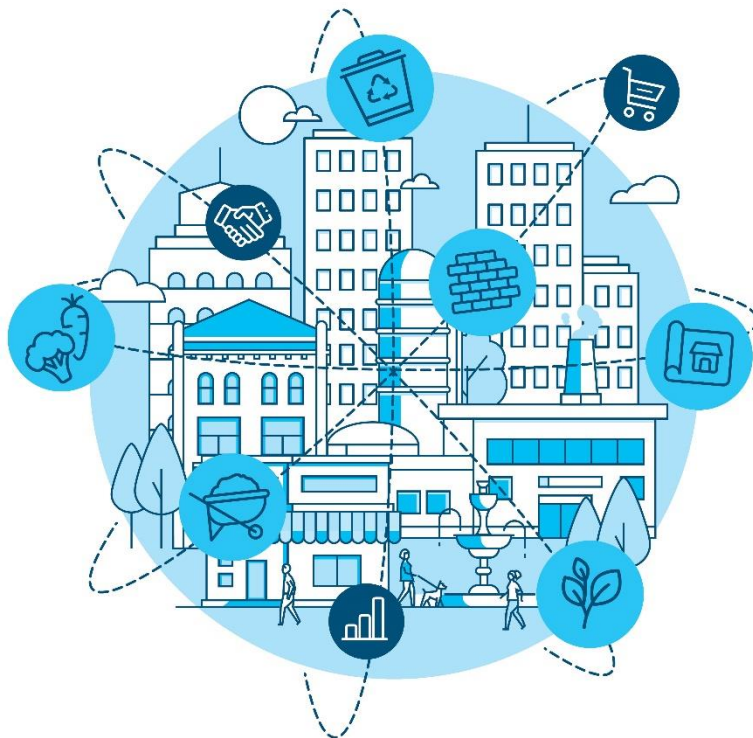





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Abstract	This document groups the Replication Plans developed by the CityLoops Replication Zones. Each plan outlines the processes, plans and activities intended to replicate the instruments and actions demonstrated through the CityLoops project. The plans are rooted in local context and highlight

	pathways and activities to systemically address circularity within city policy and planning approaches.
Keywords	Replication; CDW; Bio-waste;
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Introduction

Cities throughout Europe are increasingly recognising that the transition from a linear to a circular economy is crucial in the fight against climate change and biodiversity loss. In practice, this means that cities need to move away from the take-make-waste approach towards an economy based around closed material loops, where resource consumption is decoupled from economic growth. Aiming to address these challenges, CityLoops brought together seven European cities – Apeldoorn (The Netherlands), Bodø (Norway), Mikkeli (Finland), Porto (Portugal), Seville (Spain), and Høje-Taastrup and Roskilde (Denmark) – to pilot a series of demonstration actions to “close the loop” in Construction and Demolition Waste (CDW) and bio-waste, identified in the European Circular Economy Action Plan as two of the most important waste streams in Europe.

Over the past four years, these seven cities implemented a total of ten demonstration actions, testing over 30 new instruments and processes. These range from instruments for predicting future excavated construction and demolition waste and soil production, to awareness-raising campaigns, and from circularity decision making support tools, to simulation of impacts 3D visualisation tools and procurement guidelines for bio-waste products. The wide variety of these solutions reflect the different needs and contexts of the cities participating in the project. CityLoops has highlighted the great potential of circular approaches, showing that they can be applied effectively in many different industries and with many different objectives.

In the replication phase of the project, CityLoops wanted to bring the knowledge, experiences, tools and results generated to other cities and regions in Europe and help implement circular projects across the continent, with the ultimate aim of contributing to Europe's circular transition. To that end, CityLoops produced several publications that provide local and regional governments in Europe with guidance, recommendations, and practical examples on the circular transition. The CityLoops handbooks on [Circular Construction](#), [Bio-waste](#), and [Circular Procurement](#) aim to provide cities with a comprehensive overview of how the lessons learnt and main insights from the project can be most effectively applied in their own contexts. To provide more granular support on the CDW instruments and experiences carried out over the four years of the project, [Replication Packages](#) have been created with detailed information to allow replication of specific actions within circular construction.

Besides the dissemination of these results, a strong emphasis has been put within CityLoops on replication: seven Replication Zones have been recruited at the European level to replicate actions and instruments developed in demonstration cities. Already incorporated since project inception, Murcia and Valles Occidental were joined in 2021 by five additional Replication Zones - Espoo (FI), Ghent (BE), Prague City Services (CZ), Torres Vedras (PT) and Vienna (AT), selected out of a total of 15 applicants¹. Through a series of webinars, site visits, peer-to-peer exchanges ("twinning") and replication workshops, they have had the opportunity to closely follow developments within the projects and to get an insider look on CityLoops'

¹ <https://cityloops.eu/cities/cityloops-replicators>

numerous demonstration actions and instruments. In 2023, four Replication Workshops were organised respectively in Espoo, Ghent, Vienna, and Vallès Occidental with the aim of presenting certain Demonstration Actions more in depth, assessing collectively how they could be reproduced, and mapping key actions to undertake. Moreover, these workshops proved to be a tremendous opportunity to boost cross-fertilisation between Demonstration Cities and Replication Zones, with mutual learning on experiences, on challenges faced and on best practices.

As a final step to their involvement, each Replication Zone developed a Replication Plan to outline the processes, plans and activities intended to replicate CityLoops instruments and actions. Rooted in local contexts, these plans highlight pathways and activities to systemically address circularity within cities' policy and planning approaches. They have been developed for the most by circular economy and sustainability teams, in close coordination with other departments and often external stakeholders. They haven't been approved by local councils and so they do not constitute circular economy strategies per se. They constitute nevertheless a first step towards the development of such strategies. Additionally, it must be acknowledged that 1:1 replication rarely happens, as cities have different contexts and stands at different stages of the transition. That is the reason why these plans also include measures that are not aiming at directly reproducing actions or instruments from CityLoops, but rather at adapting them or, often, simply taking inspiration from them.

Ultimately, most Replication Zones were not project partners and as such they did not receive project funding. They voluntarily decided to dedicate time and resources to develop Replication Plans, except Prague, which lacked capacity to develop it.

This document contains the following plans:

1. Espoo Replication Plan
2. Ghent Replication Plan
3. Murcia Replication Plan
4. Torres Vedras Replication Plan
5. Vallès Occidental Replication Plan
6. Vienna Replication Plan

1. Espoo

Espoo is a network city with five urban centres, two local centres and 300,000 residents. It is a culturally diverse part of the capital region characterised by vibrant international business and innovation activities. Our population grows by an average of 4,700 residents per year. Our foreign-language population in particular is increasing at a fast pace. At the moment, we have more than 58,000 foreign-language residents, and this number is expected to grow by 35,000 by 2030. The number and relative proportion of elderly residents also keeps rising. These changes pose a challenge to our service provision.

Espoo features 58 kilometres of coastline, 165 islands, 100 lakes, the Keskuspuisto central park and the Nuuksio wilderness area in northern Espoo, where suburbs meet the national park's natural values and dozens of lakes. It is also home to a cluster of science, art and business operators, making good use of high technology, innovations and world-class expertise. Several headquarters of international companies are located in Keilaniemi, and Otaniemi has developed into a seedbed for young companies. Numerous small local companies from different fields provide services for the residents of our urban centres.



In 2020, Espoo signed an extensive European Circular Cities Declaration, whose ten goals promote the realization of a circular economy and sustainable city development. In line with the city strategy, [the Espoo Story](#), we promote [the circular economy in Espoo](#). One way to

implement the strategy is the cross-administrative [Sustainable Espoo programme](#) plan, drawn up in 2022, that specifies five circular economy priorities for the current council term of 2021–2025:

1. Circular economy solutions during the construction life cycle
2. Towards a waste-free Espoo: Reusing materials and increasing their circulation
3. Biocircular economy
4. Sustainable public procurement
5. Circular and sharing economy services for residents

Development work, experiments and cooperation related to the Sustainable Espoo programme are primarily carried out in projects enabled by external funding. The projects help us find solutions that facilitate the daily life of Espoo residents and promote, for example, low-carbon mobility, clean energy and circular economy or tackle the future challenges of a smart city. **The goal is to find local solutions for solving global challenges.**

Our development work promotes the introduction of smart, low-emission, circular economy-based urban solutions in accordance with the goals for the council term as below. The Espoo Story goals concerning sustainability and climate change are approved by the City Council. We will achieve our goals by strengthening our expertise and through cooperation between the city sectors, city corporate group, residents, businesses and partners. Through our programme work, we aim to be an international pioneer and play a strong role in the implementation of the EU programmes. Specifically:

1. Espoo will be a pioneer in implementing the UN Sustainable Development Goals
2. Espoo will achieve carbon neutrality by 2030
3. The Espoo community and residents will act sustainably
4. Espoo will be a model city of sustainable urban development
5. Espoo will be the best developer partner for sustainable and smart urban solutions

1.1. Ambition & objectives

Espoo has been a replicator city in the City Loops project since 2020, which means that we have worked closely together with the seven European pilot cities and learned from their innovative experiments and new solutions. We have had one-on-one meetings with our twinning partners Roskilde, Høje Taastrup and Apeldoorn as well as taken part on several study visits and general meetings held in the pilot cities.

Replication has been so much more than taking tools developed in the project and applying them to the Espoo operating environment. It has been time dedicated solely to discussing and developing the circularity work we do. CityLoops has enabled us to have dedicated time for reflecting and solving specific and shared challenges. We also noticed quite early on how replication is much more about mutual exchange of ideas and experiences rather than copying

something done elsewhere. We've learned a lot of things that are not directly replication actions, such as involving stakeholders already in the first phases of demolition planning to enable re-use of building parts and the benefits of soft stripping in early stages. In addition to the small learnings we have two replication actions:

1. Espoo purchase spend data of 2022 was analysed with CityLoops tools in June 2023 by level of risk, scope & influence to identify which purchase segments have the greatest impact opportunity to improve plastic recycling rate in the project '[Closed Plastic Circle – from pilots into practise](#)' (10/2022 - 10/2024). Based on this data procurement guidelines for the City of Espoo construction plastics will be created.
2. City Works department of Espoo had already, prior to Cityloops, started to look for solution for the Vanttila city garden depot which has been used as a compost field. Inspired by Apeldoorns good results we decided to look into bokashi model deeper in treating leaf litter and improving soil structure and quality. Based on Cityloops replication workshop with Apeldoorn in Espoo in March 2023 and several one-to-one meetings held with Apeldoorn the small-scale bokashi pilot in Espoo will start in Autumn 2023.

1.2. Stakeholder engagement

We believe change is achieved in strong cooperation with companies, citizens and other stakeholders. From cross-administrative cooperation to working together with the Espoo community, we aim for early onset stakeholder involvement to achieve the biggest impact.

The project 'Closed Plastic Circle – from pilots into practise' and the work package on plastic procurement have been prepared through a collaborative discussion with the procurement units of the cities of Espoo and [Lahti](#) and stakeholders in the plastics industry. In the work package, significant plastic purchases in big cities are defined in more detail and procurement criteria, guidelines and training are implemented for the selected product group together with [Metropolia University of Applied Sciences](#) and [Helsinki Region Environmental Services HSY](#). In addition cross-administrative cooperation will take place within the City of Espoo Centre of Excellence for Sustainable Development, Real Estate Services and Procurement Unit, as well as other large cities in Finland, the Ministry of the Environment of Finland, the Confederation of Finnish Construction Industries RT, local construction companies and plastics industry.

The Bokashi pilot will be implemented by the Espoo city works unit in cooperations with the Centre of Excellence for Sustainable Development. Cooperation is also planned with a local university to provide a thesis topic to evaluate the success of the experiment. They will also include the relevant officials from street maintenance, land mass coordinator and others from the infrastructure unit.

1.3. Actions for replicating CityLoops demonstration actions and instruments

Creating impact by circular procurement

Espoo purchase spend data of 2022 was analysed with CityLoops tools in June 2023 by level of risk, scope & influence to identify which purchase segments have the greatest impact opportunity to improve plastic recycling rate in the project 'Closed Plastic Circle – from pilots into practise'. Based on this data and conversations with councils and stakeholders on their needs, procurement guidelines for construction plastics will be created. The procurement criteria will be defined in collaboration with Finnish cities and a market dialogue with the construction and plastics industries in 2023-2024 and the final criteria will be available in the Motiva national Criteria bank [Kriteeripankki](#). Next steps include conducting a market dialogue and a co-creation workshop in October of 2023, finalize the purchase criteria by March 2024, and in the spring of 2024 creating procurement guidelines and conducting an online training.

The Espoo purchase spend data analysis will also support the development of sustainable procurement practises and goals in the city of Espoo in general.

A green future created from waste

The city Works department of Espoo is committed to the Espoo-wide zero carbon goals as well as to the Green Deal agreement for emission-free constructions sites which is a joined voluntary agreement (used to find solutions to climate challenges etc.). [Green deal agreements](#), such as the green deal for emission free construction sites and sustainable demolition, are made between organisations and public procurers such as councils and waste management companies.

We carried out a biomass mapping exercise in 2021 in cross-administrative cooperation with the City Works department and Centre of Excellence for Sustainable Development. The objective was to identify circular potential of biomass in Espoo. This was an excellent current state analysis of current generated or handled biomass in the city. Biomass generated by the city included e.g. green waste, alien species, reeds, wood and improved production for city's soil. The question in the mapping exercise was 'How can the city valorise its biomass?'

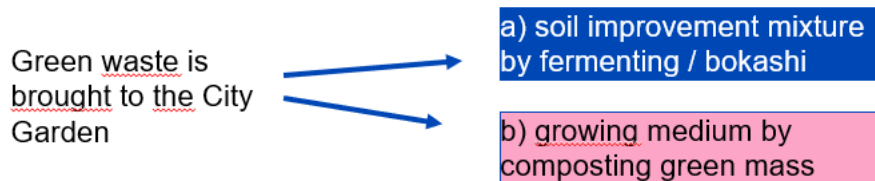


Picture: Vanttila city garden

As we replicate Apeldoorn's demonstration of bokashi treatment and use as a fertilizer, our objective is to demonstrate closed loop material streams and to make green space management more circular. When green waste is handled locally/regionally there are numerous benefits: supporting soil microorganisms and microbial activity; facilitating the absorption of rainwater into the soil, even during heavy rains; increasing water storage in the surface layers of the soil and increasing carbon storage in the soil, etc. Bokashi is a fermentation process that turns organic waste into a soil improver that adds nutrients and improves soil structure.

The Centre of Excellence for Sustainable Development has supported the preparation of the bokashi demonstration: by providing practical know-how from Apeldoorn and by looking into the costs of such a demo. Based on the material provided by Apeldoorn and the Apeldoorn-Espoo workshop, the City Works department decided on a bokashi pilot whose estimated starting time is the fall of 2023.

The city garden (Vanttila) has been used as a compost field, it covers the area of 0.7 hectares. The city is planning to explore further uses also for other green waste not just leaf litter, so when the green waste is brought to the City garden, it has two possible paths on how it will be treated. The other end-product soil improvement compost will go to the city's own green sites but also possibly for sale to manufacturers of recycled growing medium.



City Works will implement the demonstration as a part of their work business as usual; so far, the feasibility of the demo has been evaluated by the green maintenance unit, a key actor from infrastructure services and with a small “task force”. However, it is planned to include the relevant officials from street maintenance, land mass coordinator etc. Next steps will include internal knowledge building and action planning.

1.4. Identified barriers & opportunities

Espoo is the second largest city in Finland and has an organisation of 10 000 employees, and as such, change does not happen overnight. Adapting new measures and tools takes time, money and effort. There are challenges in cross-organisational exchange of information and passing down learnings. There is a lack of resources for any development work and piloting outside of business as usual.

When compiling this replication plan, we gave a lot of thought on how to build it so that it is genuinely actionable and supports change rather than another piece of paper forgotten in the desk drawer. Having the right actors, data and timing meet is not always an easy task. We have put effort into recognising the right ‘agents of change’ for maximum impact and longevity. We also faced the challenge of not having any dedicated funding or resources for replication actions through the CityLoops project. As such, we have applied the tools and learnings of CityLoops onto existing and ongoing challenges we have already earmarked funding for, such as ongoing externally funded projects and goal defined in the city strategy.

