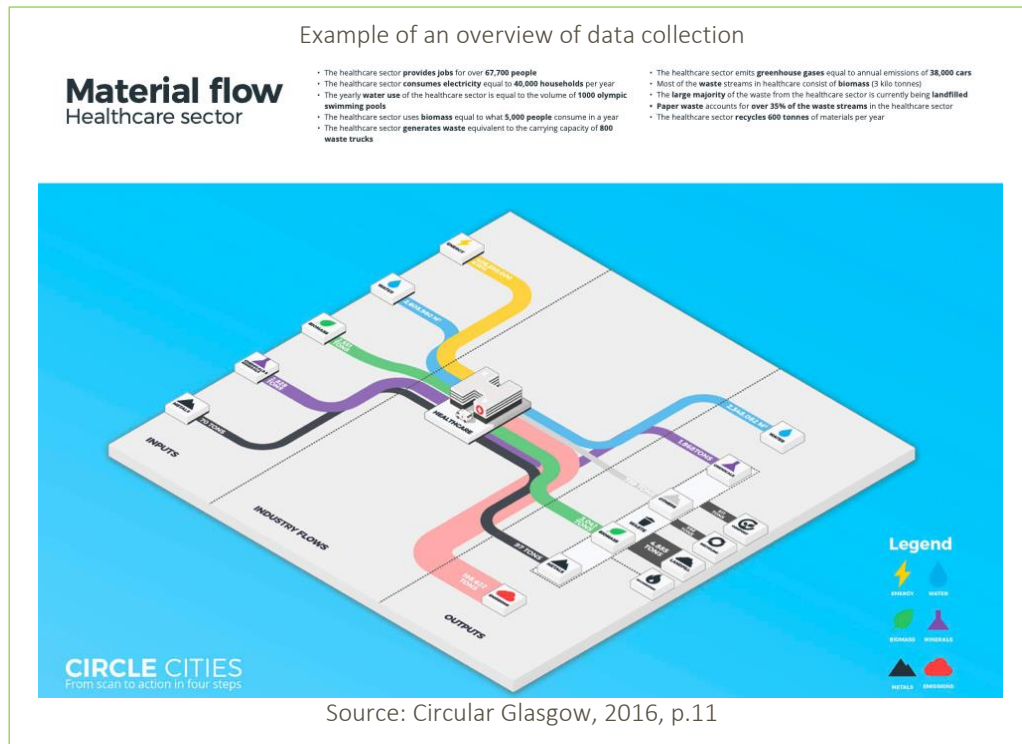
(Source: Příprav Brno, 2022)

Nevertheless, further data collection focused on circular economy issues could help the city achieve better results, such as data concerned with the frequency, amount and type of waste disposal; which sector or actors are responsible for the waste disposal; amount of water and energy required etc. The good practice of data collection is shown in the example of Glasgow below.

Example of Glasgow

The city's actors provided financial resources to a specialised non-governmental organisation called the **Circle economy** to identify Glasgow's potential for circular economy. Thanks to a Circle City Scan tool developed by the organisation a document called Circular Glasgow has emerged. It highlighted the areas in

which the city can benefit the most, since they are economically significant, and even nowadays the city policy makers are using the data to create new strategies.



The Circle City Scan has revealed four sectors (healthcare, education, manufacturing, food & beverage) which are responsible the most for waste disposal, water consumed, and energy demanded. Therefore, targeting these areas might bring the most viable solutions to the city. Further defining the nature of the waste– what kind of waste (biomass, paper, plastic) and whether it is recyclable or not may deepen the efficiency of problem solving.

For example, if the Brno municipality decides to follow the Circle City scan technique and it reveals that one of the critical sectors regarding the waste disposal, especially the food waste, is the education sector, then the municipality can create an efficient strategy (for further proposals check the box in the Objective 2 “Food Waste Solutions for Brno”).

Our recommendation

For the data collection purposes we recommend deepening the process of data collection for example by cooperating with non–governmental organisations, universities, or other actors, who have an expertise on the issue of circular economy. Collecting data is an important first step that not only facilitates the change but saves money as well, since the strategies are more targeted and thus more efficient. Even though Brno has some experience in data collection, the information is provided in a rather fragmented way⁷, which means that no coherent document considering all the necessary data with regards to the circular economy exists. However, this could be highly beneficial to the city planners, since it would connect different points of interests together which further allows one to see how impact in one area could be beneficial for others, together with achieving greater changes.

⁷ See here <https://brno2050.cz/podklady/>

OBJECTIVE 2: CREATE A ROADMAP

Recently, due to climate change, policy makers on the international, national, regional, and local level tend to choose more climate-friendly approaches. This may result in proclaiming bold targets such as “becoming net-zero by 2050” or “waste-free by 2050”. Even though it sounds nice that the policy makers are determined to contribute to global efforts to have a more sustainable future, it may awaken some scepticism with regards to achieving these goals. Therefore, it is also important to mention how they intend to do that. For this purpose, a robust strategy is needed. Starting with the data collection, as has been discussed in the previous chapter, analysing potentials, formulating goals and creating mechanisms is needed as well.

Example of Brno: efficient and sustainable mobility

One of the Brno 2050 goals is to become a "city with efficient and sustainable mobility", which means that Brno wants to implement an efficient, open, and permeable mobility system that offers the inhabitants solutions that meet their requirements. The goal is therefore to achieve a high quality, reliable and environmentally friendly public transport system which offers comfortable and barrier-free travel to all groups of residents. The goals pursued in this direction are therefore the following:

- Increase attractiveness and use of sustainable modes of transport (public, pedestrian, and bicycle transport) thus reducing the negative impact of transport on life in the city in the context of the whole Brno Metropolitan Area
- Improve quality of city environment
- Create an efficient and permeable transport system that makes it easy to choose the type of transport that best suits the needs of users
- Approach mobility in the city as a service
- Support and implement innovations in transport.

(Brno, 2020, p. 25)

Even though in the document Brno 2050, the goals are demonstrated together with specific data and indicators, any notion on how Brno is going to achieve its goals is provided. Nevertheless, it seems that the policy actors intend to further elaborate on the methods since each goal is managed by various experts; and we highly recommend that because providing the “HOW” reduces the scepticism, which brings us to our next objective— raising awareness.

Example of Milan

An example of good practice can be seen in the Milan Food Policy. The city formulated its goal to reduce food waste by 50 % until 2030. Prior to this, collection of data and their evaluation by various food experts were necessary. Later the actors defined four specific steps on how to achieve these goals: raise awareness, implement fiscal measures, create local food waste hubs and biogas stations. Each of these steps has then been further specified— for example in the case of fiscal measures the municipality introduced a 20 % reduction on municipal tax if the actors donate their food to charities or food banks.