1.5. Monitoring progress & evaluating results

We report on the development of the circular economy and sustainable way of life in Espoo to the City Council every six months as part of the reporting of the Sustainable Espoo development programme. As part of the reporting, we monitor the indicators for the realisation of the circular economy in line with the programme plan. As the circular economy develops, we will introduce new ways of measuring and monitoring the current state and development of the circular economy in Espoo.

In 2021 Espoo implemented [The Climate Watch](#), that compiles the city's climate actions, monitors their progress and evaluates their impact. The watch is divided into five categories, one of which is Circular economy and sustainable choices. The watch allows citizens and decision makers to follow the progress of the city's climate and circular actions in real time. It also helps the city's experts in the management of climate measures. In addition, as signatories of the circular cities declaration we have committed to monitoring the progress made and impacts of our circular economy activities as well as reporting to ICLEI on progress in achieving the commitment made.

Our replication actions will naturally be a part of the above-mentioned reporting processes. In addition, the success of these will be evaluated individually as a part of business as usual. The green maintenance team is looking into the possibility of linking a thesis topic into the bokashi demonstration – this research could investigate the impact of bokashi vs. compost on the environment and climate. The plastic project evaluates the impact of each work package with the IOOI-method (Input, Output, Outcome, Impact), which evaluates what can be accomplished with the resources invested in the work. In addition to monitoring inputs, outputs and results, the importance of the measures is evaluated in relation to the big picture, other actors and their actions.

1.6. Future outlook for the circular transition

Espoo is working to realise the circular economy by developing its own operations and the cooperation with companies and partners. The city is setting an example through its own actions, providing residents with services and guiding decision-making. In addition, the city aims to provide its residents with good opportunities for making sustainable choices. This is done by developing carbon-negative heating networks, sustainable transport and promoting a sustainable lifestyle by organising events and workshops just to name a few.

We need more understanding of the impact circular economy can have on accelerating carbon neutrality. By developing the measurement of the circular economy and thereby connecting the circular economy more strongly to the goal of carbon neutrality we can justify and connect the actions of the circular economy to the climate goals. To really get here we need more information about the climate benefits of the choices, nature benefits, etc. Last year we developed measurement with Helsinki Region Environmental Services HSY, but it is a theme that we will continue to address. We have also been actively participating in the preparation of the [Finnish Circular Economy Green Deal](#).

The work towards creating a circular city is by no means finished, and there are still plenty of processes that rely on a linear economy. We will continue the learning process and develop further methods towards more resource-wise actions. We also need to raise awareness of circular practices across our administration and amongst local citizens and businesses. We have very good goals and a vision, but realistically we will not meet these with the actions we currently have lined up. More ambition is needed as well as concrete actions. For this work we need strong European networks and cross-governmental cooperation such as the work Espoo is doing as [one of the pioneer cities selected to implement EU Mission on climate-neutral and smart cities](#).

2. Ghent

Ghent is a city of 267.712 inhabitants (2022) in the densely populated region of Flanders which constitutes roughly the northern half of Belgium. It is situated at the confluence of the Scheldt and Leie rivers and has a sea port through the Ghent-Terneuzen canal that runs north to the Western Scheldt. North Sea Port is a cross-border port resulting from a merger between Ghent and the Dutch ports of Vlissingen and Terneuzen. The port involves extensive industrial activities which are situated in the northern part of the city, with some large companies like ArcelorMittal, Stora Enso and Volvo. Ghent is well connected by railways and motorways to other Belgian cities (Brussels, Antwerp, Kortrijk, Bruges, Ostend, ...). The city has several academic institutions and research-oriented companies, situated mainly in the southern part of the city.

The regional (Flemish) level is most relevant for environmental and waste policy. The shift from waste policy to materials policy has been going on for at least 12 years: in 2011, what was named the Waste Decree before was renamed and extended to a Materials Decree. The Public Waste Agency in Flanders has drafted plans for specific waste streams (construction and demolition waste, plastics, household waste, ...).

In 2017, the Circular Flanders² partnership between regional and local governments, companies, civil organisations, and academic institutions was initiated to realise the transition to a circular economy by 2050. As an intermediate target for 2030, Flanders is to become a circular frontrunner in the EU and the material footprint of consumption is to be reduced by 30% and is to be decoupled from economic growth. These targets are confirmed in the Flemish Energy and Climate Plan 2021-2030. Within Circular Flanders, research projects and learning networks are being set up and there are calls for pilots.

Construction and demolition is one of the 6 themes that Circular Flanders works on. In Flanders, as in other regions, construction and demolition is an economically important but also resource-intensive sector. About 15 million tonnes of construction and demolition waste are produced annually in Flanders; this is 35% of all waste. The stony fraction constitutes about 90% of this waste stream. Almost all of it is recycled into foundations for infrastructure or buildings (downcycling). From 2019 to 2023, Circular Flanders managed a Green Deal on Circular Construction³, in which the City of Ghent was a participant.

The City of Ghent operates within this Flemish policy context and could not stay behind on circular economy. The Circular Cities Declaration was signed in 2020 and a chapter on circular economy was included in the City of Ghent's Climate Plan 2020-2025⁴. The goal is to reduce Ghent's and North Sea Port's material footprint by reducing primary materials use and keeping

² <https://www.vlaanderen-circulair.be/en>

³ <https://bouwen.vlaanderen-circulair.be/en>

⁴ <https://stad.gent/en/city-governance-organisation/city-policy/ghents-climate-actions#:~:text=By%202030,as%20drought%2C%20heat%20and%20flooding.>

products and materials in cycles. It is recognised that this requires cooperation between the City and companies, North Sea Port, academic institutions and citizens.

There are no SMART targets or monitoring on circular economy in the Climate Plan, but a number of actions were initiated, focusing on:

- Upscaling circular economy, e.g. as part of an economic spearhead policy aiming at a cleantech ecosystem on European top level. Already in 2016, a Cleantech Cluster⁵ was established in Ghent, bringing together the City of Ghent, North Sea Port, the Province of East Flanders, Ghent University and Cleantech Flanders. The goal of this partnership is to share knowledge and opportunities concerning cleantech and circular economy. In a smart circular pathway study, the economic impact of the transition towards a circular and net zero emissions industry was explored.
- Supporting urban circular initiatives: e.g. circular business incubation programme Circular Kickstart, circular competition for (pre-)starters Circuit Circulaire⁶, repair cafés.
- Awareness raising to citizens
- Setting an example and influencing the market through public procurement and City-owned buildings

The City of Ghent has participated in some pilots concerning circular construction, e.g. the URBCON (Interreg)⁷ and Stapsteen⁸ projects concerning novel concrete products with substantially reduced CO₂ footprint. But procurement of construction and demolition works remains a complex process where risks tend to be avoided, so moving away from business as usual turns out to be difficult.

Our participation as a replication zone in the CityLoops, with a study visit to Mikkeli in October 2022 and a replication workshop in May 2023, provided us with useful insights concerning both the strategic and operational level.

2.1. Ambition & objectives

- As set out in the previous section, the City of Ghent's Climate Plan 2020-2025 contains a chapter on circular economy, but there is no proper **strategy** with focus areas, targets, monitoring approach, clear roles and responsibilities, budget, ... We aim to make progress on this strategic level, further aligning existing visions and actions. As

⁵ <https://stad.gent/nl/ondernemen/economische-speerpunten/cleantech-cluster-regio-gent/een-cleantech-cluster-voor-duurzaam-circulair-ondernemen#Wat%20is%20de%20Cleantech%20Cluster%20Regio%20Gent?>

⁶ <https://stad.gent/nl/ondernemen/ondersteuning-en-premies-voor-ondernemers/sectoroverschrijdend/duurzaam-ondernemen/circuit-circulair-krijg-steun-voor-je-circulair-project>

⁷ <https://vb.nweurope.eu/projects/project-search/urbcon-by-products-for-sustainable-concrete-in-the-urban-environment/>

⁸ <https://vlaanderen-circulair.be/nl/doeners-in-vlaanderen/detail-2/stapsteen-naar-een-circulaire-stad>

circular construction can be considered as a means to an end (reducing environmental impact of materials) a circular strategy should be linked to other City strategies such as the climate plan, the spatial structure plan, ... Several CityLoops partners have shared lessons learned which the City of Ghent can benefit from. We will study the CityLoops deliverables for inspiration, e.g. the work on Urban Circularity Assessments, planning and decision making guidelines, ...

- The guidance developed by the City of Mikkeli and other CityLoops partners on pre-demolition audit, selective demolition and reuse of construction materials is very relevant to the City of Ghent in its role as building owner. The approach needs to be adapted to the Belgian / Flemish situation.
- Procurement is an important instrument for (local) authorities. The City of Ghent has been taking into account sustainability for years in procurement of goods and services for years, but only to a very limited extent in tenders for construction and demolition works. Using CityLoops (Circular Construction Handbook, Circular Procurement Handbook) and Circular Flanders guidance, we aim to introduce circularity in relevant tenders.
- As concrete is the most used construction material worldwide, it makes sense to focus on circular concrete. The City of Ghent signed the Circular Concrete Agreement Flanders⁹ in June 2023, aiming for a reduction of the environmental impact of concrete by using secondary aggregates and replacing cement.
- Although circularity is not explicitly mentioned, the City of Ghent's spatial structure plan Ruimte voor Gent¹⁰ contains many elements related to circularity and sustainability in urban planning: e.g. increasing density in areas with many services and good public transport connections, minimising sealed surfaces around buildings, encouraging temporary use of terrains awaiting development, ... Taking a look at the spatial structure plan from the point of view of circularity and constructing a coherent story on this aspect could provide us with new opportunities for action.

2.2. Stakeholder engagement

Within the City of Ghent administration, the following services should/will be involved in the engagement towards a circular strategy (for construction):

- Environmental and Climate Service
- Economic and Entrepreneurial Support Service
- Facility Management
- Labour and Employment Service
- Roads, Bridges and Waterways Service

⁹ <https://www.betonakkoord-vlaanderen.be/>

¹⁰ <https://stad.gent/nl/wonen-bouwen/stadsvernieuwing/toekomstvisie-voor-stadsvernieuwing/ruimte-voor-gent>

- City Development Company sogent
- City Architect
- Urban Development and Spatial Planning Service

Other relevant stakeholders are:

- The local waste management company Ivago
- Kringwinkels: second-hand shops
- The social-circular hub of Ghent: they support companies who want to make the switch towards circularity and they organize matchmaking between regular economy and social economy on circular initiatives. One of their focus areas is construction.
- The province of East Flanders and in particular the Provincial Development Company POM which develops economic areas
- Ghent University and other research and higher education institutions in Ghent (e.g. CAPTURE, the research centre for urban resource recovery)
- North Sea Port and Smart Delta Resources
- Circular Flanders – as a starting point for contacts with a range of stakeholders such as the Flemish Waste Management Agency OVAM, research institutions (Buildwise, VITO, ...), construction sector federations (Embuild, ...), other municipalities, ...

2.3. Actions for replicating CityLoops demonstration actions and instruments

Action 1: City of Ghent vision and strategy on circular economy	
Description	The first indispensable hurdle to be taken is the design of an overall vision and strategy on circular economy for the City, which should then be recommended for adoption to the next city council after the local elections in October 2024. Targets and a monitoring and evaluation approach should be included, as well as a rough estimate of budget needed for specific actions. The strategy should also clarify roles and responsibilities in the City of Ghent administration.
Stakeholders	City of Ghent stakeholders (see section 2 above)
Monitoring and evaluation	See section 5 below
Timeline	2023-2025

Budget	No budget in the current policy period for specific actions, however, a vision and strategy will be developed in the current policy period, aiming for a dedicated budget from 2026 on.
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Action 2: Urban mining and reuse of construction materials	
Description	<p>Urban mining and reusing materials can be an innovative approach to reduce the huge environmental footprint of the construction sector. Closing loops for construction materials is currently not included yet in other City strategies.</p> <p><u>First step:</u> strive to maximum preservation of existing buildings, i.e. demolition as the least preferred option, only e.g. when the building cannot be renovated to comply with functional requirements. As CityLoops partner Høje-Taastrup points out in their demonstration report, renovating buildings results in large CO₂ savings compared to demolition and new construction.</p> <p><u>Second step:</u> systematic implementation of reuse audits and inventories. How to do this is still under assessment. For instance, this action could be implemented externally via tenders or framework agreements, or internally via training of City personnel. Both the Facility Management department and the City Development Company sogent were enthusiastic to implement the idea.</p> <p>These reusable components would be made available for external reuse, refurbishment and/or resale via a material bank. Internal reuse in City-owned buildings could still be too complex in this step, due to lack of certification of second-hand materials and strict fire safety regulations for publicly accessible buildings.</p> <p>Nonetheless, a local ecosystem in Ghent with a number of stakeholders active on second-hand construction materials has been created. Their needs and difficulties have been analysed, e.g. the need for external funding and the need for a better digital planning tool, connected to the reuse inventory.</p>

	<p>For the latter purpose, a first contact was made with DuSpot (contact via CityLoops partner Apeldoorn). This tool looks promising for the Roads, Bridges and Waterways Service, but at this moment less for the City Development Company sogent or for Facility Management.</p> <p>Based on the lessons learned from our network with local stakeholders and (hopefully) progression on certification of second-hand materials, reuse in larger or City-owned projects could be also considered in a future step.</p>
Stakeholders	<ul style="list-style-type: none"> • City of Ghent stakeholders • Ivago • Kringwinkels • Network of local/regional stakeholders, consisting of material producers, consultants, social economy partners, architects, building contractors, material banks, furniture designers, ...
Monitoring and evaluation	<p>Possibilities for monitoring (tbc and not exhaustive):</p> <ul style="list-style-type: none"> • Number of projects with reuse inventories / selective stripping • Number of candidates for tender for selective stripping • Amount (kg) of materials/components “saved” from demolition • Amount of waste (normalized for the size of the project) • Amount of CO₂ saved based on the parameter above • Number of partners for reuse in the network of local stakeholders
Timeline	Running
Budget	None for now; looking for funded project opportunities.

Action 3: Circularity in procurement: Material impact criteria

Description	Procurement is an important instrument that allows the City to set an example and to communicate its ambitions to the private sector. Material impact criteria, based on Life Cycle
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	<p>Assessment (LCA), can be used in tenders to reduce environmental impact.</p> <p>In Belgium, the tool TOTEM was developed as a tool to improve the environmental performance of (materials in) buildings. It calculates the environmental impact over the entire life cycle of materials, elements (e.g. insulated walls) or whole buildings. The environmental impact is based on 12 groups of impact parameters, e.g. climate change (CO₂ equivalents), toxicity, land use, ...</p> <p>Five gradual ways of introducing TOTEM in tenders are suggested (with increasing impact, but also increasing complexity and cost):</p> <ul style="list-style-type: none"> • Expertise with TOTEM or the willingness to follow a training as a selection criterion • Calculation of the environmental performance (after completion of the project) • Mandatory calculation of the environmental performance • Optimization of the environmental performance • Environmental performance as an award criterion <p>The drawback is that there is no reference value yet for the calculated environmental performance, and neither is there a (shadow) cost foreseen (in TOTEM).</p> <p>An alternative could be to focus on the life cycle carbon in the near future, i.e. taking into account scope 1, 2 and 3 CO₂ emissions, as it was suggested during the CityLoops replication workshop. Here, the challenges are to define an ambitious yet realistic target value and to follow-up afterwards.</p>
Stakeholders	<ul style="list-style-type: none"> • City of Ghent stakeholders • VITO / OVAM (development of TOTEM) • Ghent University • Architects and consultants
Monitoring and evaluation	<p>Possibilities for monitoring (tbc and not exhaustive):</p> <ul style="list-style-type: none"> • Overall number of tenders implementing TOTEM (based on of the 5 possible approaches mentioned above)

	<ul style="list-style-type: none"> • Number of tenders with a specific material impact criterion on total or scope 3 CO₂. • Evolution of life cycle CO₂ over time as a function of building volumes with gradually decreasing target values (long term)
Timeline	To start – to be further discussed with the Ghent stakeholders.
Budget	None for now. Lack of budget for extra cost might hinder fast implementation.