As the case studies above showed, it is important to not only set realistic goals, but to think of specific steps that would help to achieve these goals.

Therefore, it is not enough to say: “we want more...” but to ask, “how can we achieve it”.

Food Waste Solutions for Brno

Inspired by the case study of Milan we recommend some possible solutions for the Brno municipality regarding the food waste.

1. Education Sector

Brno municipality has control over preliminary and primary schools; therefore, it could easily follow the case of Milan in which they started a project educating children about the food waste and possible solutions on how to reduce it. This can be done by broadening the already existing initiative of the Ministry of Agriculture called “Fruits, vegetables and milk for schools” by not only informing the children about the issue of food waste, moreover by adding a reusable bag allowing the kids to store the food they were given for the net day instead of wasting it. In the case of Milan, they achieved to reduce 17 % of food waste by similar doing.

2. Wider public

The city of Milan focused on helping the citizens with less fortunate life–situation by creating a local food hub in which citizens may donate but also take food that would be thrown away. The local food hubs may be created by renovating city’s brownfields. Another possible solution is to cooperate with food charities. The city may incentivize companies with high food waste concentration, such as restaurants, private–businesses or canteens, to donate the surpluses to such charities instead of wasting it. The motivation could be arranged by reducing the municipality tax– for example by paying less for the municipal waste fee.

Third possible solution regarding the food waste is more economic one and it lies in the idea of turning food waste into biofuels. If the Brno municipality and the SAKO company could provide the citizens with special bags dedicated to the food waste and arrange the regular service for the waste collection, the huge amounts of food waste then can be transported to a facility in which it is turned into a biogas that can be further used for other purposes. Collecting food not only from restaurant but also the citizens may help to achieve greater results.

Our Recommendation

When setting a goal, one should ask questions. Firstly, why the issue exists, when has it emerged and how it can be possibly solved. This may help to identify the nature of the issue, its origins and the current situation regarding the phenomenon. It also brings one to think more about the possible solutions regarding the problem mitigation. When the existence of the issue is recognized and the goals are set, it is time to frame the phenomenon in its full complexity for which multidisciplinary view is often needed. For this purpose, creating a visual mind map could help.

OBJECTIVE 3: RAISING AWARENESS

Based on existing studies and a public survey it seems awareness and the existing culture are barriers to the development of the circular economy in the Czech Republic....

“Consumers are not interested in ecologically responsible products and services, and at the same time are great traditionalists... company employees are not very enthusiastic about contributing, and social responsibility or sustainable business do not play a big role in strong company departments”

(Klepek & Velová, 2018, p.8)

Thus, to make the Brno 2050 strategy feasible, it seems essential to focus on the aspect of **explaining and teaching** the why and how of circular economy to the general public and businesses. In its 10-year vision Brno sets a priority of teaching and informing citizens on the sustainable development, specifically they aim to create a circular economy platform, launch a campaign and competitions (Brno, 2021a, p. 68). However, there is no such a policy proposed in the Action Plan. To raise awareness about the circular economy among the citizens, Brno could easily inspire and implement some of the practices on raising awareness functioning abroad.

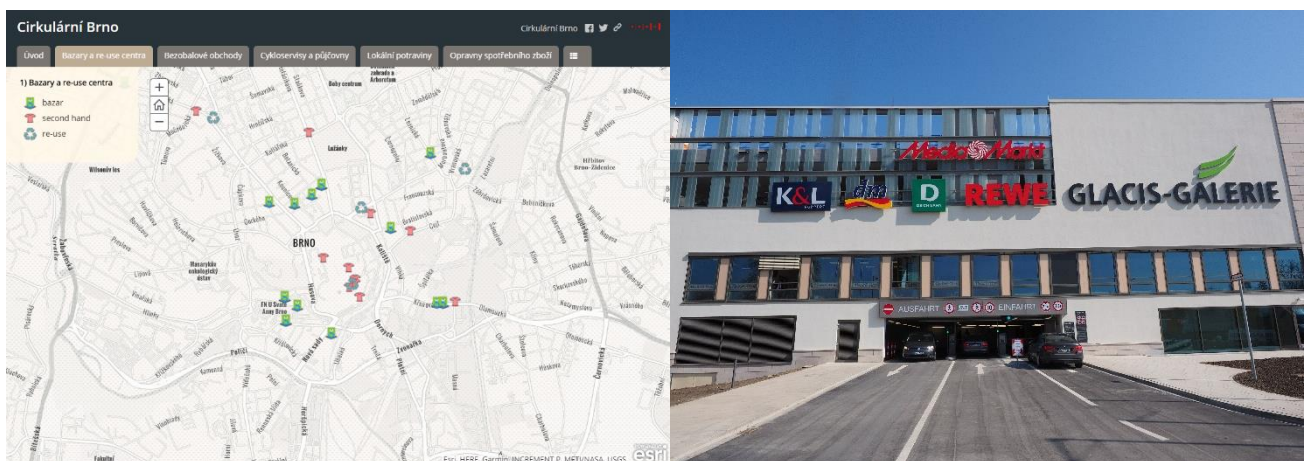
Example of the circular shopping centers

Brno 2050 Strategy includes circular goals: make the most of the residual material, reduce waste production, higher resource self-sufficiency and efficient waste collection (Brno, 2020, p.65). However, achieving circular goals largely boils down to the choice of the individuals to opt for the circular solution.⁸

When it comes to making decisions in favour of the circular economy raising awareness amongst citizens is key. An easy way to do that is to make the circular economy solution visible, tangible and something people encounter and use every day – such as going to the shopping centre. This way, the citizens will view the CE as something that they can relate to and understand. There **circular shopping centers/hubs** already exist in Europe, for example the Yuman village in Brussels and de Potterij in Mechelen (see chapter 3; European Union, 2019).

This solution would function similarly to the **Brno circular map** in terms of providing access to circular shops, services, and organizations; however, it would be a visible part of urban environment, raise more awareness and create a **one-stop shopping experience**, which is very convenient for the citizens as it reduces their effort and the number of trips they need to make to access the circular services.

To enhance circularity principle in implementing a new solution, Brno could opt for transforming its **unused public property**, such as the brownfields near main train station or the Židenice barracks into circular economy hubs/centres.



Brno circular map versus shopping centre. Sourced from pexels.com, priprav.brno.cz.