Action 4: Circularity in procurement: Change-oriented design & construction

Description	<p>In tenders for architectural design, it is common practice to include qualitative award criteria. Candidates can be asked to provide their vision on change-oriented design and construction or to document the reduction of the environmental impact of construction elements. The challenge here is to formulate objective criteria which allow evaluation and comparison of the offers. We aim to find an approach to be ambitious and at the same time to have realistic criteria which can be adapted to the project context.</p> <p>In tenders for construction, renovation and demolition works, price is usually the only criterion. Introducing requirements or qualitative award criteria on circularity means that concerns on e.g. risk, cost and legal issues have to be addressed. Using guidance from Circular Flanders and CityLoops we aim to test criteria on e.g. reuse of construction elements (based on reuse inventories, see Action 2), recycled content, ... It may be a good starting point to focus on concrete, as concrete has a huge impact, due to the large volumes used and the environmental footprint of cement.</p> <p>CityLoops partners Roskilde and Mikkeli pointed out that early market dialogue (within the boundaries of public procurement legislation) can help to determine realistic criteria, and that procedures with negotiation can be advantageous.</p>
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	Another recommendation from Roskilde is to identify and assess possible risks related to at an early stage and to agree on consequences and responsibilities.
Stakeholders	<ul style="list-style-type: none"> • City of Ghent services involved in procurement: Facility Management, Roads, Bridges and Waterways Service, City Development Company sogent • Province and POM • Circular Flanders
Monitoring and evaluation	<p>Possibilities for monitoring (tbc and not exhaustive):</p> <ul style="list-style-type: none"> • Number of candidates for ambitious tenders • Number of buildings with a change-oriented design and construction • Vol% of reusable elements (medium term) • Adaptability index of a building (medium term) • Possible future CO₂ savings of reusable or recyclable elements via method D in LCA calculations (medium/long term)
Timeline	To start – to be further discussed with the Ghent stakeholders.
Budget	None for now. Lack of budget for extra cost might hinder fast implementation

2.4. Identified barriers & opportunities

Barriers pre-identified:

- Varying points of view on relevance, priorities and responsibilities concerning circular economy at the political level and in the City administration.
- Need for an overall vision/ambition/strategy.
- Need on specific capacity for overall follow up and follow up per service.
- The current economic situation might hinder the extra financial means which are needed to kick off circularity in projects (extra cost of materials, but also longer timelines for projects, studies, LCAs, ...).
- Lack of experience with integrating circular principles in specifications and tenders
- Lack of certification of second-hand materials

Opportunities:

- The local elections in October 2024 provide an opportunity for the City administration to work on a circular vision and strategy and to recommend it for adoption to the new city council.
- Given the extensive amount of circular initiatives by citizens, as well as small and larger enterprises, it is clear that circularity is widely supported, which should facilitate the process of obtaining political support.
- Specifically with regard to construction and demolition waste, there is a network of several stakeholders from the broad construction sector in Ghent (regular economy, social economy stakeholders, non-profit organizations,...) who are willing to work with second-hand construction materials and agreed to collaborate and strengthen each other.

2.5. Monitoring progress & evaluating results

The City of Ghent has the ambition to reduce its direct CO₂ emissions by 40% by 2030 as compared to 2007, and to achieve climate neutrality by 2050. These emissions are currently being monitored for Ghent by VITO and are reported within the Covenant of Mayors framework¹¹. There is also a local Sustainable Development Goals (SDG) reporting¹².

To limit global warming, it is important to consider indirect CO₂ emissions, e.g. embodied in materials or food. In that sense, circularity is a means to lower these scope 3 CO₂ emissions. It remains to be studied whether/how the current CO₂ monitoring could be extended towards the overall CO₂ emissions in the long term.

At this moment, no specific indicators / KPI's have been defined for circular economy or circular construction in Ghent. No legislation is currently in place, although VITO and OVAM are studying the possibility of introducing an M-label for (new) buildings by 2030. This would give insight in the environmental impact of (materials in) a building, similar to the energy performance of a building.

In Section 3, some suggestions were made on how to monitor and evaluate the actions, but these need to be further discussed internally before being implemented. On the short term, the most straightforward indicators focus on direct (physical) impacts or stakeholder engagement, and not yet on outcomes regarding amount of waste, CO₂ emission, environmental impact, ... on a city level. On the medium term, it is our ambition to evolve towards full life cycle considerations, but these are more complex to introduce and require further evaluation before a correct implementation can be done.

¹¹ <https://www.vlaanderen.be/lokaal-energie-en-klimaatbeleid/burgemeestersconvenant/co2-inventarissen>

¹² <https://stad.gent/en/city-governance-organisation/city-policy/ghents-sustainable-development-goals>

Nonetheless, some preliminary actions were launched:

- The City of Ghent participated in a CityLoops workshop in June 2023 by Metabolism of Cities on material flow analysis and is currently analysing how to implement such an analysis also for Ghent.
- A proposal for funding on monitoring the flow of construction materials was submitted, together with the city of Amsterdam, but was not withheld.
- At the end of 2023, a Community of Practice on monitoring will be started up by OVAM, the Flemish Waste Company, in the framework of Circular Flanders.

2.6. Future outlook for the circular transition

In Ghent, there are already lots of smaller circular initiatives by citizens and organisations, like sharing initiatives (e.g. Op Wielekes¹³, a “bike library” for children which started in Ghent but is now active throughout Flanders; or Ghent’s leading position as a car-sharing city in Flanders), Repair Cafés¹⁴, the growing interest in the circular competition Circuit Circulaire, ... Many industrial companies are taking important, large-scale steps towards a more circular economy. In the City administration, we see circular ideas coming up in several departments. These examples illustrate the increasing awareness, creativity and enthusiasm of the Ghentian citizens, enterprises and civil servants to take part in the circular transition.

With the abovementioned actions related to circular construction, we hope to create additional momentum in the City of Ghent administration and among stakeholders related to the construction sector in Ghent.

We believe in the value of experiments and hope to expand our capacity in circular construction e.g. by actively looking for Flemish or EU funding opportunities.

We urge the EU, Belgian and Flemish policy levels to facilitate the circular transition by removing barriers. There is a need for e.g.

- A certification scheme for second-hand construction materials
- A standard for reuse inventories
- A tax shift favouring second-hand construction materials: e.g. lower VAT. Also, the high tax on labour in Belgium is a barrier.
- A timeline for the introduction of an M-label for new buildings (similar to energy performance)

¹³ <https://www.opwielekes.be/waar/>

¹⁴ <https://www.ivago.be/nl/particulier/afval/wat-kan-je-zelf-doen/repair-cafe>

3. Murcia

Murcia is the capital of the Region of Murcia, self-governing region located in the southeast of Spain, and bathed by the Mediterranean Sea. With 460.369 inhabitants, it is the seventh most populated city in Spain, with a population density of around 450 inhabitants per square kilometre. Less than half the local population lives in the urban area (28 neighbourhoods), and the rest are unevenly spread through the 54 municipal districts, into which the municipal area is divided.

The city extends approximately 882 km² (341 sq mi). It is divided from north to south in two parts separated by a series of mountains. These two zones are called “The Field” (south) and “The Vegetable Garden or Orchard” (north) of Murcia.

Besides the marked administrative and commercial character, which turns the city into a place where the main economic activity is the service sector, one of the main economic sectors is agriculture. Murcia is surrounded by fertile landscapes with huge fruit and vegetable plantations.

The support and adoption of circular principles are expressed as both, great necessities and an opportunity to ensure, among other things, that urban and rural areas develop in parallel and in connection; which will bring about numerous economic, social and environmental benefits.







Murcia City Council’s journey towards circularity is based on a multilevel governance model that involves all the key actors: citizens, social council and economic and social agents.

Based on the previous Circular Assessment study (Ayto. Murcia, 2020), Murcia has written “Murcia’s Circular Economy Strategy”¹⁵, which includes the Action Plan and its corresponding Monitoring Plan.

To achieve a circular municipality, it is necessary to first define the medium-term goals (2030), which will be attained thanks to the development of the actions framed in the Action Plan that will be monitored in a short-term span (2025), as indicated in the Monitoring Plan.

However, our vision is enterprising and it even goes further in terms of the development of the municipality that we aim for, in the long-term (2050). By that date, we envision a 100% circular municipality that, among other things, generates high-value products from urban waste, minimises the consumption of single-use products and feeds mainly on proximity products. Likewise, we seek a municipality that approaches or practically achieves climate neutrality; generating energy, mainly from renewable sources. Murcia will deploy a clean, safe and connected mobility and it will enable the reduction of emissions in the industrial sector. It will also reuse part of the water consumed, it will prevent the degradation of Murcian ecosystems and it will keep a green and blue infrastructure that connects neighbourhoods and districts.

¹⁵ <https://www.estrategiamurcia.es/upload/2021/11/Murcia-s-Circular-Economy-Strategy.pdf>

Focus Area Consumption 	Decreasing waste generation by 10% Increasing local product consumption by 20%
Focus Area Waste Management 	Preparation for reusing and recycling municipal waste will be increased to a minimum of 60% by weight Selective collection of 60% of bio-waste and valorisation of 90% of it by weight
Focus Area Water Management 	Increasing reused and recovered water/sewage sludge by 10% Decreasing the number of incidents caused by floods by 10%
Focus Area Sustainability of Urban Spaces 	Producing 40% of our energy from renewable sources Increasing the surfaces destined to green spaces by 10%
Focus Area Mobility 	Increasing the use of sustainable transport by 50% Reducing the CO ₂ emissions generated by vehicles by 40% (year reference 2007)
Focus Area Cross-cutting Policies 	Increasing public participation by 20% Increasing the number of enterprises that engage in internships on circular economy by 35%

3.1. Ambition & objectives

Murcia is working on several pilot actions tested in City Loops projects. The pilot cities and their actions are:

a) **Porto:**

- 1) Circular Entrepreneurship Contest: Murcia has already organized a Circular Entrepreneurship Contest in 2023 URBAN CIRCULAR CHALLENGE¹⁶ and it is planned to hold every year. Moreover, Murcia has a CIRCULAR HUB (<https://www.ayto-murciacim.es/hubs-murcia-inicia-llamada-a-proyectos/>), with the purpose of promote circular start-ups in the city. In this hub, 10 start-ups are selected to receive support from experts in circular economy to develop their idea.
- 2) Reducing Food Waste via food donation network: in September 2023, Murcia starts a project to reduce food waste in schools. An audit of food waste in canteens is going to be carried out and match those schools with food banks and NGOs.

b) **Seville:**

¹⁶ <https://www.cetenma.es/hola-desafios-urbanos-circulares/>

- 3) Separate bio-waste collection route in a neighbourhood: Murcia is implementing bio-waste collection, so several study visits and exchange trips has been carried out with Seville, in order to learn from their experience in the pilot action.

3.2. Stakeholder engagement

This mission entailed the creation of a multi-level governance model sustained by key stakeholders (citizens, social council and economic and social agents); and characterised by focuses of action that have facilitated a participatory vision of citizenship, the smart management of the city and a commitment to foster coordination amongst administrations.

It is proposed to improve the participation of the different stakeholders in circular economy issues through the governance scheme proposed in “Murcia’s Circular Economy Strategy” (through the creation of a public participation body) and the Murcia Circular platform.

The multi-stakeholder approach will be developed using as a germ the Biowaste Club that will be created in the European project HOOP, of which the Murcia City Council is a partner, and which in the future will be called Circular Clubs. Briefly, the Biowaste Clubs are configured as forums for participation, debate and monitoring of actions at municipal level in the field of circular economy involving all relevant actors.

3.3. Actions for replicating CityLoops demonstration actions and instruments

a) Food waste assessment

a.1) **Necessity.** The municipality of Murcia does not have official figures on the amount of food wasted, but it is estimated that the figures are similar to national figures. In order to put an end to food waste, the commitment and involvement of citizens, businesses and the City Council are necessary so that together, it is possible to overcome the challenges that prevent the creation of a local surplus collection network, including logistical feasibility and, therefore, the use of surplus food.

a.2) **Activities.** A key and fundamental activity to reduce food waste is the implementation of information and educational campaigns aimed at citizens (e.g. the development of exemplary activities in schools), but also at private entities. These campaigns will tackle the barriers identified after the completion of the food waste assessment in the municipality. This study will analyse quantitatively and qualitatively the generators of food waste (households, catering and leisure, markets, events, etc.) and the collection logistics, at the time that it will identify the

challenges they face and propose solutions and measures to be implemented. In regard to these measures, measurement indicators for their correct monitoring will be proposed. In addition, among those activities involving the private sector, the City Council, within its competences, will create tax incentives for companies that donate food and train their staff in waste reduction. Another important and necessary activity to minimise food waste is to encourage public-private collaboration and collaboration with social agents, this will be possible through the City Council's provision of more aid and an improved collection logistics.

a.3) **Experiences.** Several non-profit organisations work in the municipality of Murcia, such as the Banco de Alimentos del Segura (Segura Food Bank, BASMUR as per the Spanish), Jesús Abandonado (charitable Foundation), Red Cross, Caritas, etc., carrying out great social work enabling the distribution of food to the most vulnerable groups. Today, there are also private initiatives that try to fight against food waste, among them is the Toogoodtogo Platform with its App (Toogoodtogo, 2021).

a.4) **Financing / Investment plan:** this action is included in the public contract with the company PREZERO, which is responsible for waste management in the city of Murcia.

b) Organic waste (bio-waste) selective collection

b.1) **Necessity.** The implementation of the brown bin in the city of Murcia, its neighbourhoods and districts is progressing slowly. Moreover, it is mandatory according to EU / Spain law.

b.2) **Activities.** The success in the selective collection of the organic fraction and its corresponding valorisation with a market outlet for the products obtained will require a series of priority actions.

These activities will be developed on the basis created in the European projects VALUEWASTE and CITYLOOPS and will include as a first step the development of a collection and recovery plan for the entire municipality that includes an assessment of the generation and state of waste management and a study of business models that reflect recovery alternatives. The conclusions of these studies will determine the measures that could be implemented, such as the development of incentives for selective collection/taxes on excessive waste production, systems to control the quantity and quality of waste, agreements with large generators, promotion of community composting plants, development of recovery systems to produce high value products, etc. The preliminary studies will be the basis for ongoing information and awareness-raising campaigns, which will be specific and targeted at key actors (citizens and the HoReCa sector) and in general at each neighbourhood depending on their degree of awareness/participation and geographical characteristics. The implementation of selective collection and recovery of the organic fraction of urban waste will be carried out by updating citizen campaigns and infrastructure so that the quality of the bio-waste collected allows its correct recovery, as well as its subsequent disposal on the market.

b.3) **Experiences.** The selective collection of bio-waste in the municipality and its valorisation into high-value bioproducts has already begun in La Flota neighbourhood and markets, within

the framework of the European project VALUEWASTE and the pilot action in Seville in CITYLOOPS. The implementation of an efficient and viable collection and recovery system is expected, adapted to each area of the municipality and resulting in separation rates and quality of bio-waste suitable for its correct recovery. This will have a positive influence on the reduction of greenhouse gas emissions, as well as on the creation of bioproducts to replace those produced from non-renewable sources, and which will allow the development of a genuine local circular economy based on bio-waste.

b.4) **Financing / Investment plan:** this action is currently funded by NEXT GENERATION funds.

c) Creation of a Hub of circular and innovative enterprises. Annual Circular Contest.

c.1) **Necessity.** In such a competitive society, marked by the impact of covid-19, attracting talent, promoting innovation and the contribution of disruptive ideas under the prism of the circular economy are essential. In addition, it is necessary to give greater weight to the industrial (and digital) sector, which in Murcia is below the national average, both in terms of the number of companies and employability. In this way, we are talking about reindustrialising the municipality, revitalising and diversifying the economy through circular, disruptive, sustainable and innovative companies. The climate is favourable, in fact, the Region of Murcia has one of the highest rates of entrepreneurship in the country as evidenced by the creation of two initiatives to promote technology-based entrepreneurial companies, one private, Acho Valley, and the other driven by the regional government, Zakut Innovation Hub.

c.2) **Activities.** This action proposes the creation of a Hub, understood as a physical space based in the Municipal Initiatives Centre (CIM), where innovative companies undertake their projects, interact and generate synergies to respond to the challenges they face. To attract companies and funds, the brand "Murcia Business Circular Hub" will be created. The Hub will have the following areas or services:

- FabLab Space for companies and repair area for citizens.

- Coworking/accelerator space for startups and new businesses that offer the best solutions to the proposed challenges, and may receive prizes and distinctions for this. There will be pioneering initiatives such as Acho Valley.

- Consolidated companies and leaders in circular economy which will form an Advisory and Mentoring Committee and will collaborate with other organisations in the annual proposal of challenges in different sectors to be solved by the innovative companies.

- Catalyst space, where events, activities, brainstorming, etc. will be organised. For holding events, such as fairs and exhibitions, the CIM has an open-air space equipped with multiple services.

-Training/tools in circular economy and for innovative companies. Murcia's European Centre of Enterprises and Innovation and the Development Institute of the Region of Murcia (CEEIM as per the Spanish and INFO as per the Spanish, respectively) will collaborate with the event.

- "Hello Circular Urban Challenges": an annual contest for circular start-ups where they have the chance to win a mentoring year in Circular Hub and economic reward.

c.3) **Experiences.** The Hub can be considered a pioneer initiative in the municipality of Murcia. Previously, the CIM, a 1,500 square metre municipal space for entrepreneurs and their business initiatives, has housed/driven some of the areas that the Hub will develop. In particular, it has facilitated the establishment and consolidation of recently created business projects. Moreover, Murcia has expertise in the organization of circular contests in 2021 and 2022.

c.4) **Financing / Investment plan:** this action is currently financed with public money from the annual budget in Municipal Initiatives Centre (CIM).

d) Adoption of innovative participatory approaches

d.1) **Necessity.** The challenge is to achieve effective participation by all stakeholders through innovative approaches and mechanisms.

d.2) **Activities.** It is proposed to improve the participation of the different stakeholders in circular economy issues through the governance scheme proposed in this strategy (through the creation of a public participation body) and the Murcia Circular platform. The multi-stakeholder approach will be developed using as a germ the Biowaste Club that will be created in the European project HOOP, of which the Murcia City Council is a partner, and which in the future will be called Circular Clubs. Briefly, the Biowaste Clubs are configured as forums for participation, debate and monitoring of actions at municipal level in the field of circular economy involving all relevant actors.

d.3) **Experiences.** The City Council has a specific platform where the active participation processes are hosted. In addition, the City Council will benefit from the experience of the Biowaste Club that will be developed in the HOOP project.

d.4) **Financing / Investment plan:** this action is currently financed by Horizon 2020. In the short term, this action will be financed by public money.

3.4. Identified barriers & opportunities

Often, the most successful actions are those that build on previous experiences. In Murcia there are a large number of initiatives related to the circular economy that are already underway and that need to be visualised and capitalised on as an example for the development of new ones.

Circular economy projects and initiatives often go hand in hand with innovation and technological progress, which in most cases implies the need to find external sources of funding, especially if carried out by small companies or startups. Thus, the main objective of “Creation of a Hub of circular and innovative enterprises. Annual Circular Contest” and “Adoption of innovative participatory approaches” is to visualise and facilitate access to sources of funding.

For this actions, two barriers are identified:

- 1) Lack of human resource at municipality level
- 2) Lack of funding

However, many financing opportunities are detected due to the interest of EU Commission to implement EU Green Deal (Next Generation and ERDF mainly).

The implementation of the brown bin in the city of Murcia, its neighbourhoods and districts is progressing slowly. It currently faces a series of barriers such as the need to adapt collection to the different neighbourhoods and districts and treatment facilities, lack of awareness among citizens and the HoReCa14 sector, which affects the quantity and quality of the bio-waste collected, and the insufficient development of business models associated with recovery. Currently, these business models are not profitable and depend especially on the quality of the bio-waste (presence of improper materials).

The implementation of brown bin in the city of Murcia is thanks to Next Generation funds and some kinds of financial mechanism are detected in order to fund state-of-the-art valorisation.

For the assessment of food waste and create a network of food donation, in order to reduce it, three barriers are identified:

- 1) Lack of human resource at municipality level
- 2) Lack of funding
- 3) Lack of awareness in citizen

However, many financing opportunities are detected due to the interest of EU Commission to implement EU Green Deal (Next Generation and ERDF mainly).

3.5. Monitoring progress & evaluating results

The main challenge of the circular transition is to define how to achieve the objectives set out in the actions. For that, Murcia has developed a Monitoring Plan, with two main objectives:

- 1) to evaluate the degree of compliance and success of the actions defined in the Action Plan through a review process, and

2) to propose the updating of the actions and the definition of new ones

Moreover, it is crucial to identify which public department is responsible for the implementation of the action.

In the following sheets, indicators and departments in charge are described:

	PRIORITY LINE	ACTION	COUNCILLORSHIP IN CHARGE	COLLABORATIONS	TARGET AUDIENCE	MONITORING AND EVALUATION INDICATORS	TIMELINE	ESTIMATED BUDGET
FOCUS AREA: CONSUMPTION								
C1.1	Implementing measures to ensure responsible and proximity consumption	Campaign to encourage responsible and proximity consumption	-Councillorship for Employment, Commerce and Markets	-Mercamurcia (Agri-Food Logistics Distribution Centre) -Councillorship for Urbanism and Ecological Transition	-Commerce -Citizens	-Number of municipal tenders and contracts incorporated to responsible and proximity consumption criteria -Number of private initiatives created about responsible consumption and proximity commerce	2021-2025	50000
C1.2		Introduction of circular and sustainable guidelines for events and celebrations	-Councillorship for Culture, Tourism and Sports -Councillorship for European Programmes, Municipal Initiatives and Public Road	-Councillorship for Urbanism and Ecological Transition -CESPA (Waste Management and Treatment Company) -“Peñas Huertanas” (sociocultural associations for the preservation of Murcian culture), Confraternities etc.	-Event sponsors and managers -Citizens	-Number of sustainable initiatives proposed and developed at events/festivities -Amount of avoided waste	2021-2025	15000
C2.1	Reconnecting the city with its surroundings	Ecodesign for the creation of circular environments	-Councillorship for Employment, Commerce and Markets -Councillorship for Infrastructures, Procuring and Development	-Entities specialised in eco-design -Entities specialised in circular business models training	-Entrepreneurs -Citizens	-Number of entrepreneurs trained in circular models -Number of circular businesses created	2021-2025	60000
C3.1	Minimising food waste	Food waste assessment	-Councillorship for Employment, Commerce and Markets -Councillorship for Infrastructures, Procuring and Development	-Non-profit entities with food banks	-Citizens	-Amount of recovered and served food (tons/year) -Number of private initiatives created -Number of initiatives developed by non-profit organisations.	2021-2025	120000
C4.1	Encouraging reuse and repair	Creation of ecosystems to extend product lifetime	-Councillorship for Sustainable Mobility and Road Cleaning	-Neighbours associations -Consumer associations -Non-profit associations	-Citizens	-Number of initiatives inscribed in the registry of entities for reuse/repair -Number of available spaces to lengthen product lifespan	2021-2025	120000

	PRIORITY LINE	ACTION	COUNCILLORSHIP IN CHARGE	COLLABORATIONS	TARGET AUDIENCE	MONITORING AND EVALUATION INDICATORS	TIMELINE	ESTIMATED BUDGET
FOCUS AREA: WASTE MANAGEMENT								
R1.1	Promoting the separation and selective collection of all the fractions at source	Organic waste selective collection (bio-waste)	-Councillorship for Sustainable Mobility and Road Cleaning	-CESPA (Waste Management and Treatment Company)	-Citizens -Sector HORECA -Market squares	-Amount of the bio-waste selectively collected (tons/year) -Quality of the collected bio-wasteo (%) (improper materials) -Percentage of urban bio-waste recovery	2021-2023	5M€/year
R1.2		Measures to reach the objectives of preparing for reusing and recycling the municipal fractions	-Councillorship for Sustainable Mobility and Road Cleaning	-CESPA (Waste Management and Treatment Company) -ECOEMBES (Organisation for Recycling and eco-design)	-Citizens -Shops (small shops and department stores)	-MSW generation from minor construction work (tons/inhabitant/year) -Preparation for re-use and recycling of packaging, glass, paper and cardboard, textiles, WEEE, and household waste fractions (%/fraction)	2021-2024	0.5M€/year
R2.1	Optimising the management of the Construction and Demolition Waste	Activities to promote the correct management and assessment of the construction and demolition waste (CDW)	-Councillorship for Sustainable Mobility and Road Cleaning	-CESPA (Waste Management and Treatment Company)	-Citizens -SMEs from construction industry	-Quantity of CDW deposited in authorised dumps (tons/year) -Number of tenders where criteria for the separation and recovery of CDW are included	2021-2025	200000
R3.1	Encouraging ecodesign, reusing, remanufacturing and recycling	Circular Economy Fair	-Councillorship for Sustainable Mobility and Road Cleaning	-CESPA (Waste Management and Treatment Company) -Environmental associations -Neighbours and consumer associations	-Citizens -Shops -Other public entities	-Number of entities that participate in the events programmed -Number of attendees	2021-2025	50000

PRIORITY LINE	ACTION	COUNCILLORSHIP IN CHARGE	COLLABORATIONS	TARGET AUDIENCE	MONITORING AND EVALUATION INDICATORS	TIMELINE	ESTIMATED BUDGET
FOCUS AREA: CROSS- CUTTING POLICIES							
P1.1	Coordinating/aligning Strategies/Plans/Initiatives	Creation of the web platform "Circular Murcia"	-Councillorship for Health and Digital Transformation	-Councillorship for Sustainable Mobility and Road Cleaning -Design associations -Circular Initiatives Managers	-Citizens -CE initiatives managers	-Number of circular economy enterprises/initiatives hosted -Number of visits -Number of service/materials/services offered and acquired/contracted	2021-2025 30,000
P2.1	Capitalising circular actions as examples of good practices	Creation of a Hub of disruptive, circular and innovative enterprises	-Councillorship for European Programmes, Municipal Initiatives and Public Road.	-Leader enterprises in Circular Economy -Development Institute of the Region of Murcia -Circular economy business accelerators	-Small-sized companies and innovative and disruptive start-ups -Citizens	-Number of attendees to the activities -Number of enterprises hosted -Number of challenges proposed -Number of activities developed	2021-2025 100,000
P3.1	Developing effective, current and continuous public participation strategies	Adoption of innovative participatory approaches	-Councillorship for Education, Urban Agenda and Open Government	-Procuring and services with participation campaigns	-All the stakeholders (multiactor approach)	-Number of participants -Number of mails, requests and questions received -Number of surveys/participatory processes planned	2021-2025 15,000
P4.1	Developing training and/or awareness-raising activities	Development of the circular awareness-raising campaign	-Councillorship for Education, Urban Agenda and Open Government	-Procuring and services with awareness-raising campaigns	-All the stakeholders (multiactor approach)	-Number of campaigns carried out -Number of people reached by the campaigns -Degree of acceptance/consumption of circular products and participation in CE initiatives	2021-2025 40,000
P5.1	Developing municipal funding calls to boost circular economy projects	Development, identification and visualisation of funding calls for circular economy projects	-Councillorship for European Programmes, Municipal Initiatives and Public Road.	-Councillorship for Economic Management and Security -Regional government -Entities developing funding calls for Circular Economy	-Stakeholders interested in developing projects in Circular Economy	-Number of funding calls identified -Number of municipal funding calls that envisage circular economy projects -Number of applications received for municipal funding calls	2021-2025 3,000

PRIORITY LINE	ACTION	COUNCILLORSHIP IN CHARGE	COLLABORATIONS	TARGET AUDIENCE	MONITORING AND EVALUATION INDICATORS	TIMELINE	ESTIMATED BUDGET
FOCUS AREA: CROSS- CUTTING POLICIES							
P6.1	Promoting Sustainable and Innovative Public Procurement	Development of the Municipal Sustainable Public Procurement Manual	-Councillorship for Infrastructures, Procuring and Development	-Procurement services	-Stakeholders interested in participating in Sustainable Procurement processes	-% Circular goods/services purchased/contracted by the City Council -Number of Sustainable Public Procurement processes with circular criteria -Number of SMEs that have participated in Sustainable Public Procurement processes	2021-2025 6000
P7.1	Improving the access to information and monitoring	Measures to improve the access to information, information use and availability	-Councillorship for Education, Urban Agenda and Open Government	-Research groups from universities	-Citizens -Entities	-Number of consultations -Number of complaints on access to information -Number of applications positively resolved -Number of new indicators included	2021-2025 6000

3.6. Future outlook for the circular transition

The transition from lineal model to circular one, to be effective is necessary to count on a strategy articulated by means of a clear and simple roadmap. The intention of the Circular

Economy Strategy is perfectly described in its definition: establishing a set of rules that aim an optimal decision in each moment. This implies planning, establishing goals, looking into the future with the eyes of the present and being efficient. Thus, it is necessary to define short, medium and long-term goals, and to develop actions that are continuously monitored and updated. It is important to know what to do, but it is equally important to define who will carry it out (and how to achieve it).

Therefore, the future outlook for the circular transition is to adapt our municipality's economy to ensure a sustainable future, by modifying consumption, product and waste management patterns; strengthening companies' competitiveness; protecting the environment and reinforcing citizen participation.

4. Torres Vedras

The objective of the Torres Vedras CityLoops Replication Plan is to define initiatives and actions useful for the Organization from learnings as a CityLoops Replicator Zone, in the transition to a circular economy in biowaste and construction sectors.

This plan includes the objectives and ambition, as well as the definition of the stakeholders who will be involved. It also includes the actions that will be replicated and the impacts on a municipal scale.

The “Torres Vedras CityLoops Replication Plan” also identifies the barriers, opportunities, and the factors for the successful implementation of the defined actions.

This Replication Plan presents a list of specific indicators to monitor during the implementation stage, and how to evaluate the success of the measures.

Context

The municipality of Torres Vedras is in the district of Lisbon, being bounded to the north by the municipality of Lourinhã, to the northeast by the municipality of Cadaval, to the east by the municipality of Alenquer, to the south by the municipalities of Sobral de Monte Agraço and Mafra, and to the west by the Atlantic Ocean. With a population of 83 130 inhabitants, is administratively subdivided into 13 parishes, in a total area of 407 km².

The 20 km of coastline makes Torres Vedras a touristic hotspot, with 12 Blue Flag Award beaches in 2023. Since 2009 this coastal area is a Quality Coast and a Green Destination Awarded territory.

Just a few km from Lisbon, Torres Vedras has rich polyculture lands, and is the Portuguese municipality with the biggest wine production. Agricultural activity (vineyards and horticulture), the agri-food and metallurgical industry and retail trade play a major role in Torres Vedras economic activity, with a total of 9 976 enterprises (INE 2010).

In 2011, the labor force in the municipality was 38 768 individuals, which represented an activity rate of 48.8%.

Torres Vedras set Sustainability as a strategic mission in the past 20 years and have been working in several axis to promote it. Circular Economy is one of the topics that have been embraced. In the last years were developed several actions with the main goal to achieve a circular regenerative economy and engage the community, suppliers, businesses, and social sector on board to this mission.

Involvement within CityLoops has been coordinated by *Serviços Municipalizados de Água e Saneamento* (SMAS), an entity that belongs and integrates the Municipality. It has a board of directors, like a municipal enterprise but with a specific national legal framework that exists in Portugal for water, wastewater and waste management services at municipal level. The members of the board are appointed by the municipality, in the beginning of each municipal mandate, usually the chairman of the board of directors is the mayor.

The municipal circular economy and climate change policies and strategies are built with SMAS contributions and in a close cooperation with the municipality teams that work these topics. Beside SMAS and the Municipality, the other public actors that should be highlighted are Intermunicipal Community which integrates several Municipalities in our region (12 municipalities of the West Region) and the enterprise (VALORSUL) that is responsible for the waste treatment (incineration and landfill) and valorisation (anaerobic digestion and compost production), VALORSUL recovers 20% of all domestic waste produced in Portugal, serving 1.6 million inhabitants in 19 municipalities.