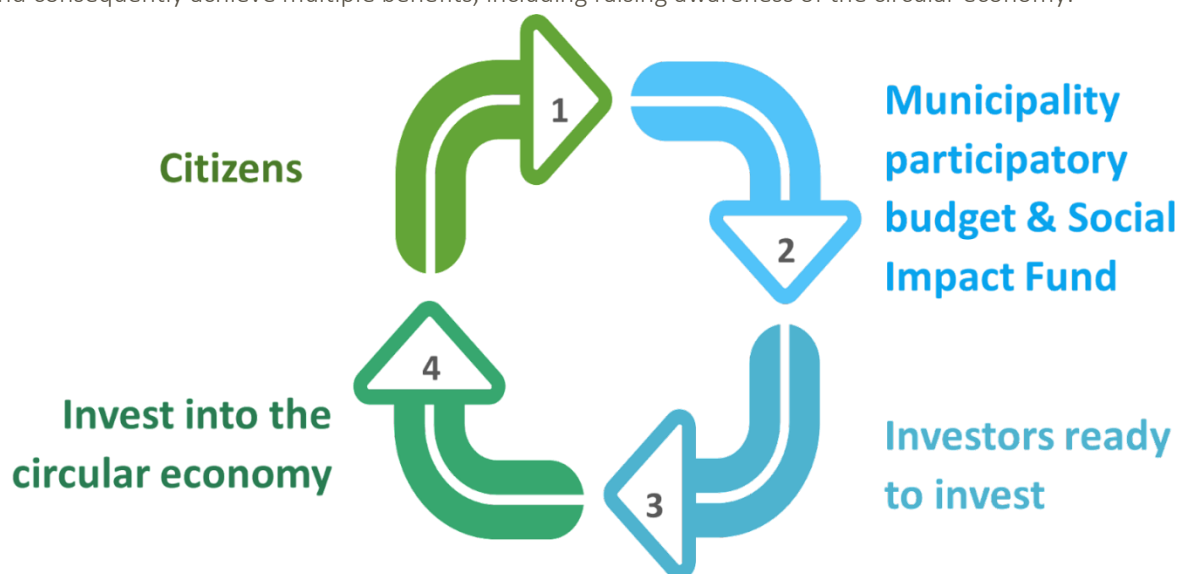
⁸ This can be further supported by other tools such as implementing a new payment scheme for the waste collection to incentivize the citizens to reduce their waste production and increase the recycling rate. Brno already plans to do this, see goal A (Brno, 2021a, p. 67).

Our Recommendations

As our case study reviews shows, **municipalities rarely implement a CE project themselves** and solely from their own funding; a partnership with other institutions and actors is usually needed. For a municipality to implement circular projects focused on raising awareness, such as the circular shopping centre, large initial investments are needed. This is where Brno could once again seek inspiration abroad by looking into the social impact funding.

Social Impact Funding: Raise Awareness and Investment at the Same Time!

Here are some key steps that Brno City can make to raise funding for implementation of its circular projects and consequently achieve multiple benefits, including raising awareness of the circular economy.



The Social Impact Funding and Raising Awareness Process, Source: Authors.

1. Citizens

First, Brno city could collect citizens' opinions on which type of CE project they would like to see in their environment. Brno already has experience with citizens participation mechanisms such as *Pocitová mapa* and could use it to map citizens views again. Including citizens in the decision-making would promote active citizenship and allow the citizens to take responsibility for their environment.

2. Use the municipality participatory budget or a social impact fund

Second, the municipality would need to finance the chosen idea. They could either dedicate a part of their **participatory budget** to the circular projects and let the people vote or they could create a **social impact fund**. This would connect citizens' and municipality' ideas with the investors that want to invest, but do not know where.

A **social impact fund** does not aim to maximize profit but the positive social impact. It can have the form of a cooperative development fund, so companies and citizens themselves can invest in making their neighbourhood, district, or a city more circular and sustainable. This, coupled with the revenues from the investment can serve as an incentive to invest.

Impact investing is a novelty in Czech Republic; however, the practice is well established in other parts of the EU (French PHITRUST, IMPACT PARTNERS FRANCE, StadsMakersFonds, CB ESPRI Impact One.).

- **Belgium** – StadsMakersFonds invests in socially impactful projects. It is a cooperative development fund focused on co-financing the repurposing of buildings to create places for sustainable and local

entrepreneurship, build community and aid vulnerable groups. The fund does not have any criteria for investors – anyone can invest. (Stadsmakersfonds, 2022)

For instance, Mechelen is transforming an unused public building into a circular lab with restaurants, stores, workshops, start-ups etc. The creation of the lab is partially financed through Stadsmakersfonds. The city of Mechelen succeeded in raising the awareness by creating a CE lab and finding finances to implement it (see chapter 3).

- **Slovakia** – Miroslav Beblavý and Crowdberry created investment fund CB ESPRI Impact One to support the social economy in Slovakia. The majority of the funds were invested by Slovak Investment Holding (10 millions EUR) from the European Social Fund. This way, it is possible to use the EU Cohesion Policy to gain funding, but it comes with a set of EU regulations. As a result, the organization is not as flexible in their spending. (Koreň, 2022)
- In the **Czech Republic** similar practice allowing individuals to make more sustainable investments was established. Česká spořitelna has a new product line of ESG funds for sustainable investments. ESG funds include bonds and stocks issued by companies that meet responsible and sustainable business standards. This allows for sustainable investing but does not have the added value of enriching one's own environment and directly seeing and benefitting from one's own investments.

To **create a cooperative development fund**, the city could either partner with a fund and form an agreement on using the funding to invest into the local CE projects. In return, the municipality could provide some investment from the municipal budget. Or the city could create their own social municipal fund and find investors.

3. Raise investment from companies, citizens, and other subjects

To support the project and invest into a social impact funds, citizens and companies should be informed on the importance and benefits of the circular economy solutions the city wants to implement. Municipality could partner with other organisations, impact hubs and labs, and launch a campaign both on and beyond the social media.

4. Let the investment have a social impact = implement a solution

With the raised finances, Brno would implement the local circular solution such as the circular center. This would maximize the **local social impact** which links us back to the first step, the citizens, as they would **directly benefit from the solution** in their everyday lives and understand the circular economy better.

As mentioned in the beginning, the implemented solution would create **more awareness** of the circular economy. Circular economy shopping centres/hubs and similar projects introduce the circularity into the everyday lives of people naturally and can make the CE part of the everyday shopping experience. They are tangible manifestations of circular economy principles and a natural part of the city environment. They are very visible and easy to grasp, but still new models of production and consumption that promote learning about the CE. The awareness itself does not easily translate into measurable reduction in emissions, energy consumption or climate impact but helps build support from below that is needed for the circular transformation.