Ultimately, Torres Vedras is part of several networks and has been part of various national and international projects over the years:

NETWORKS:

- **“PROCURA+ European Sustainable Procurement Network”**, co-ordinated by ICLEI.
- **ACR +**, the Association of Cities and Regions for the Sustainable Resource Management.
- **“Green City Accord”**, an initiative launched by the European Commission. The fulfilment of this commitment will also contribute to the implementation of the "European Ecological Pact" (European Green Deal) and to the United Nations (UN) Sustainable Development Goals (SDGs).
- **Institutional Pact for the Valuation of The Circular Economy in the Centro Region.** In 2020 the Municipality of Torres Vedras reinforced its commitment to the Circular Economy by joining this Pact promoted between the Commission for the Coordination and Regional Development of the Region Centre (CCDRC) and 84 public and private entities. This Pact promotes Healthy and Sustainable Food Systems, through development of a sustainable program that contemplates the 4 stages of food process for school meals: Production (Bio school vegetable garden Program and education campaigns), Acquisition (local providers), Confection (local school canteens), Consumption and Healthy Habits (reduction of food waste and promote good eating habits).
- **Circular Building Cities- URGE Network:** as part of the integration of Oeste Intermunicipal Community into the URGE Network (Circular Building Cities), SMAS Torres Vedras has been taking part in a series of meetings and actions. This network, part of the EU's URBACT programme, aims to accelerate the principles of the circular economy in the construction sector. In 2021 it was recorded a video about the

management of CDW collection in Torres Vedras greenpoint for construction demolition waste disposal, which was presented at the Network's online seminar. It was also developed an Action Plan, that compromises all the municipalities involved for its development in the period 2023 – 2030.

PROJECTS:

- **Torres Vedras Circular Purchases Project:** in 2018 Torres Vedras launched this project, integrated in the National Project funded by Environmental Fund. This project aims to support the development and testing of circular products and services within the scope of public procurement in the Municipality of Torres Vedras, to implement the transition agenda for ecological and circular purchases recommended in the Circular Economy Action Plan. Three products and services have been identified with the potential to integrate the principles of Circular Economy that derived from experience in previous projects: Acquisition of food goods, catering and uniforms.
- **Building SPP - Capacity Building in Sustainable Procurement Project:** funded by LIFE Program LIFE09 ENV/PT/000050 (2010-2014). The main results of this project were, at the strategic level, the development of a Sustainable Procurement Policy; at the operational level, the development of an acquisition procedure for urban pests with sustainability criteria and the beginning of a dialogue process with suppliers in the sectors of food / catering, uniforms and civil construction works.
- **Green Med - Greening Public Procurement in Mediterranean Local Authorities:** funded by LIFE Program LIFE03 ENV/GR/000221 (2003-2006). The main results of this project were the completion of a procurement procedure for the purchase of cleaning products for the municipal school cafeterias with the inclusion of environmental criteria and the proposal for design and construction of the new Environmental Education Centre building, with eco-efficient characteristics and environmentally friendly materials (currently built and in operation).
- **Environmental Education Centre:** located in Torres Vedras, this municipal service has developed over the last few years an educational program with several initiatives that address entire community and intend to involve, in a dynamic and interactive way, the population in environmental awareness projects, that addresses topics such as: Biodiversity, importance of rivers, sea and oceans, forests and green spaces, water, wastewater and waste and circular economy, mobility, energy and climate change. Some of the activities that have been developed are related to circular procurement, food waste, circular economy in the construction sector, domestic and community composting.
- **School Food Sustainability Program (PSAE):** since 2014 the Municipality of Torres Vedras has been developing this Program, combining two dimensions of work:

1- Economic dynamization of school food and meals.

2- Promoting health/nutrition and educational services.

To prepare school meals, a network of Private Social Solidarity Institutions (IPSS), (Non-governmental organisations) has been set up which, together with the municipality, guarantee the supply of an average of 4,000 school meals a day. Assuming the increase in cost, the option to make the most of the logistical and human resources already available in these institutions significantly reduces the ecological footprint that would have been unavoidable if the easier and cheaper model of purchasing these meals from a catering company had been chosen. In this way, the Municipality and Parishes (through 14 local NGO), directly manages canteens / kitchens for the supply of school meals.

- **“Bio School Vegetable Garden Program”**: the municipality has been working with a special focus on raising awareness in the student’s community to “close the food loop”: production of organic vegetables - consumption of organic products in the canteen or at home – composting – and finally the compost back to the garden.
- **Municipal Program for domestic composting**: it consists of awareness-raising sessions in which participants receive a home composter; 1 200 composters have already been delivered. There has also been a focus on raising awareness and training for composting in schools and institutions, where training sessions have been held and composters have been provided. As part of internal training, sessions have also been held for SMASTV employees and compost bins have been provided.
- **Municipal Program for community composting**: in 2019, the municipality started a community composting pilot project named “Compostim”. This project is coordinated by a local group of citizens and combines community composting with an aromatic garden that users can enjoy. It is designed to be used by around 3 to 4 families per unit. To date, 5 community composters have been installed.

4.1. Ambition & objectives

The sustainability challenge requires urgent, comprehensive, and coordinated actions. Those actions will contribute to the response to the climate emergency and will feed into the Local Strategy for Circularity.

As part of the governance of the sectorial actions, the Municipality will cooperate closely with stakeholders to identify barriers to promote and implement circularity in the processes and ways to address those barriers. We need to think and to act: How to change from a waste approach to a systemic resources approach.

BIO-WASTE

The ambition of Torres Vedras is to work on the entire food system, not just in a food waste approach, as the Municipal Programs that promote Composting, the School Food Sustainability Program (where local and organic food play an important role), and Bio School Vegetable Gardens Program demonstrate.

For the food waste the Municipality, main goal is to promote its valorisation, by encouraging awareness and engagement of citizens, school's community and municipal stakeholders, such as markets, canteens, and restaurants.

With the biowaste collecting scheme, the biowaste will be collected and use for energy recovery and compost production. Are expected, in the first year of the program to transform more than 2 000 tonnes /year of biowaste, through a pilot project. In the future, the aim is to expand the collection scheme for more urban areas of the territory.

In the rural areas the municipality has significant potential for the success of home composting programs, in these places the selective collection of biowaste will not achieve significant results and will always have a very high cost-benefit ratio, given the number of kilometres to be travelled to collect small quantities of biowaste. In these areas the municipality intends to continue the capacity building program to promote domestic and community composting for the communities that live in rural areas.

CDW

Torres Vedras major priority in CDW is to use public procurement with circular criteria, and the stakeholder's involvement, to guarantee that local companies are obliged to recycled and re-incorporate the CDW, in the replacing of works, also the promotion of Green-Points and Door-to-door collection for small producers with awareness-raising campaigns, to reduce the illegal dumping of CDW are one of the priority actions.

Following the Action Plan resulting from the participation in URGE Network and also the lessons learned from the CityLoops project Torres Vedras is committed to the development between 2023 and 2030 of the following actions:

1. Manual on CDW Good practices
2. Training of Municipal Technicians
3. University Seminars on CDW
4. Creation of the municipal "Head of Circular Economy"
5. Creation of an Eco Centre network
6. Promotion of selective demolition and definition of valorisation criteria
7. Quantification of CDW at regional level
8. Regional Meetings
9. Local governance on CDW
10. Consumption of recycled CDW aggregate equal to the volume of CDW delivered
11. Identification of CDW materials, support suppliers for certification

12. “Green public procurement”: Promotion of Framework Agreements for valorisation of CDW

4.2. Stakeholder engagement

Torres Vedras Municipality is committed with the CityLoops approach to close the loops of waste material, promoting a circular economy approach to the city's development, for that stakeholders engagement is a crucial factor to guarantee the success of the Municipal Biowaste and CDW programs.

Torres Vedras has experience in stakeholders' involvement, due to the work that have been developed in other projects and initiatives since 1999 (year that started to build the Environmental Municipal Action Plan, involving public participation), and also due to the Climate Change Strategy that has now a abroad commission whit representatives from civil society, local and national government, economic sector, universities, public and private sectors.

The other key action is what may be called an internal stakeholders engagement, the integration of several levels of management, the municipal services and departments , such as education, environment, green areas management, public works, urban planning, public procurement, entrepreneurship and business support area, together with main stakeholders, such as Valorsul (Regional Waste Company), parishes (local authorities), Tourism Sector (hotels and restaurants), Social Economy Sector.

For these two topics, Biowaste and a CDW the municipality will test to different approaches, one is using the local commissions that are already available, like the “Local Climate Change Commission” to introduce the discussion and engagement of stakeholders about the strategy for Biowaste and CDW. The other is to create small working groups that will focus on defining activities that can improve, in a quick and effective way the results of the local programs for these two waste streams, including citizens and local business representatives.

4.3. Actions for replicating CityLoops demonstration actions and instruments

With the knowledge exchange, best practices share and learnings that result from the study visits, meetings technical session and information collected from the CityLoops Project, Torres Vedras expect to implement the following actions:

BIOWASTE:

Biowaste Collection Program (TORRES + BIO): this program aims to implement the selective collection of biowaste in the city of Torres Vedras, for more than 12.000 inhabitants. This program is the result of an application that was submitted by SMAS Torres Vedras, which was approved by National Program POSEUR - Operational Program for Sustainability and Efficiency in the Use of Resources. Is expected to start in September 2023.

Torres + Bio contains 4 main actions:

Action A1: Collection of biowaste in the city of Torres Vedras

This action involves the selective collection of biowaste of domestic origin in the city of Torres Vedras, through the installation of neighbourhood containers. Cumulative with the other actions, is expected that all the city's biowaste have the potential to be selectively collected.

For this action, it is estimated a collection of 1,400 tonnes per year of biowaste.

Action A2: Collection of biowaste in School canteens

This action involves the selective collection of biowaste in school canteens, using the door-to-door system.

Based on existing data and the estimates made, it is expected a collection of around 146 tonnes per year.

Action A3: Collection of biowaste in the Municipal Canteen and in the City Market

This action aims to collect the biowaste from the social canteen of the Torres Vedras Municipal Staff, located in the Municipal Market. It also covers the biowaste from the Municipal Market with 52 operators selling different food with an estimated 880kg/day of biowaste produced 6 days a week.

For this action, it is estimated a collection of 157 tonnes per year of biowaste.

Action A4: Collection of biowaste in Restaurants, Hotels and markets

This action involves the selective collection of biowaste in 116 Restaurants, 13 Hotels and Guesthouses and 3 Markets (out of town), using the door-to-door system.

Based on existing data and the estimates made, it is expected that around 635 tonnes per year will be collected selectively.

In addition to the actions of biowaste collection, the program integrates, and it is complemented with 3 essential components for the success of the actions, namely:

- ICT (Information and Communication Technology) system for monitoring biowaste collection, supporting collection planning and the operation of the incentive model;
- Awareness-raising and dissemination campaigns, among the population and target producers;
- Study to change the current waste tariff to a PAYT system, promoting biowaste sorting at source, which rewards good practices and leads to increased efficiency of biowaste collection.

CDW

There's already a political commitment from Torres Vedras municipality with CDW circularity, result from URGE Network. The Municipality of Torres Vedras are committed to CityLoops approach to close the loop of waste material, promoting a circular economy approach to the city's development, in the CDW sector, and reducing the illegal dumping of CDW.

The Replication Actions that will be implemented as a priority in the City of Torres Vedras are presented below.

Action 1 - Public procurement processes

Use public procurement and stakeholder involvement to ensure that local companies are obliged to recycled and re-incorporate the CDW, in the replacing of old pipelines for drinking water and sewage works, and also in others construction works;

Action 2 - Creation of Green Points for small producers

Definition, in collaboration with the parishes, to create Green Points for small producers, distributed throughout the county of Torres Vedras;

Action 3 - Promotion of door-to-door collection service for small producers

The municipality already have a door-to-door collection service for small producers of CDW, resulting from small demolition and construction works (around 2m³). The aim is to is to promote this service to more users reducing the illegal dumping of CDW.

Action 4 – Awareness-raising campaigns

Designing and carrying out Awareness-raising campaigns to engage community, construction companies and public workers, to encourage proper separation of CDW.

The actions are intended to increase awareness of CDW management among citizens and small producers. As well as to promote the use of Green Points for the management of CDW by citizens and small producers, increasing the amount of CDW managed through Green Points by citizens and small producers, and also reducing the illegal dumping and landfilling of CDW in the city.

4.4. Identified barriers & opportunities

The factors that can facilitate the implementation of this Replication Plan are:

- Political commitment and integrated management;
- Capacity building and training of technical and operational staff on the circular economy and, specifically, on CDW and waste management;
- Increase citizen's perception of environmental benefits, which result from the implementation of environmental good practices in waste management;
- Establishment of local partnerships with relevant stakeholders;
- Opportunity to improve the image of the participating organizations as more environmentally friendly companies, which include good environmental practices in their activities);
- Development of a technological platform and data information system for waste collection management;
- Creation of communication channels and dissemination of results to (and with) citizens;
- Disseminating the project (and its innovative character) to other municipalities in the Oeste Region, boosting replication in other territories;
- Access to external funding (National or European Level).

The main factors that can be identified as barriers in the implementation of this Plan are:

- Lack of interest from citizens / unsuccess in promoting behavioral change (and change to an circular approach to a vision of "waste as a resource");
- Lack of financial and resources, to continue and enlarge the project;
- Lack of human and operational resources to implement the actions;
- Involving the various types of public (citizens, community and private sectors);
- Strengthening the capacities of local stakeholders;
- Lack of legislation in the CDW sector in Portugal;
- Limitation of national public procurement and lack of commitment from suppliers/companies able to respond to circular clauses in public contracts;
- Difficulty in maintaining biowaste collection containers (ensuring frequent washing).

- The possibility of odours in the biowaste disposal containers;
- Problems in the communication and operation of the IT system;
- Difficulty in users adapting to new procedures, new waste selection rules at home, use of container opening technologies;
- Improper disposal and abandonment of waste;

To overcome these obstacles, the municipality is planning to implement a close monitoring systems, reinforce the technical teams, to guarantee rapid responses to problems and also implement simplified communication channels that will be always available so that users can report problems and difficulties, as well as clarify doubts.

4.5. Monitoring progress & evaluating results

Monitoring is an important tool for ensuring the success of the project, essential decision support tool that allow timely action to be taken to correct or adapt the measures, as well as acting with users to communicate results or request changes in behavior. It also makes it possible to systematize data for evaluating the project's results and provides credibility, transparency, and rigor in its implementation.

The indicators were selected considering the impact of the demonstration actions individually and its impact in the city, and their relevance to analyze the circularity progress.

A large part of the indicators refers to pilot actions that are going to take place in the city for the first time, so there is no previous data available, in addition, it will be necessary to create new databases.

BIOWASTE

Indicator name	Description	Measurement Unit	Expected Outcome 2025
Collection of biowaste	Installation of proximity containers and collection of biowaste in the city of Torres Vedras	Number of proximity containers installed	266
		Tonnes of biowaste collected per year	2 338
		Percentage of city population with regular biowaste collection	10%
		Number of domestic composters distributed	1 500

Domestic composting	Distribution of domestic composters	Quantity of biowaste for collection avoided (ton/year)	85
Community composting	Installation of community composters	Number of community composters installed	6
		Quantity of biowaste for collection avoided (ton/year)	43
Awareness-raising activities	Door-to-door awareness-raising activities in the project's target area	Number of days of door-to-door awareness-raising activities	45
		Number of flyers distributed explaining the project	1000
Dissemination and communication	Communication and dissemination of the project	Number of means of publicising the project (journal, radio, flyers)	3

CDW

Indicator name	Description	Measurement Unit	Expected Outcome 2025
Circular Criteria	Increased share of "circular" indicators and specifications in tender documents and contracts.	Number of public tenders with circularity criteria	10
Green Points	Increased use of clean points for CDW management by citizens and small producers	Number of Green Points created	10
		Number of visits to the clean points by citizens and small producers	5 000
		Ton/year of CDW material avoided to illegal dumping	3 000
Door-to-door collection service for CDW material	Increased use of door-to-door collection service for CDW material by citizens and small producers	Number of requests for door-to-door collection / year	200
		Ton/year of CDW material avoided to illegal dumping	120
Dissemination and communication	Communication and dissemination of the project	Internal communication and capacity building of circularity criteria for public procurement processes	2

		Number of means of publicising the CDW project (journal, radio, flyers), Green points and Door-to-door collection service for CDW material	3
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4.6. Future outlook for the circular transition

Transition to circular economy in Torres Vedras is a municipal strategic objective that requires an integrated, transversal, and multidisciplinary approach, aligned with the aim to accomplish sustainable development, which implies guaranteeing environmental quality, economic prosperity, and social equity, to the benefit of current and future generations.