Besides, the circular shopping centre, city could opt for building other common circular spaces with a similar function of raising awareness about the circular economy. One example comes from the case study of Milano city. **Milano's food hub** for collection of the food that would be thrown away has not only changed the practices of the citizens but created awareness about the food waste issue. Rather than wasting the food, citizens may help others by donating food into several hubs created in the city. Citizens may then feel better about helping someone in need, which strengthens the community ties and increase the possibility that they will do it again, until it becomes an integral part of their practice.

Outcomes:

- Allowing socially impactful investment encourages people to take responsibility for their environment.
- By repurposing municipal buildings, the city uses otherwise abandoned unused resources.
- The solution taps into the ability of the municipality to engage more actors, connect with businesses and citizens.
- The implementation of the project itself can create local jobs and make the CE stores, shops, and organisations more easily accessible.

Challenges

- Investors may be too demanding in terms of wanting to make both big social impact with their investments and have a huge revenue from it.
- It may be difficult to find investors for a newly introduced fund.
- Impact investing is a novelty in Czech Republic and people may not believe that it is possible to profitably invest into a project with positive social impact.

DIGITALISATION

In addition to OBJECTIVE 1 & 2 we would recommend a digitalisation of data and projects. Brno has already made some steps in the sphere of digitalisation; therefore, it is only a reminder to continue with the practice of digitalisation since there are multiple benefits connected to it.

Facilitating access to the circular economy - the role of communication and digital tools

As we have previously underlined, one of the main challenges of the circular economy concerns its accessibility, which involves raising public awareness, but also the provision of tools allowing them to be informed and to move to action easily, even on an individual scale.

The Municipality of Brno can play an essential role in raising awareness of the circular economy by disseminating information through the **local press**. Local media can carry out investigative work on the circular economy to promote the model and encourage the population to adopt reflexes in its direction.

In France, **the Cycl'op platform** lists and organizes all circular economy initiatives in the Occitanie region according to various criteria allowing its users to be informed on the subject. Grenoble, elected European Green Capital for the current year, encourages everyone to get involved and to amplify their actions in favor of the planet thanks to a fun and accessible website where you can find 43 challenges, divided into 12 themes and 114 ideas for actions for the planet that can be done on a daily basis, whatever the means available and the scale of the action.

We have also seen that in Finland the first **Road map** to a circular economy has been developed, listing a set of behaviours to be provided in several areas to achieve this objective.

These three examples illustrate various ways to promote circular economy initiatives that are accessible and can be implemented by the Municipality of Brno.

OBJECTIVE 4: REUSING WASTE

Reuse and Redesign

Reuse and redesign policies make up for a large part of the circular economy policies aimed at reducing waste production, prolonging the life of products/materials, and increasing their value. The municipality aiming for transition to the circular economy should focus on these activities as they are essential for closing the loop. Construction and building material, and items such as furniture, fixtures or electronics make up a substantial part of the waste collected at the waste collecting centres in Brno. The amount of waste collected at the centres is smaller compared to communal waste collected from people as shown in the graph below. However, compared to mixed municipal waste, the type of items and material collected at the collecting centres are more easily reusable, consequently, this part of waste production can be further decreased.



(Source: Statutární město Brno, 2021)

According to the Czech legislation, reusing is allowed: “a movable thing, which has been handed over to a place designated by a municipality and which can be used for its original purpose in accordance with other legislation does not become waste if it has been handed over for re-use... During construction, demolition etc. the waste producer must ensure highest possible rate of reuse and recycling” (541/2020 sb. Zákon o odpadech, 2022, §12§15). Similarly, the EU regulations require 70% of the non-hazardous construction and demolition waste to be recycled, reused, or backfilled (European Commission, 2016, 38).

Some municipalities, including Brno created a space at the waste centres dedicated to reusable items. This naturally decreases the illegal practices that were, and potentially still are, going on at the collection centres, such as reaching an agreement with the operator of the facility to exchange an item for a sum of money. In its effort to decrease the waste production, Brno city in cooperation with the city's joint stock company SAKO launched the project “**Second life**” (Druhý život) allowing for the reusing of old items brought to the waste collection centres (SAKO Brno a.s., 2022).

- People can bring smaller items (books, toys, CDs, sports equipment, kitchenware...) to **RE-USE** points located at some collecting centers and anyone can buy them for symbolic prices.
- Project **RE-NAB** allows for the old furniture from collection centres to be given to the socially disadvantaged
- **RETRO-USE** –historic items which may be reused in theatres or museums are given second life

However, this solution discards a wide range of items and materials that could be reused and would not have to enter the waste treatment process, such as construction material (brick, tiles, wood), items such as light fixtures or damaged items. At some collecting centers, individuals may buy preselected small items; however, **companies, individuals, and other actors do not have access to the majority of the waste collected**, they cannot see what is available, where it is located, nor the quantity or the condition of the item, consequently, **it is not being reused, repaired, redesigned and repurchased**. Our recommendations will thus focus on reusing waste collected at the waste collecting centers – the waste that is not being reused to its full potential.

Our Recommendations

1. SAKO and Brno Municipality would create a digital inventory of reusable materials and items.

To remove the barriers to reusing collected waste – Brno could create a digital inventory of the materials and items. This solution was already created by the company **Loopfront** and implemented by the Asker municipality in Norway on a limited scale (see chapter 3 “The GreenStock Platform”). Brno could either purchase it or opt for a tailor-made solution. The items/materials could be registered directly at the waste collecting centres upon bringing them in or, to reduce the pressure on the centres, it could be registered by the waste producers themselves, e.g., a company could register inventory in their buildings or materials after a demolition/reconstruction. This would create a **bank of items/material in the Brno area**, accessible to both citizens and companies. The platform would have market functions: (1) “register an item into the database” with all the technical information and location of the item and (2) “reserve the material for reuse”. Similar to the Loopfront solution, report functions would be added.

The digital solution should incorporate functions to calculate (1) waste reduction, (2) financial savings, (3) decrease in CO2 emissions, similar to GreenStock solution.

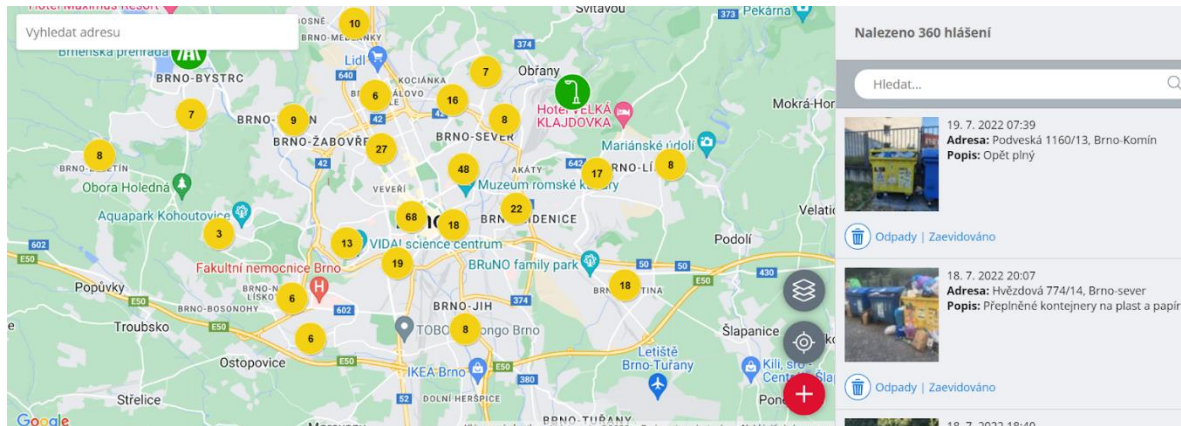
Besides registering waste from collecting centres we propose to **integrate existing web solutions** such as Bazoš.cz or darujizaodvoz.cz into one digital platform (see visualization below). The final platform would list all the material/items available for reuse in the Brno area that can be found on different web sites. Similar to that Tripadvisor, the users would be linked to the original source. This comprehensive solution would increase awareness of the already existing solutions, provide better access for the “buyers/re-users” and “waste producers” and decrease the amount of waste going into the waste treatment process even further.



Authors' visualization (2022)

2. Integrate the digital inventory into the Brňáci pro Brno application.

Brno could integrate the digital inventory into their existing app solution that is already known by the citizens. As shown in the picture, the items available for reuse would be marked on the map according to their location and more information on the selected items would be shown on the right side of the layout. Adding a new feature to already existing app can easily increase the awareness of the digital inventory among the people.



Sourced from Brňáci pro Brno.

3. Municipality could strive to assure EU funding

Since digital and green transition are currently the main priorities of the EU, the Commission financially supports digital circular economy solutions (e.g., the Horizon programme). Municipality could strive to assure funding from EU funds for the project.

4. Engage companies and social work centres in repair and redesign

Brno could partner with the local (both in core and hinterland) **social working centres** from the Chamber of Social Enterprises and Socially Responsible Organisations. Working centres would be in charge of redesigning and repairing the items that could be later repurchased (Komora sociálních podniků, 2022). Opting for centres in the hinterland would also create more jobs **outside the metropolitan core**.

- MYJÓMI (recycling, reuse, assembly, disassembly, sewing workshop)
- SIMEVA (painting, masonry) cooperates with JMK on creating protected jobs for the socially disadvantaged

Brno could also engage design companies and universities such as the Faculty of Forestry and Wood Technology at Mendel University or FaVU to design new prototypes made from items/material registered in the platform. This would create more **local jobs** in the circular economy and, again, maximize the local social impact

5. Procurement of redesigned/repaired items

Ensuring redesign and repair would allow both public and private actors to buy reused rather than new, for example when furnishing municipal buildings, such as school, the city could furnish it with redesigned furniture. This would support the green public procurement, which is a goal of the Brno municipality.

6. Inform about the solution via competitions and a newsletter

The success of the solution depends on the awareness of it. Here we have two main propositions.

First, to send out a **newsletter** to all the stakeholders and citizens in a form of list of new materials and furniture added to the inventory. Second, launch a **competition** for the most circular district and company, and include reusing waste among the evaluation criteria. This would also incentivize actors to procure these redesigned items.

Furthermore, Web app “Odpadové hospodárstvo”, “PripravBrno” and other partners that could participate in the solution such as ImpactHub (partner of the Chamber of Social Enterprises and Socially Responsible Organisations) or SAKO could promote the platform and raise awareness on the opportunities to access the reusable items or materials.

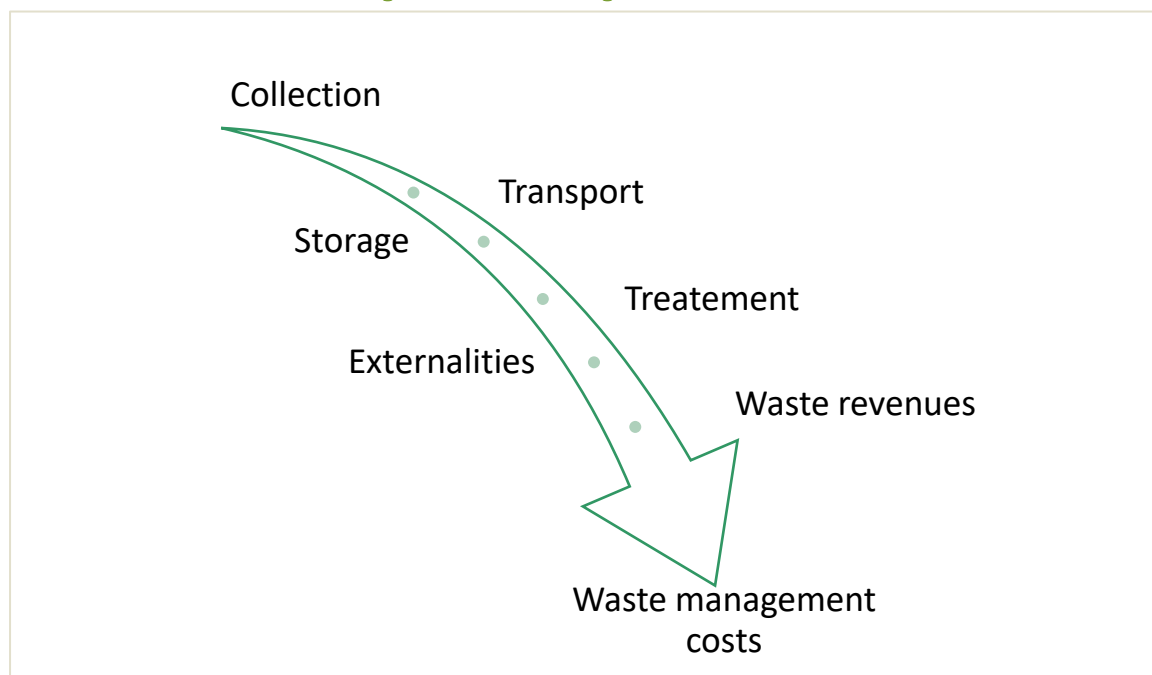
A. Local Benefits of the Solution

Lower municipal costs for waste management and efficient utilization of the local resources

Reduction of municipal costs for waste management would happen at multiple stages: collection, transport, storage, and treatment of the waste. Part of the waste would not even enter the municipal waste management system as it would go directly from the "waste producer" to the "waste user" (individuals, companies, re-design work centers...). The digital inventory diverts materials and items away from the system, resulting in less energy and financial resources spent on the collection, transportation, storage, sorting, and treatment. The waste registered into the platform at the collecting center would have to be stored by the city; however, the costs for waste treatment and the environmental externalities (climate change, CO2 emissions, health costs, loss of ecosystem or biodiversity) would still be lower because the waste would be re-used and wouldn't enter the waste treatment (Department for Environment, Food and Rural Affairs, 2011).