These actions on biowaste and CDW will contribute to increase circular transition city's strategy/policy. Expanding biowaste collection to other areas close to the city, promoting and increase domestic and community composting, as well as using public procurement to promote a circular economy in areas other than CDW (water and wastewater management), are considered priorities for the municipality.

Torres Vedras city in the last years developed several actions with the main goal to achieve a circular regenerative economy, and engage the community, suppliers, businesses, and social sector on board to this mission, so our outlook for the future is optimistic, there is only one possible path, the path of circular transition.

In the waste management perspective circular future will include the development of practices for reusing and sharing products, enabling technologies, governance of institutions at various levels and changing mind sets.

Raising awareness, acting at a local level (products, companies, consumers), changing the economic system based on linear business models to circular business models that replace the concept of "end of life", are also public sector responsibility and public procurement is a key action that can lever circular transition.

Through the implementation of this plan, Torres Vedras expect to inspire and encourage others (municipalities) to do the same.

5. Vallès Occidental

Vallès Occidental is a county located in the Metropolitan Area of Barcelona, in Spain, with 23 very diverse municipalities and more than 940,000 inhabitants. With more than 25,000 companies, it is home to a diversified economy. It has strong assets in scientific and technological infrastructures, training and research institutions, relevant business organisations, social entities and qualified human capital. It is a territory which combines large cities (two with more than 200,000 inhabitants and three between 50,000 and 100,000 inhabitants), nine towns of between 10,000 and 50,000 inhabitants and a few very small villages (nine with less than 10,000 inhabitants). Moreover, it counts with three natural parks and 60% of its surface is composed of forests.

The County Council of Vallès Occidental (*Consell Comarcal del Vallès Occidental (CCVOC)*, in Catalan) is a supralocal administration that coordinates policies and actions with the local governments and actors in the territory, and it has been working on the circular economy transition for years now. In 2016, it started working with a group of organisations made up of universities, research centres including Leitat Technological Centre, local administrations and business groups, which led to the signing of the Vallès Circular Agreement¹⁷ by 42 organisations. Since the moment the agreement was signed, the circular economy has become part of the political and strategic agenda of the county and conditions that facilitate the participation of local councils, companies, organisations and citizens of the region in the process of change have been created. Advancing in complementary paths, in September 2019, the Declaration of Climate Emergency was approved by the Council of Mayors, incorporating issues such as energy efficiency and air quality into the regional agenda.

Within this framework, participating in the CityLoops project as a replication zone from the beginning of the project has been an important incentive and it has reinforced the commitment in this area. In particular, it has strengthened strategic action in this area, with concrete steps such as joining the European Circular Cities Declaration in January 2021. Additionally, it has increased the County Council's engagement with the circular economy. In the context of the Vallès Circular initiative, the County Council has been present in several spaces such as the World Climate Summit COP25, in December 2019 in Madrid, or the Circular Economy Hotspot 2021 in Catalonia.

The action in demonstration cities of CityLoops, on the one hand, has provided references for the evolution in areas that already registered activity in Vallès Occidental. In particular, the Recooperem project focuses on reducing food waste from school canteens by redistributing the food to vulnerable families and the Circular Market (*Mercat Circular*, in Catalan) is an initiative to make the most of fruit and vegetables, avoiding food waste from the Mercavallès wholesale market, the second largest market in Catalonia and located in Vallès Occidental. On the other hand, CityLoops has opened the beginning of work in the field of circular construction and the application of circular public procurement where no significant projects or actions were

¹⁷ <http://vallescircular.com/qui-som/>

registered beforehand. In short, this project has contributed to the increase in activity in the territory, which has helped to make progress in sharing a vision and actions with other stakeholders in the transition towards circularity.

5.1. Ambition & objectives

The replication objectives focus on proposals to advance the circular transition in Vallès Occidental under the vision of Circular Cities and to strengthen a territorial and concerted action model. This will be done by taking advantage of the learnings acquired from the participation in the CityLoops project, which will serve to act in specific areas that have been the focus of the project and to open up spaces for the future to incorporate the practices and tools developed. Moreover, activating the work in these areas will function as a stimulus and reference for other areas and will help to build a progressively more circular future. In this line, the following objectives have been set:

Food waste sector

Firstly, to centre the replication in the field of organic waste, specifically, in the prevention and management of food waste, associated with food sustainability. The aim is to provide elements to start new projects, to do an analysis of the situation and to identify local actors to increase the generation of synergies and proposals for food prevention and management, both in quantity and in quality. This is to be developed during the years 2022 and 2023, with a forecasted continuity in 2024.

Construction sector

The objective in this sector is to centre the replication in putting circular construction on the agenda of the territory, with the mobilisation of actors and the promotion of synergies and shared future projects. To do this, the aim is to identify actors and initiatives and open up a space of knowledge and collaboration to set objectives and priority lines of work, to be developed during the years 2022 and 2023, with a forecasted continuity in 2024.

Circular Public Procurement

The focus of replication actions will be on the information and dissemination of the concept and the opportunities it opens up, as well as on the promotion of actions to increase the introduction of circularity criteria in public procurement. To do this, the presentation and work of the concept will be used in the transfer day of the CityLoops project in Vallès Occidental, scheduled for September 2023, and the development of a package of dissemination actions

among the municipalities scheduled for 2024 will begin. This impulse must be used to move forward in the medium term in a plan to foster circular public procurement in Vallès Occidental.

The CityLoops knowledge transfer day in Vallès Occidental, held on September 28 and 29, 2023, was an important event both to strengthen the positioning of these objectives in the political and territorial agenda, and to encourage the involvement of the different stakeholders. And it is expected that the continuity of action in these areas will have a relevant support framework within the territory's objective of creating the Vallès Circular Park, which is described in the last section of this document.

5.2. Replication actions and detected barriers and opportunities:

Construction sector

Stakeholder engagement

All the actors involved in the value chain of the construction sector can be grouped into those categories of the construction life stage: Plan, Design, Produce, Transport, build, Use/Maintain, Reuse/Demolish. When speaking of planification, the most important role lies with public authorities, who should embed circular principles in their vision for the future development of the territory. In Vallès Occidental, the County Council (CCVOC) does not bear the responsibility for planning, as this role remains to the initiative of each municipality. In this context, our primary goal is to maximize the participation of local public administration, especially municipal politicians and technicians, taking advantage of the coordination role of CCVOC among the County area. Additionally, architecture and design firms are also key pieces in the application of this circularity, and their presence is very relevant especially in the biggest cities of the area. Regarding the production stage, at Vallès Occidental we find important manufacturing companies of construction materials, with a lot of influence when incorporating circular economy.

Undoubtedly, a very important role in the circularity of the sector is played by demolition companies and construction waste managing companies, due to their role in selecting and valorising waste as resources. In general, the construction sector is usually composed of numerous SMEs, and also in Vallès Occidental there are 927 installation companies and 733 building construction companies.

A stakeholder database has been created within CityLoops project, mapping the most relevant actors. They were categorized into 4 helixes (Administration, Society, Economic Agents and Knowledge Agents), and further categorized by each stage of the sector value chain.

Most relevant actors have been involved during the project, and encouraged to know more about CityLoops solutions, and finally invited in a first workshop, to start actual engagement process. Alongside the event invitation, a comprehensive document has been shared, where all the information regarding circular solutions developed by CityLoops demo cities were collected and translated into Catalan, to facilitate its comprehension. More details on the engagement strategy have been reported in the following section.

Actions for replicating CityLoops demonstration actions and instruments

As it has been explained, the County Council of Vallès Occidental does not have the role and the duty to manage public infrastructures or buildings, so the replication of CityLoops circular actions has to go through the involvement of other local actors, both public authorities and private companies.

In this context, the CCVOC, with LEITAT support, worked on the organization of a workshop, that brought together key actors from the sector to share experiences, and generate links and networking for possible initiatives and business opportunities. This first event led to the formation of a working group, that will be sustained by the effort of a hard core of key actors, but participation will remain open to all those others who wish to join. In the vision of CCVOC and LEITAT, the working group will convene annually to provide updates to all other participants on results, challenges, and work proposals for the future. In this way, the working group could evolve in a stable working platform: the **PLATFORM - CIRCULAR CONSTRUCTION**, that will in the future become the engine of the circular economy in the construction sector of the region, generating a positive impact both for the participants and for the local construction sector.

The proposed platform is intended to be managed by the core working group with a co-creation approach, so that the most relevant actors and those affected by the actions of the platform can participate, each one with its point of view, thus generating a participatory process. The methodology for this platform is structured around 5 key points: **1 Co-Create** an open and shared space for the promotion of the circular economy in the construction sector in Vallès Occidental, both for large companies and for SMEs, local administrations and citizens; **2 Share** studies and research for the development of the knowledge of the participants in the matter of circular construction; **3 Co-Develop** tools and methodologies for the application/replication of practical cases of circular solutions; **4 Promote** specific work actions to stimulate connections and synergies between the actors involved; and **5 Co-evaluate** as an endpoint and starting point at the same time; every year the results of the previous year will be shared, to draw lessons that will be shared among all the participants.

The work plan proposed for the period between 2023 – 2024 is:

- **1st workshop (March 31st, 2023)** to promote the platform proposal to the relevant actors, and complete shared work tasks: 1) complete the mapping of actors and circular solutions available in Vallès Occidental territory, along with barriers, challenges and opportunities of the development of a circular construction sector; 2) define common development goals together with knowledge interests that can be worked on in the next working day with CityLoops.
- **2nd workshop (September 28th, 2023)** during the CityLoops Replication Workshop at Vallès Occidental, taking advantage of the presence of CityLoops' experts. On this day, the results obtained from the meeting in March will be explained, providing an overview of current context. Topics of interest that have emerged from the first meeting will be dealt in more detail, with the aim of transforming this knowledge into resources to promote specific actions in our territory. One of the objectives of this working session will be to develop replication actions that can be used to apply to open calls for innovation project funding, like EU projects, national financing schemes or other tenders.
- **Drive actions and new projects.** LEITAT and CCVOC will maintain collaboration spaces and promote exchanges among participants, to support the generation and maturation of proposals, as well as in the search for resources for the implementation of circular solutions.

The first impulse to the action plan has been generated by CityLoops project, through the organization of the two mentioned meetings (in March and September 2023). CCVOC and LEITAT took advantage of the available resources and started the engagement of local actors, as first step in implementing the Replication plan. During the preparation of first meeting, held in March at LEITAT head quarter, participants received detailed information and material on CityLoops circular solutions, while during the working session, important feedback from local actors have been collected.

The current implementation plan and foreseen activities are designed to be agile and it will need a small effort from LEITAT and CCVOC side to keep running the working platform. Also, one of the first goal will be to extend the working group with the help of the most involved stakeholders, in order to share future work and the management of the platform.

A second important milestone would be the participation in open calls for public financing, in order to secure additional resources for this initiative. Currently have been identified two potential calls, that could be of interest, for a joint application to finance replication action on circular construction:

1. DUT Call 2023¹⁸ - DUT Partnership: Circular Urban Economies Transition Pathway: CUE Topic 1: The Built Environment as a Resource Base. **Deadline: 21st Nov 2023**
1st stage; 2nd stage on 30th April 2024. This is a joint programming initiative, whereby one first applies at EU level and then at national level (AEI)

¹⁸ https://dutpartnership.eu/funding-opportunities/dut_call_2023/

2. HORIZON-CL5-2024-D4-02-04¹⁹: Design for adaptability, re-use and deconstruction of buildings, in line with the principles of circular economy (Built4People Partnership); **deadline: 21 January 2025.**

Identified barriers & opportunities

Barriers and opportunities have been organized per value chain. In general, the construction value chain can be spread into the following lifecycle stages: Planification and Design, Material Production, Transportation, Build, Use and Maintain, Reuse and Demolish. Main barriers emerged are:

- 1) For the planning phase, the current regulations, the fragmentation of the sector and the lack of support from the public administration together with the general lack of knowledge on the subject are a problem.
- 2) Regarding the design phase, the lack of specialists in circular design strategies, means that the system has still to mature.
- 3) In production, the technical and economic difficulty of obtaining certain raw materials for construction due to the current world situation is highlighted. In addition, production regulations are very demanding in some areas in Spain and certain quality standards must be met which are quite complex to achieve at a competitive price.
- 4) For the construction phase, they identified as barriers that the regulations are not very favourable, that the work is not considered dignified enough.
- 5) Regarding the use/maintenance phase, the lack of social demand for circular constructions and the lack of good maintenance of the buildings is identified.
- 6) Regarding the reuse phase, the regulations appear again as one of the main barriers together with the mixing of materials in the different components of the building so that it is more complex to reuse them due to the fact that it involves separation processes of materials.
- 7) Finally, in the demolition phase, the harsh regulations stand out as a major barrier. As an opportunity, as in the previous phase, the identification of a building as a "material bank" stands out.

Main opportunities emerged are:

¹⁹ <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl5-2024-d4-02-04;callCode=null;freeTextSearchKeyword=HORIZON-CL5-2024-D4-02-04;matchWholeText=true;typeCodes=1,0;statusCodes=31094501,31094502,31094503;programmePeriod=null;programCcm2Id=null;programDivisionCode=null;focusAreaCode=null;destinationGroup=null;missionGroup=null;geographicalZonesCode=null;programmeDivisionProspect=null;startDateLte=null;startDateGte=null;crossCuttingPriorityCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=sortStatus;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState>

1. At the planning phase, the improvement of current legislation has been identified as an opportunity. The quantification of building residual value has also been identified as an opportunity at this stage.
2. For the design life stage, increasing knowledge and competence about circular construction solution and involved technologies is a great opportunity to gain competitiveness against competitors.
3. For the construction phase, the opportunities are to solve these barriers through interdisciplinary collaboration, challenging the current way of working in construction companies by focusing on different ways of building.
4. Regarding the demolition and reuse stages, the scarcity of raw materials discussed in the production phase presents an opportunity. It is identified that a building can serve as a "materials mine" and that materials reused from a building to generate other products could have a certification.

5.3. Replication actions and detected barriers and opportunities: Food waste sector

Stakeholder engagement

In Vallès Occidental there is a significant number of stakeholders involved in the food value chain. There are multiple companies working on food production and food processing, but there is also a strong commerce and tourism sector in the territory which make restaurants, hotels, cafés and bars a big player in the sector. Food waste in Vallès Occidental is collected separately as organic waste and this is managed by Vallès Occidental Waste Consortium, the public waste management organisation at the county level. The County Council of Vallès Occidental as well as the 23 local governments of the territory act directly on food waste management and play a key role in the circular transition of this sector. In addition, social organisations have been redistributing food to vulnerable families for years. Finally, in Vallès Occidental there are universities and research centres who do research on innovative solutions in this regard.

In regard to the CityLoops project, as mentioned above, one of the main priorities for Vallès Occidental as a replication zone is to increase the involvement of actors and the level of action. The aim is to connect all those stakeholders from the territory in order to find synergies among them, implement high impact solutions and accelerate the transition towards a sustainable and circular food system. For Vallès Occidental this is a key priority since it is essential that all actors involved in the value chain participate in such a process where they all can share their experience and perspectives as well as shape the path ahead.