Asker municipality with approx. 96 000 inhabitants implemented the digital solution on a limited scale (for fixtures and furniture from municipal buildings and available for municipal staff only) and has made financial savings, lessened their waste production and CO2 emissions (Skanche, 2022). Similar or better results are expected for Brno municipality, depending on the scale and success of the operation. The municipality could use the financial savings to support other local development initiatives.

Stages of waste management costs reduction



Authors' visualizations based on Department for Environment, Food and Rural Affairs (2011).

Less waste ends up at landfills

The waste from collecting centers can be recycled, transferred to a landfill, or burnt. All waste management results in some costs for the city in the form of direct expenditures or externalities. In case of waste incineration, energy recovery can be made, however, construction waste cannot be burnt. If the waste ends up at a landfill, the negative externalities linked to environmental issues are even higher. Some reusable items or construction materials such as tiles or bricks that cannot be incinerated wouldn't have to enter the waste treatment process and could be directly re-used.

Utilization of the maximum potential of the local materials (increasing re-use and re-design activities)

In other words, the waste from waste producers (the companies, individuals, and public institutions) would become input for the "waste users" (individuals, companies, re-design centers, and public institutions).

Making a wider range of items and materials available for public use and assuring re-design and repair removes barriers for re-using the waste. The digital platform makes disposal, i.e., offering waste for re-use/repair/re-design/ or accessing the reusable materials and items more accessible. The waste may be re-used directly, or a company may increase its value by re-designing/repairing and creating a new product which can generate revenues. This allows for more efficient management of municipal resources, both financial and environmental.

Less illegal practices

Illegal practices such as disposing of the construction material into the communal waste and illegal dumping (of furniture etc.) next to containers are unsustainable and result in higher municipal expenditures if, for example, no one takes the trash next to the containers and the SAKO company collects it. Individuals or companies may be more motivated to get rid of their waste in a sustainable way if they would not need to bring it to the waste collecting centers themselves and could offer their reusable materials or waste on the digital platform.

Green procurement and financial gains

Both private and public actors are unlikely to use the furniture from waste collecting centers to furnish their buildings at the moment. By launching cooperation with re-design work centers, the companies and public institutions would be more motivated to opt for buying re-used than buying new. This could increase green procurement both in the private and public sectors (Brno city). The municipality could even accrue more financial savings if they opted for buying re-used and repaired instead of new when refurnishing municipal buildings.

Creation of local jobs in the circular economy

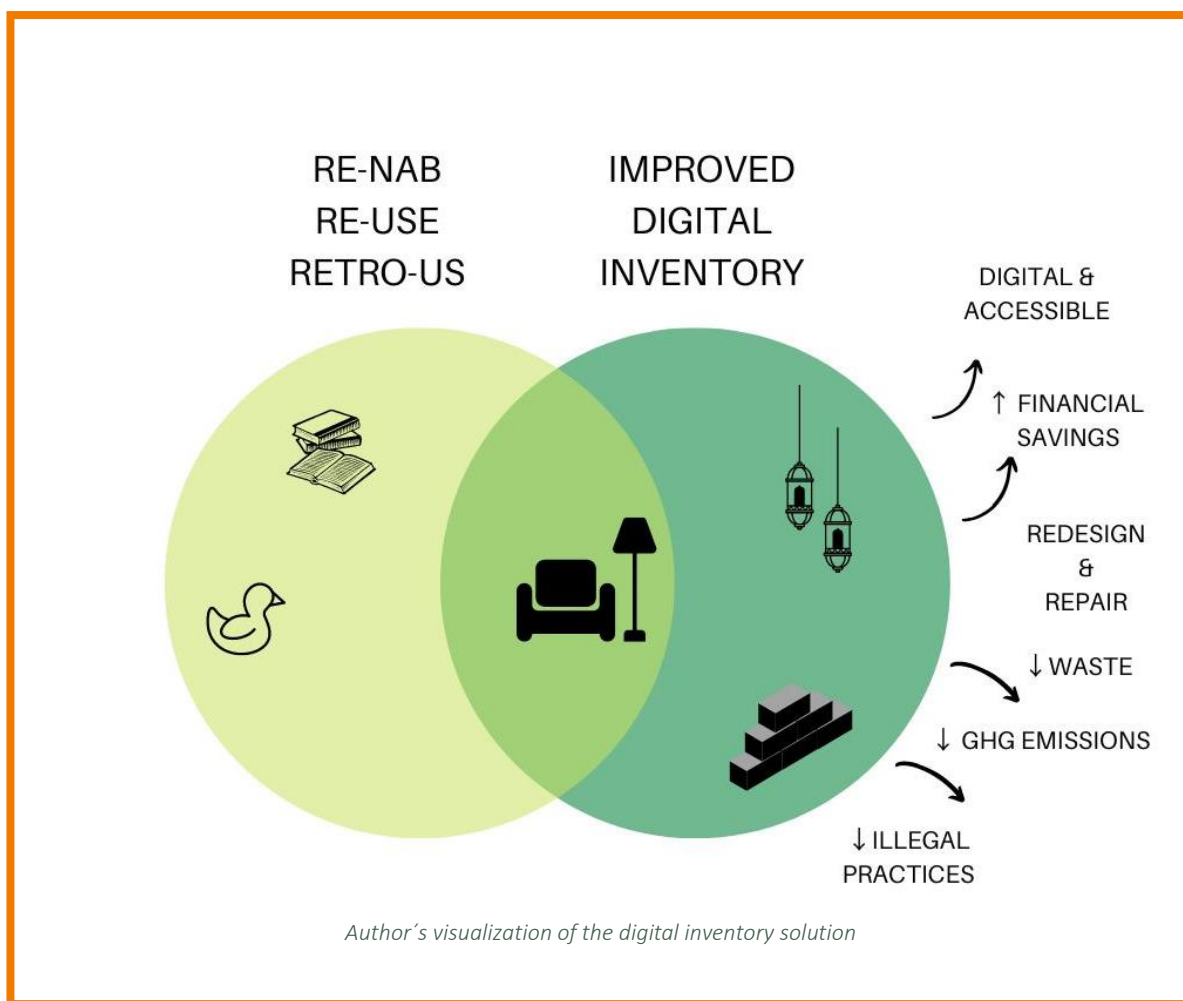
By cooperating with social working centers or other companies focused on re-design or repair, Brno would create more local jobs in the circular economy and enhance the skills of the citizens in the circular economy.

Helps to achieve and track Brno's strategic goals

The outcomes of the solution (less waste production, increased rate of re-using waste) align with Brno's strategic goals. Furthermore, a digital inventory tool that tracks waste reduction, CO2 emissions reduction, or energy and financial savings is suitable for monitoring the city's progress in achieving its goals.

B. Challenges of the solution

The elaboration and the implementation of the solution can lead to multiple challenges. (1) **Initial investments** and more personnel for the implementation of the digital solution would be needed. This could be partially offset by EU funding which supports both circular and digital solutions. (2) **Guidelines** on what type of waste is suitable to record on the platform and **monitoring processes** would have to be put in place as there are risks linked to reusing hazardous waste.



OBJECTIVE 5: COOPERATE WITH BUSINESSES

The city actors are rather limited in the scope of their power and finances. In order to facilitate the transformation to a circular economy, cooperation with businesses is an important step which can be beneficial for both sides.

The city of Brno already has some experience with regards to cooperating with businesses. On their website **Prepare Brno** (Připrav Brno) they show numerous examples of good practice which have been enabled by collaboration with dozens of companies in the Brno metropolitan area (see picture below). However, only a few of them have been dedicated to the circular economy – for example, IKEA's initiative “Second life to furniture” or testing biomethane buses by Dopravní podnik města Brna.



Example of Glasgow

In the case study of Glasgow, several examples of small business projects have been given. Each of the businesses focused on different areas – food, textile, construction industry or culture, thus providing an insight on how a circular economy can be innovatively incorporated in various domains of our lives. What these projects have in common however, is the matter of finance and other forms of support, which can be provided by the city.

An example of good practice can be seen in supporting a local small business or a start-up company with an innovative idea which lacks necessary finance in order to execute its plans

As in the case of Revive Eco whose activities aiming at reusing coffee grounds have been financially supported by the Scottish Zero Waste Fund.

Even though Brno has made some progress in cooperating with businesses, it was not the case of local small businesses or start-ups. In Brno there are more than 1100 restaurants, bars, coffee houses or brasseries (Prokopová, 2018). Brno was also once considered as “Moravian Manchester” since the textile industry represented an important component of the city's economy and on these historical roots some companies are intending to build and revive their business. The construction industry is also important for Brno. Therefore, there are many hidden possibilities for the city to support local and small businesses, with different points of focus, on their path towards a circular economy.

The Coffee Industry

In Brno there is definitely a strong coffee culture. There are many places where one can buy a coffee—therefore the amount of coffee waste must be tremendous. However, it is not being sorted nor collected separately, despite it's potential. Coffee waste could be re-used quite economically and efficiently—for example in the form of soil fertilizer or making a high-value cosmetic products out of it (as in the case of Revive Eco in Glasgow). The municipality can take a more active role in dealing with the coffee waste. By establishing some collecting points around the city and raising awareness among citizens by for example arranging a festival that would connect experts, restaurants, coffee places and wider public with the aim to inform them about the coffee waste potential. The more coffee waste collected, the better. Eventually it can be used by the municipality itself—as a fertilizer to green rooftops; or by the local farmers who offer their agriculture products daily on the Zelný trh market. In this way a strong connection between the city centre and farmers hinterland may be created.

Example of Málaga

Another example of good practice may be seen in the case of Málaga, where a strategy of a single energy company changes the future of the whole region. In the field of energy, Brno has more experience to build on than in the case of a circular economy, which is supported by the fact that in their initiative Prepare Brno majority of the projects are coming from several energy companies. As in the case of Endesa who at first proposed several energy-concerned projects and now creating a circular economy scheme based on its previous initiatives, we would recommend Brno to the same.

Our Recommendation

To summarise, cooperating with businesses could be beneficial for both sides. The municipality often does not have wide range of expertise groups which would bring changes to the city easily. Therefore, by delegating these initiatives to businesses, who specialise in different areas, may save not only finance

necessary for the human capital but time as well. Moreover, the city planners can directly affect only defined spheres of influence such as waste management, public buildings, transportation and so on, however they are rather short in powers concerned with the fields of private businesses, which often focus on broader areas such as food, textile, culture, or construction. Small and local businesses may often lack finance for implementing their innovative ideas which can not only bring a positive change to the society but also a new stream of finance to their businesses. Making businesses more profitable may further bring many unforeseen benefits. The same applies to companies who are neither small nor local. Cooperating with business and energy giants may provide the city with a fundamental building block on which a circular economy may be built as the case of Málaga showed.

OBJECTIVE 6: COOPERATE WITH OTHER CITIES AND INSTITUTIONS

The preliminary stage preceding the cooperation with the various actors of the circular economy would be to establish a place of meeting and exchange between these same actors to question the already existing initiatives, their stakes, problems and personal objectives with regard to their activities and their constraints and create a positive ecosystem where cooperation would be at the centre.

Brno has already made some progress in cooperating with other cities (see Chapter 5). It has also established platform integrating Brno (core) with its hinterland managed through Brno Metropolitan area. However, there are still some international organisations that Brno is not part of, and we perceive it as a **missed opportunity**.

Examples of international cooperation

The municipality of Brno can play a fundamental role in this meeting, in particular by organizing an event (forum, exhibition, circular economy summit, etc.) as Santiago Lefebvre, Rose-May Lucotte and Kevin Tayebaly did by creating **Change Now** the world's largest collection of solutions for the planet. The goal is to create and bring together the first global community of change makers regarding the planet. Over 3-days, visitors are able to discover and test new technologies and innovative ideas or listen to hundreds of start-up pitches from future change-leaders on different themes (circular economy, sustainable city, energy, biodiversity, health, food and culture, mobility, changing habits, tech for change, responsible fashion, etc.).