Actions for replicating CityLoops demonstration actions and instruments

During the CityLoops project, the plan has already started to be put into action. The actions that have been and will be carried out are the following:

- 1) Map actors in the food sector. As a first step, CCVOC and LEITAT mapped those actors of the four helices (administration, society, economic agents and knowledge agents) who already have circular initiatives in place to tackle food waste or any other linear and unsustainable aspects of the current food system in Vallès Occidental.
- 2) Engage local stakeholders. After the mapping exercise, two workshops were organised in order to bring these actors together. In order to join efforts, in collaboration with HUB B30, an open innovation network created to promote collaboration, economic development and social cohesion of the B30 territory, which is part of the Barcelona Metropolitan Area. 51 participants from academia, social entities, private companies and public administration, both at a county and local level were brought together to discuss the current situation of the food sector in relation to the circular economy:
 - **1st workshop on April 21st, 2023²⁰**: In this workshop, ongoing initiatives in the territory were presented, including Recooperem. In addition, the objective was to discuss barriers faced by all, as well as opportunities perceived.
 - **2nd workshop on May 5th, 2023²¹**: In this occasion, Leitat presented technological solutions to problems faced by companies in the food sector as well as European projects such as CityLoops where the circular pilots by demonstration cities in the biowaste sector were presented. Next, a session was organised to co-design solutions based on the opportunities previously identified. These two workshops served to put together the perspectives on the matter from different types of stakeholders from Vallès Occidental and other counties, and to confirm the willingness that there is in the region to work together on circular solutions.
 - **3rd workshop on September 28th and 29th, 2023**: Currently, the County Council of Vallès Occidental together with LEITAT are organising a replication workshop with CityLoops partners. In particular, a two-hour thematic session will be held around food waste prevention and management, in which the Porto cluster will explain their experience with food waste prevention through different tools such as the Food planning tool or the guidelines developed for circular public procurement. In addition, there will be a working session so that participants work together on a specific real challenge and design solutions for it. The objective is to create a consortium of local actors who are interested in collaborating to look for funding through another project that continues the work in this regard.
 - **Accompanying action and new projects**. CCVOC and LEITAT are committed to do a follow up on the work activated in these workshops and to continue organising

²⁰<http://hubb30.cat/ca/oportunitats-dels-recursos-organics-avancar-cap-leconomia-circular>

²¹<http://hubb30.cat/ca/solucions-circulars-al-territori-de-leix-b30>

meetings where the actors that are part of the platform will put together the progress that has been made. The objective is also to expand the platform so that more actors in the food value chain join it and more synergies can be found. In order to do this, a follow-up meeting will be organised in the last quarter of 2023 to discuss the progress made, any barriers that have been faced and think collectively how these can be solved. In 2024, three more meetings will be organised throughout the year to continue the work and make sure that circular solutions are being implemented. In order to do this, CCVOC and LEITAT will search for funding opportunities and other resources that can be useful to the actors involved.

- 3) Expand food waste prevention and management strategies. Another future action for Vallès Occidental is to continue expanding food waste prevention and management via the Circular Market and Recooperem projects. The latter initiative currently involves 13 municipalities, 59 schools, 17 catering companies and 15 local social organisations. Since it was launched in 2015, more than 40,000 meals have been served, reaching almost 3,500 families and avoiding the generation of more than 15 tonnes of waste. In the near future, the aim is to grow the network by not only incorporating more schools in the project, but also big companies with their own catering service, hospitals, catering companies and other entities in the region.
- 4) Citizen engagement and awareness raising. Finally, as it has been proved in the CityLoops project in Porto or Apeldoorn, involving citizens in circular actions is key so that everyone is part of the transition. In this direction, the aim is to organise raising awareness activities to bring the problem closer to people, companies and entities, with the final objective of generating innovative solutions collectively. This will be done by analysing and identifying the needs of people and families in vulnerable situations, training and awareness raising, and outreach campaigns among the general population. Image identity will be developed through logos and creation of dissemination materials such as leaflets, roll-ups and files for presentations. Finally, dissemination of the activity will be carried out through social networks, own media and recognition by external media.

Currently, new financing sources are being explored, both at the national and European level. The main objective for it will be dedicated to demonstration actions so that high-impact solutions are implemented in the territory. For instance, The County Council of Vallès Occidental is considering participating in an Interreg call to share circular experiences with other European cities and regions. And LEITAT is also exploring open calls to tackle environmental and social issues around food, together with local and international private and public organisations.

Identified barriers & opportunities

In the first two workshops, local stakeholders were asked about what barriers they face in their work regarding the implementation of circular solutions. Some of the barriers mentioned included:

- 1) the lack of enabling regulatory framework and high level of bureaucracy with public administration. For instance, a lot of steps are necessary to validate the procedures of making the most of food (i.e. avoiding food waste) in the current rights-based system in which there are many actors involved.
- 2) A lack of public-private collaboration (and lack of collaborative culture in general).
- 3) A lack of high-quality data availability and lack of incentives to collect data.
- 4) A lack of social acceptance among the population in some aspects around food waste, such as the lack of acceptance towards smart containers for organic waste
- 5) And a lack of resources, for instance, of knowledge, financial resources, time, or personnel.

Vallès Occidental, therefore, has the challenge of overcoming these barriers and the objective is to tackle at least a few of these during the replication workshop at the end of September. For instance, the lack of collaboration between actors will be directly worked upon by bringing together as many relevant actors in the value chain as possible from public and private organisations. But in the thematic sessions of the workshop, the objective is to find interested partners to search for funding together to implement a project that can solve a common problem.

In addition to this, in the first workshop several opportunities in the sector were identified that could tackle the previously mentioned challenges, such as:

- 1) The creation of new channels in the public administration to create an enabling regulatory framework (challenge 1).
- 2) Industrial symbiosis among companies in the territory who are based on industrial parks (challenges 1 and 2).
- 3) The implementation of emerging technologies and use of data (challenge 3).
- 4) And the education and sensibilisation of the society about environmental, economic and social problems around food and other organic waste (challenge 4).
- 5) Community composting which could serve to reduce transport and costs around waste collection as well as to increase population awareness around waste generation (challenges 4 and 5).
- 6) And the adoption of eco design principles to improve circularity from the beginning of product or process development. For instance, applying ecodesign principles such as using recycled, recyclable and/or biodegradable materials for food packaging (challenge 5).

Regarding the factors that can enable the implementation of circular solutions, one is the political will and existing resources around this area. Moreover, the fight against food waste has become popular over the last years among some segments of the population as well as in organisations working in the food sector. Therefore, many actors are already educated and committed in this regard, which can facilitate the acceptability of new circular projects in this area.

Another major opportunity for the circular transition around food is the Catalan Law 2/2020 about Food waste and loss prevention which was approved in 2020²². The law imposes a series of obligations on all agents of the food chain, with a corresponding sanctioning regime. Among other obligations, companies in the food chain, social initiative entities and other non-profit organisations that are dedicated to the distribution of food will be required to have a Food Waste and Loss Prevention Plan, to measure and report annually on the levels of food waste and loss generation and to adopt the relevant measures to apply the hierarchy of priorities established by law regarding the destination of surplus food.

5.4. Monitoring progress & evaluating results

The initiative also wants to set indicators for monitoring the impact of its work. CityLoops indicators were reviewed and among all the possible indicators, the following indicator groups have been selected:

- 1) Actions to involve local actors
- 2) Closing material loops and reducing harmful resource use

At this stage it is proposed to use few indicators to monitor the actions generated by the commitment of local actors and close the food stream, as shown in Table 4:

Group 1) Actions to involve local stakeholders actors

Indicator	Construction	Food Waste	Circular Public procurement (general)
Communication and awareness campaigns to	- No. campaigns / events	- No. campaigns / events	- No. campaigns / events

²² [https://salutpublica.gencat.cat/ca/detalls/Article/Saprova-la-nova-Llei-de-prevencio-de-les-perdues-i-el-malbaratament-alimentaris-a-Catalunya#googtrans\(ca|en\)](https://salutpublica.gencat.cat/ca/detalls/Article/Saprova-la-nova-Llei-de-prevencio-de-les-perdues-i-el-malbaratament-alimentaris-a-Catalunya#googtrans(ca|en))

Indicator	Construction	Food Waste	Circular Public procurement (general)
spread knowledge of the applied circular economy	<ul style="list-style-type: none"> - No. beneficiary organizations - No. people 	<ul style="list-style-type: none"> - No. organizations beneficiaries - No. people 	<ul style="list-style-type: none"> - No. administrations beneficiaries - No. people
Networking actions around the circular economy between local stakeholders	<ul style="list-style-type: none"> - No. networking actions - No. participants - No. collaborative proposals 	<ul style="list-style-type: none"> - No. networking actions - No. participants - No. collaborative proposals 	<ul style="list-style-type: none"> - No. networking actions - No. participants - No. collaborative proposals
Public workers trained in circular public procurement	<ul style="list-style-type: none"> - Number workers 	<ul style="list-style-type: none"> - Number workers 	<ul style="list-style-type: none"> - Number workers
Acquisitions with circularity requirements beyond existing levels	<ul style="list-style-type: none"> - No. tenders - Volume (per) one thousand euros acquired (què vol dir?) 	<ul style="list-style-type: none"> - No. tenders - Volume one thousand euros acquired 	<ul style="list-style-type: none"> - No. tenders - Volume one thousand euros acquired
Investment and financing in circular economy programs	<ul style="list-style-type: none"> - No. programs - No. participating organizations - Volume one thousand euros investment 	<ul style="list-style-type: none"> - No. programs - No. participating organizations - Volume one thousand euros investment 	<ul style="list-style-type: none"> - No. programs - No. participating administrations - Volume one thousand euros investment
Support tools and resources generated/used	<ul style="list-style-type: none"> - No. registered initiatives 	<ul style="list-style-type: none"> - No. registered initiatives 	<ul style="list-style-type: none"> - No. registered initiatives

Table 1: Selected KPIs

Group 2) Closing material loops and reducing harmful resource use

Indicator	Construction	Food Waste
Tons of waste avoided through circular initiatives	- No. tons of CWD	- No. tons of organic waste
Beneficiaries of the utilization initiatives	- No. receiving works/buildings	- No. host families - No. distributed meals - No. receiving organizations
Circular initiatives in the territory promoted by the administration	- No. works with circularity criteria	- No. prevention projects
Circular initiatives in the territory driven by private stakeholders	- No. buildings with circularity criteria	- No. prevention projects

Table 2: Selected KPIs

The aim is to start monitoring and recording the progress made in these areas and others, using the selected indicators listed above, with the aim of setting annual improvement targets based on the progress made.

As for the indicators on actions to involve local actors, they will start being monitored in 2023.

Regarding the indicators related to Closing material loops and reducing harmful resource use, the process is more complicated: to move forward, it will be important to have an increase in motivation and knowledge of the parties involved (administrations, companies, workers), so that they give more value in having reliable data to make a more effective and efficient management regarding the use of resources. A key lever for this will be to be able to have financial resources to implement procedural changes, tools or mechanisms for monitoring indicators in spaces that do not exist yet.

5.5. Future outlook for the circular transition

To advance the circular transition with a vision of Circular Cities and as a territorial strategy, it is planned to:

- Continue to strengthen the presence of the circular economy in the framework of the policies and strategies of the region, especially of local administrations and social,

economic and scientific agents. Taking advantage of the momentum and commitment worked under the CityLoops project.

- Maintain collaboration links between the County Council and Leitat to advance the lines of work promoted within the framework of CityLoops and others, placing a special emphasis on action related to food sustainability, with the prevention of food waste.
- Take advantage of the increase in knowledge, actors involved, and initiatives related to the principles of circularity, especially in the areas linked to CityLoops to transfer working methods and actions to other areas such as textiles or water.
- Open up new opportunities, the Vallès Occidental County Council and the Consortium for Waste Management are working together to develop a transformation project with a proposal for intervention on 25 hectares, with the construction of a circular economy park: the Vallès Circular Park. By reorienting the role of existing facilities and creating new ones, five spaces are set to be created, to act as a lever for transformation and to be a revulsive for the promotion of the circular economy for the area. Firstly, there will be a training and talent area, to assist in the transformation and secondly, a business area to stimulate solutions for circularity. There will also be a food area, to address the prevention of food waste in particular, a waste and resource recovery area, with the plan to deal specifically with the use of organic and construction waste, and finally, a civic area, to bring citizens closer to knowledge and circular consumption.
- Create favourable conditions to establish links between the circular economy and the social and solidarity economy, in order to create initiatives for an alternative, more socially and environmentally sustainable economy.

6. Vienna

Vienna, the capital, is Austria's most populous city with 1.9 million inhabitants (01.01.2022) and at the same time one of nine provinces of Austria. That is why Vienna has a City Senate and a Provincial Government as well. Since 2012, Vienna's population has grown by 12.5 % and it is expected that Vienna will soon grow to 2 million inhabitants. The average age of Viennese citizens is 41 years. By 1 January 2022, people with 179 different nationalities lived in Vienna. For Austrian references, Vienna has a high population density – 4,656 people per km² live in Vienna. Public housing / social housing is a very important aspect for Vienna, about 24 % live in public housing (2011)²³.

The overall goal of the city of Vienna is to become climate neutral by 2040. The following agreements, strategic documents and programs, among others, contribute to the implementation of the goal:

- **The progress coalition for Vienna²⁴:** The 2020 coalition agreement contains the overarching goal of reducing greenhouse gas emissions to net zero by 2040. The city of Vienna wants to become climate-neutral. To achieve this, the city is focusing on climate protection, climate adaptation and the circular economy. In terms of the circular economy in the building sector, this means strengthening the principles of the circular economy (in line with the waste hierarchy) and urban mining approaches, for example by introducing a material pass that records the materials and recyclables used.
- **Smart Climate City Strategy – Smart City Wien²⁵:** The strategy is based on all of the SDGs of the UN Agenda 2030. Vienna's approach develops its full impact and effectivity through the combination of three dimensions: Quality of Life, Innovation and Resource Conservation. **For the built environment two goals focusing on circular construction have been determined:**
 - **From 2030 circular planning and construction to maximise conservation of resources is standard in new-build and refurbishment projects.**
 - **By 2040, at least 70 % of the building components, products and materials recovered from demolitions and major refurbishment projects are reused.**
- **Vienna Climate Guide²⁶:** The Roadmap to achieve the goals of the Smart City Strategy Vienna, in particular climate neutrality in 2040. The Roadmap contains over 100 measures which are continuously adapted and supplemented.
- **Strategy VIENNA 2030 – Economy & Innovation²⁷:** The economic strategy "VIENNA

²³ [viennainfigures-2022.pdf \(wien.gv.at\)](#)

²⁴ [Die Fortschrittskoalition für Wien](#) (German only)

²⁵ [Smart Climate City Strategy - Smart City Wien](#)

²⁶ [Vienna Climate Guide](#)

²⁷ [Strategie "WIEN 2030 – Wirtschaft & Innovation"](#)

2030 – Economy and Innovation" propagates smart solutions for a future-fit Vienna. To this end, the strategy relies on regulatory and qualitative standards with regards to life-cycle oriented and circular planning and construction in the field of resource conservation (see objective 1.4 of the strategy). With regards to digitalization, the strategy sets targets on digital applications for the representation of resource consumption as well as on new business models (see targets 3.1 and 3.2 of the strategy). The strategy is implemented through so-called flagship projects. The program "DoTank Circular City Wien 2020-2030" (DTCC30) is one of the flagship projects.

- **DoTank Circular City Wien 2020-2030 (DTCC30)²⁸:** The inter-municipal programme sets impulses for the transition from a linear system to a circular city with a focus on the built environment. The long-term goal of the city-run programme is to align the framework conditions in favour of a circular system – from planning, production and use or reuse to processing for recycling and the market for secondary materials.

A smart and circular Vienna means high quality of life for everyone with the greatest possible resource conservation. In Vienna's interpretation, a sustainable City is one that never loses sight of the "human dimension" and always focuses on the needs of local stakeholders. The development of a sustainable, liveable city is only successful if everyone benefits, and everyone is able to play their part.

6.1. Ambition & objectives

In order to set appropriate impulses for the transition from a linear system to a circular city, the programme "DoTank Circular City Wien 2020-2030" (DTCC30) is installed in the City of Vienna, Executive Group for Construction and Technology, Coordination Unit for Resource Conservation and Sustainability in the Construction Sector.

The programme is a flagship project of the Economic Strategy VIENNA 2030 and sees itself as a cross-municipal hub around the topic of circular economy in the built environment. The task of the programme is to develop, coordinate and control measures for the implementation of a circular economy in the building sector - with the aim of reducing the consumption of resources and emissions over the entire life cycle. The programme "DoTank Circular City Wien 2020-2030" (DTCC30) cooperates nationally and internationally with pioneers from different fields. Sharing knowledge is an essential basis for the transformation process and being part of research projects is an ideal opportunity to create new knowledge and learn from each other.

Therefore, the deconstruction and demolition waste scope of the CityLoops project is in great interest. The programme "DoTank Circular City Wien 2020-2030" (DTCC30) is checking the following CityLoops tools, actions, methods and processes for the possibility of replication:

²⁸ [Home - VIE.CYCLE – zirkuläres Bauen \(wien.gv.at\)](https://www.wien.gv.at/home-vie-cycle-zirkulaeres-bauen) (German only)

On the one hand tools and methods that focus on the digitization part of construction such as:

- **Digital twin (3D-GIS visualization)**
- **3D Visualization Tool for Monitoring and Planning**
- **Pre-demolition Screening and Selective Demolition Procedure**
- **Construction Materials Passport, Databank, and Marketplace**
- **Material flow analysis**

And on the other hand, tools that help involving stakeholders and citizens:

- **CityLab Stakeholder Engagement Platform**

By replicating these CityLoops tools and methods, the programme “DoTank Circular City Wien 2020-2030” (DTCC30) aims to enhance the sustainability, efficiency, and inclusiveness of our urban development initiatives, ultimately creating a liveable and environmentally built environment.

6.2. Stakeholder engagement

Since Vienna is a replicator city to Bodø, the DoTank has been concentrating on following CityLoops tools and actions:

- Digital twin (3D-GIS visualization)
- Stakeholder engagement (urban living lab)
- Material flow analysis

As three different tools / actions have a potential for replication, specific stakeholders from various departments and organizations need to be involved:

Digital twin (3D-GIS visualization)

For a potential replication on the topic of implementing data relevant for Circular Planning in Digital Twins (3D-GIS visualization) stakeholders from the City of Vienna from the departments Surveying and Mapping, Architecture and Urban Design and Building Inspection should be involved. External stakeholders with expertise in digital building solutions like BIM (building information modeling) are also needed for a potential replication and can support a potential project with their expertise.

Stakeholder engagement (Urban Living Lab Nordwestbahnhof)

Since the quintessence of an Urban Living Lab is the integration of different stakeholder groups, a potential replication requires an involvement of many different actors. Within the City

of Vienna, experts from the field for participation processes, urban development and planning, economic affairs, technical urban renewal and smart city need to be involved. For the operation of an Urban Living Lab, a suitable operator needs to be engaged – this will be an external expert and needs to be determined. To support experiments, research institutes from Vienna's Universities, especially from Technical University of Vienna, University of Natural Resources and Life Sciences and University of Applied Arts Vienna, focusing on circular construction and social design should be involved as well. The Urban Living Lab will also address dedicated civilians and businesses located around the Urban Living Lab.

Material flow analysis

In 2022, a material flow analysis has been conducted for the City of Vienna. For a potential replication with focusing on integrating the gained knowledge from the project CityLoops, the responsible department within the City of Vienna needs to be involved – economic affairs, labor and statistics. Furthermore, the superordinate department for climate affairs and experts from the department for waste management, street cleaning and vehicle fleets needs to be involved. As an external research partner, the university which conducted the material flow analysis in 2022 is a potential partner as well (University of Natural Resources and Life Sciences).

6.3. Actions for replicating CityLoops demonstration actions and instruments

The priority area of the coordination unit for Resource Conservation and Sustainability in the Construction Sector is circularity in the built environment and therefore the focus within the CityLoop's projects lies on Construction and Demolition Waste (CDW).

As already mentioned in chapter 2 – Stakeholder engagement – our potential replication actions are digital twin (3D-GIS visualization), stakeholder engagement and material flow analysis. In this section the aim is to highlight stakeholders management as this is the area where the assessment of whether replication is possible has already been positive and the first concrete steps towards implementation have been taken already. There are no specific replication projects yet for the other two potential replications (digital twin and material flow analysis).

As part of the "DoTank Circular City Wien 2020-2030" program, an Urban Living Lab with a focus on circular construction is planned to be established in the Nordwestbahnhof (former train station, called North West Train Station) urban development area from 2024 on. This location has been chosen, since circular planning and construction principles will be implemented in this urban development area. The Urban Living Lab is a test space for innovative solutions and is intended to support the development in the area. The product of this Urban Living Lab is the provision of a physical and organizational framework to jointly

implement experiments, initiate learning processes and achieve new insights and innovations. The results are highly relevant for the programme "DoTank Circular City Wien 2020-2030" and the development of the Northwest Station and should lead to new sustainable solutions for circular building and living as well as to a greater acceptance by sharing necessary measures and changes. The urban living lab will have two focus areas:

- **CIRCULAR PLANNING AND CONSTRUCTION:** Practical check – specifications/practices from the circularity factor (another research project the DoTank is involved with; indicators for determining the level of “circularity” a building is having).
- **CIRCULAR USE:** User Activation in Circular Buildings.

Following key learnings have been developed within the replication workshop in Vienna on 29th June 2023:

- **Identifying key stakeholders.**

The first step in designing an Urban Living Lab is to identify the key stakeholders. After this analysis, different formats, task areas and research questions arise for the individual stakeholder groups. For Vienna, this means that early stakeholder mapping is essential for a successful Urban Living Lab. Different formats for activation result for different stakeholders.

- **Getting key stakeholders on board early in the design process.**

Involving stakeholders early on enables better communication and collaboration throughout the project. This reduces misunderstandings and conflicts. Different views of stakeholder groups can lead to new solutions and ideas. For Vienna, this means that an early assessment of stakeholder’s needs is essential for a successful Urban Living Lab.

- **Ensuring a transdisciplinary composition of stakeholders.**

Different competencies, experiences and perspectives are needed in an Urban Living Lab to implement the change process and a transdisciplinary composition of stakeholders is essential. Through the exchange of different disciplines, innovative ideas can be promoted, synergies can be used, and potential conflicts can be identified and resolved at an early stage. Transdisciplinary action enables a combination of skills and the joint design of sustainable and future-proof urban spaces. For Vienna, this means that the composition of the participants is essential for a successful Urban Living Lab. However, this requires a common language and a common understanding of the goals. For example, a person from the planning practice may have a different idea of terminology than a person from civil society.

- **Enabling science to meet practice.**

One of the tasks of the Urban Living Lab is the cooperation between science and practice and the testing of theoretical research results. It is essential that research results in the field of circular construction are quickly subjected to a practical test. For Vienna, this means that transferring theoretical knowledge into practice is essential for a successful Urban Living Lab. For example, the project "a circularity factor for Vienna" can be used to try out how separability of components works in practice and which construction methods are particularly suitable.

- **Giving importance to project management and control as key success factors.**

The success of an Urban Living Lab depends to a large extent on the operator and the project management. Project management tools ensure an effective and structured process and enable the implementation of the defined goals. Good leadership ensures clear communication, motivated and informed stakeholders and a functioning team. For Vienna, this means that a very detailed list of specifications for operating is essential for a successful Urban Living Lab.

- **Making knowledge generated from the Urban Living Lab accessible.**

Knowledge gained in the Urban Living Lab should be made available. But making something accessible also means analysing and processing the knowledge generated accordingly. This allows other interested parties to learn from the experience and results gained and use them for similar challenges or projects. The publications contribute to transparency and understanding of the approach in the reality lab. For Vienna, this means that dissemination of results is essential for a successful Urban Living Lab.

Who is planned to be involved in the Urban Living Lab, what will be the different roles?

The search for partners and the identification of key stakeholders is one of the most essential and first steps in the development of an Urban Living Lab and is part of the project conception. However, the following roles are definitely needed:

Strategic Project Management

The strategic project management is in regular exchange of information with the operator, formally releases content and represents the interests of the City of Vienna in the Urban Living Lab.

Operator Urban Living Lab

Conception of methodology and implementation formats, coordination of reality lab incl. participating partners and stakeholders, communication and processing of results.

External assignment of the management (tbd).

Research facilities

Coordination and execution of experiments (technical, natural scientific, social scientific etc.). Cooperation is envisaged with, among others, TU Vienna, BOKU Vienna, the Applied Services and subsidiaries of the City of Vienna.

Participate in experiments and can submit questions to be worked on in the Urban Living Lab Involvement of relevant departments and subsidiaries.

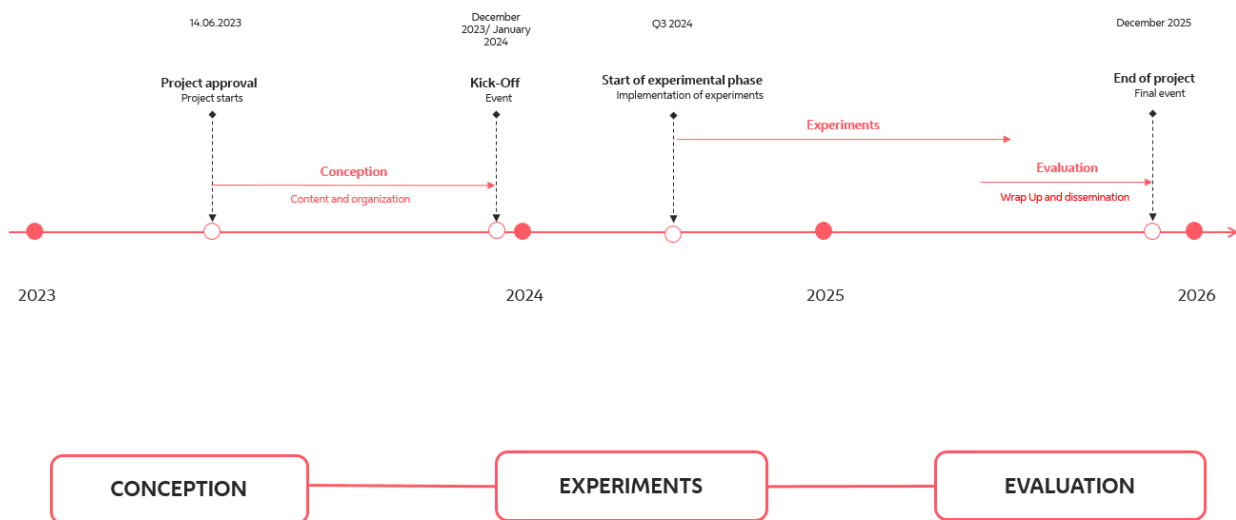
Other users.

Users are actively involved in decision-making and development processes. There is a regular exchange of information and formats are developed for specific target groups. This group includes the administration (district level), area management, quality advisory board and project management of the Nordwestbahnhof district, organized citizens and other users like experts from the practice and companies.

Timeline

The project has entered the preparatory phase since a funding has been approved for the external operator on June 14, 2023. In total, it is planned, that the Urban Living Lab will run until the end of 2025, with the official kick-off planned for December 2023 or January 2024. The experimental phase should last 12 months and start in Q3 2024 preferably.

Planned Timeline Urban Living Lab Nordwestbahnhof



6.4. Identified barriers & opportunities

A wide range of factors can influence the successful implementation of circular principles. The DoTank has identified various barriers and opportunities for two clusters:

1) STAKEHOLDER ENGAGEMENT

Implementing an Urban Living Lab for circular economy presents numerous opportunities and challenges. Here are some key opportunities and barriers the DoTank has identified:

Opportunities

- **Innovation and Collaboration:** Urban Living Labs create an environment for cross-sectoral collaboration between government, industry, academia, and the community. This fosters innovation by bringing diverse expertise together to develop and test circular economy solutions.
- **Real-world Testing:** Urban Living Labs provide a platform to test circular economy concepts and technologies in a real urban environment. This allows for practical insights and feedback that can lead to scalable and replicable solutions.
- **Community Engagement:** Urban Living Labs engage the local community in sustainable practices and circular economy principles. This can lead to increased awareness and participation in circular initiatives, contributing to a more sustainable urban lifestyle
- **Data and Learning:** Urban Living Labs generate valuable data on the performance and impact of circular solutions. This data can inform policy decisions and help refine circular economy strategies over time.
- **Policy Innovation:** Urban Living Labs can serve as a testing ground for new policies and regulations that support circular economy practices. Successful initiatives can inspire broader policy changes at the city or regional level.

Barriers

- **Resistance to Change:** People often resist changes to established systems, so addressing concerns and providing explanations is crucial.
- **Scaling Up:** Moving from small-scale Urban Living Lab experiments to citywide or regional implementation can be challenging. Scaling up circular initiatives while maintaining their effectiveness and integrity is a significant barrier.
- **Resistance from Traditional Industries:** Existing industries that rely on linear production and consumption models may resist circular economy disruptions that could affect their business models.

- **Monitoring and Evaluation:** Measuring the success and impact of circular economy initiatives can be complex, requiring robust monitoring and evaluation systems.

2) DIGITAL TWIN

Implementing a digital twin with aspects of circular economy principles presents numerous opportunities and challenges. Here are some key opportunities and barriers the DoTank has identified:

Opportunities

- **As an opportunity to transfer science-based findings into daily practice:** Already existing, theoretical data from research institutes can be put into practice and be made usable. A digital twin can contribute to use the full potential on a city level about data.
- **As a decision making tool and as a tool for scenario planning:** Accurate data collection enables data-supported decision-making, forward-looking (urban) planning and simulations/scenario planning for complex urban and building projects. In the context of resource conservation, material flows could be optimized for future building demolitions, for example, or construction (site) logistics. A digital city twin with circular aspects can simulate various circular development scenarios.
- **As a tool to coordinate/optimize urban construction logistics:** Linking the digital twin with circular aspects can help to make supply chains more efficient, better coordinate material flows and link logistics operations between construction sites.

Barriers

- **Lack of Capacity:** If the team responsible for implementation lacks the necessary skills, knowledge, or experience, progress can be slow or ineffective. Such an elaborate (pilot) project can only be implemented by providing human and financial resources.
- **Novelty of the topic:** As with any innovative topic possible barriers may occur.
- **Unspecified use cases:** Use cases need to be specified well to achieve set goals.

6.5. Monitoring progress & evaluating results

In a first step, the project team reviewed the CityLoops indicator framework and select indicators that align with circularity goals that want to be addressed. This task has already been fulfilled – three focus areas for potential replication have been selected.

Vienna's approach to CityLoops replication is to test a potential replication via implementing a digital twin with circular aspects, including circular aspects within a material flow analysis and establishing an Urban Living Lab for stakeholder engagement.

Furthermore, possible ways to monitor progress and evaluate results are the following:

Definition of clear project objectives. Define specific, achievable, realistic and time-bound (SMART) objectives for each potential replication.

Setting up performance indicators. KPIs are established to measure the progress towards project goals and can be qualitative or quantitative.

Developing a project plan. Each potential replication will be set up with a project plan that serves as a roadmap and includes tasks, timeline and responsible stakeholders.

Tracking of progress. Project management tools like status reports or regular team meetings are used to monitor the progress on a regular basis.

Documenting and communicating results. Documentation of project results, a general evaluation, challenges and lessons learned is very important to successfully complete a project. For upscaling and to ensure transparency and knowledge-exchange, communicating the results and key learnings to most relevant stakeholders is crucial.

These steps will be part of each potential planned replication project.

6.6. Future outlook for the circular transition

On the way to a circular economy, the first thing has to unlearn something – "linear thinking" – and learn something new – linking the end of a life cycle with the beginning of a life cycle. At first glance, this seems simple, because thinking in cycles is not new in principle and the cycles in the natural environment can serve as a model for us. However, a systemic change process of this kind is highly complex. Why? Because the transformation from a linear to a circular economy requires many different actors in different places and with the ability to think integratively and systemically.

This requires innovation, which usually comes about through collaboration and transdisciplinary cooperation. The programme "DoTank Circular City Wien 2020-2030" (DTCC30) therefore cooperates nationally and internationally with pioneers from different sectors and is also well connected within the City of Vienna and other programmes on the administrative level, to avoid creating parallel structures and to support knowledge exchange. Sharing knowledge creates more knowledge – an essential basis for the transformation process and an important prerequisite for shaping change. The programme is based on an iterative, transdisciplinary process with the participation of diverse stakeholder

groups. This means a step-by-step approach in which different disciplines work together on a problem. The process involves repeated iterations of exchanging ideas, sharing experiences and developing solutions. This approach makes it possible to integrate multiple perspectives and gradually work towards a common understanding and a comprehensive solution. It is a continuous cycle of trial, learning and adaptation to achieve successive improvements. The process is repeated until the desired result is achieved. In doing so, the programme works according to the principles of **define, operationalise and implement**. Step by step, measures are set to implement a circular economy by 2030. But the DoTank also wants to provide impetus for the private sector since not everything can be dictated by the administration.

Being involved in many projects and collaborating with many different stakeholders also means that many resources are tied up (in terms of personnel) and concurrently managing the coordination of these diverse projects can pose a challenging task.



CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and bio-waste, where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and soil, and bio-waste, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspects of CityLoops are stakeholder engagement and circular procurement.

CityLoops started in October 2019 and will run until September 2023.



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