Another good example can be demonstrated by the **Milan Urban Food Policy Pact** (MUFPP) which was launched in 2015 with over 100 cities. Currently it has 200 signatories, and the leaders are committing to developing sustainable food systems to grant healthy and accessible food to all together with protecting biodiversity. MUFPP annually hosts an Annual Gathering of Mayors Summit. Moreover, it runs Milan Pact Awards with the aim to collect and share best practices from cities. (C40 Knowledge, 2022)

The **Green City Accord** is a movement consisting of European mayors who are committed to make cities cleaner and healthier. By signing the Accord, cities agree to manage following five areas: air, water, nature & biodiversity, circular economy & waste, and noise. City that is eligible to join this movement must have population of at least 20 000 inhabitants and be located in the European Union. (European Commission, 2022)

In the photo below, some benefits are mentioned:



(Authors' illustration based on European Commission, 2022)

Moreover, the Accord provides the city with funding opportunities. There are several EU funding programmes and financing instruments such as LIFE, ERDF, Cohesion Fund, URBACT, INTERREG. (ibid)

Lastly, but not least since there are many international organisations, there is a global network of mayors called C40 cities with the aim to act against the climate crisis. C40 is concerned with various topics and on their website several networks can be found– such as Sustainable Waste Systems Network, Walking and Cycling Network, Zero Emission Vehicles Network, and many others. Through these networks technical, financial, and other measures are provided to the cities. (C40, 2022)

In the same line, cities can cooperate on a **bilateral level**, as the example of French–Finnish cooperation. the event "France-Finland conference on the circular economy (May 17, 2022)" organized by embassy of France to Finland, Institut Français of Finland, CERDI (CNRS/UCA), European Center of Excellence on Sustainability and the Finnish Innovation Fund Sitra aims to bring together a group of actors (ambassador, ministries, researchers) to discuss the circular economy.

Our Recommendation

Cooperating with other cities through multilateral or bilateral framework can bring numerous positive advantages. Firstly, if city takes part in any circular–oriented organization, it gives a clear signal about the policy makers' green intentions. Secondly, exchanging information and practices with other cities can be not only inspiring, but could facilitate change towards more sustainable future as well, given the information and knowledge that others have. Thirdly, participating in international organisations may bring new streams of finance and technologies. Lastly, the exchange is mutual, therefore Brno could bring some new ideas to others as well, which could strengthen Brno's overall position in the international arena.

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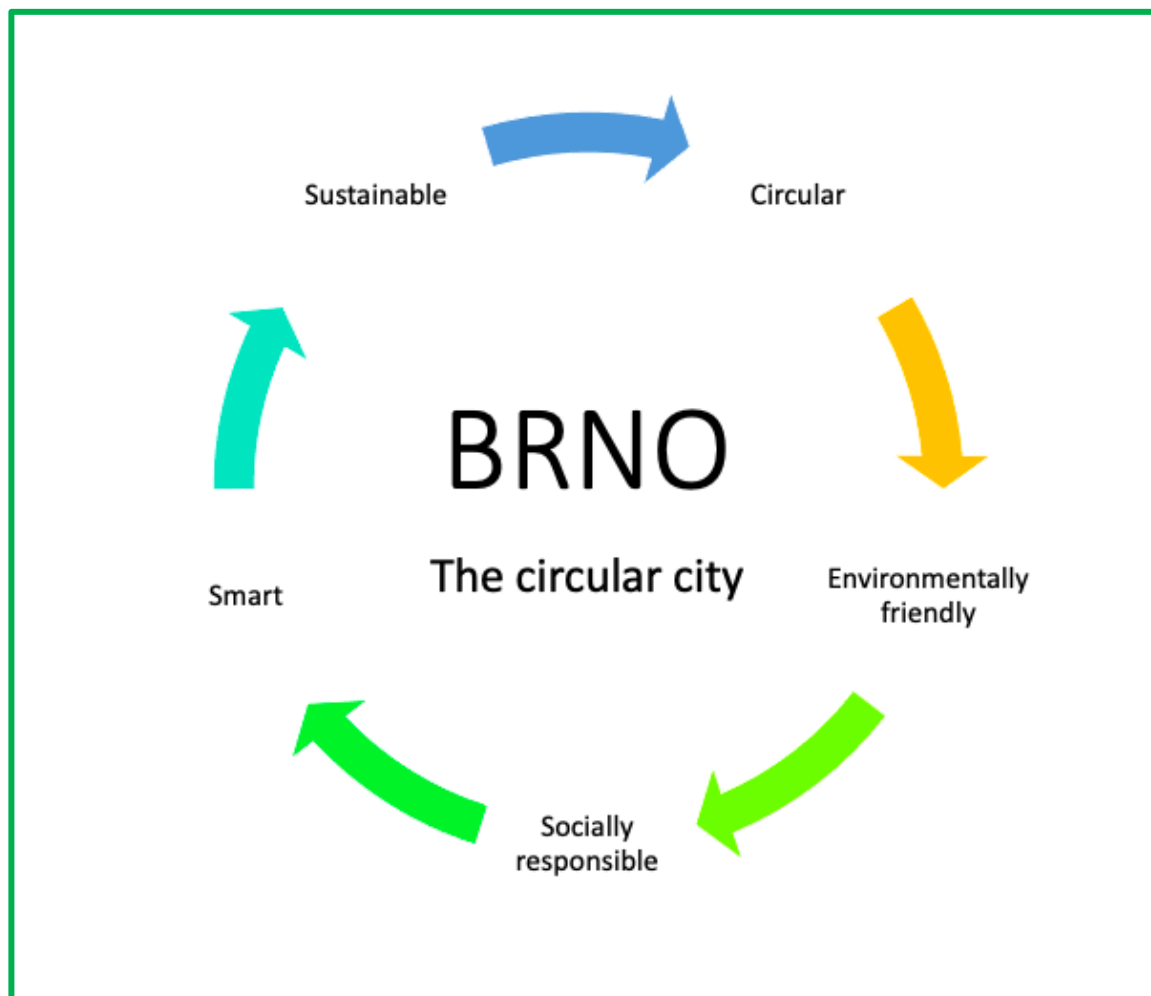
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Final Summary

This project allowed us to understand and deepen the notion of circular economy, the role of local authorities in its implementation, and its degrees and forms of implementation around the world. After drawing the contours of the institutional and administrative framework of the Czech Republic and based on the international case studies carried out previously, we have tried to develop proposals aimed at accelerating the transition to a circular economy in the city of Brno as a tenant considering the specificities of the city and the country.

It is by identifying innovative circular economy solutions adapted to the legislation in force, by determining specific objectives, by connecting the actors (researchers, political leaders, entrepreneurs, manufacturers, etc.) and by raising awareness among the general public (by especially consumers) that the circular economy will be able to take hold in Brno in all sectors (waste, water, energy, agriculture, architecture, textiles, etc.)



Source: Authors