Reflow | Co-Creating Circular
Resource Flows in Cities

'constRuctive mEtabolic processes for material flOWs in urban
and peri-urban environment across Europe'

Deliverable 4.1

THE REFLOW
HANDBOOK

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Abstract (for public dissemination only)	The REFLOW Handbook is a practical resource designed to assist cities in their transition to circular and regenerative cities. This Handbook is open, iterative and participatory. The Handbook contextualises REFLOW and offers an initial investigation into the element of urban governance innovation, particularly with respect to the circular economy. Specifically, this document builds on exploratory research aimed at 'collaborative governance design', which will be further explored and expanded on within the REFLOW pilot cities. The Handbook concludes with an initial series of tested tools meant to assist cities in navigating the first steps of the transition.
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Preface

The mainstream linear economy model that has largely influenced contemporary urban development is quickly coming to an end. Signals are popping up relentlessly around us showing that such a model is no longer sustainable, and that radical new forms of organising human activities are urgently needed to make sure the planet survive. Yet, we are barely aware that the way we produce things is a deliberate choice. Alternatives exist and can be intentionally chosen to reduce negative impacts and externalities on natural ecosystems, and in turn on people and society as a whole.

Cities can be powerful sites for accelerating the transition to the circular economy - an alternative that is currently emerging and gaining momentum. As cities deploy the majority of materials, persons and information flows, they can be meaningful testbeds for redesigning circular value chains across almost all sectors, influencing both consumers and businesses. In turn, as the so-called 'wicked' challenges of the new millennium are heavily concentrated in cities, the circular economy may offer a possible framework of action to respond to major problems such as environmental degradation, pollution, unemployment and exclusion.

However, the transition to a more circular and regenerative city is a complex challenge and systemic in nature. As such, the transition is not likely to happen via minor interventions at the edge of the current model; rather, it will require whole scale system reforms. Aside from clear political visions and holistic strategies of urban development, it will require new regulations, massive investments, new alliances and partnerships, as well as new ways of governing them. It will require the development of a completely new body of knowledge, capacities and skills, based in turn on a more dynamic, fluid and creative approach to traditional disciplines. Above all, it will require us to radically transform the way we look at cities and how we tackle the tension between the *hyper global* and the *hyper local*, with what that means in terms of who can access and benefit from the opportunities that the circular economy will create.

This handbook-- open, iterative and adaptive just like the cities we imagine-- is designed as a tool to help cities navigate and engage in this transition.

1. About the REFLOW project

REFLOW is an EU H2020 project, from 2019 to 2022, that seeks to understand and transform urban material flows and to co-create and test circular and regenerative solutions in urban and peri-urban areas across Europe. It has received funding from the European Union Innovation and Research Program, under the Grant Agreement No. 820937. The vision of REFLOW is to develop circular and regenerative cities through the re-localisation of production and the reconfiguration of material flows at different scales, leveraging Fab Labs and makerspaces as catalysts for wide-scale collaboration and co-creation conducive to systemic, sustainable change.

The project builds upon the concept of **'urban metabolism'**, which seeks to understand urban contexts through the lens of biological systems and technical processes. The metabolism consists of all the chemical processes that occur within a living organism, or, in this case, the city. In biology, the synthesis of proteins is considered a constructive metabolic process. In urban sciences, the city dynamics that make up the urban metabolism are defined by the flow of materials, information, and the distribution of activities, making cities the most complex systems ever created by humans. Under the current urban paradigm, cities consume more resources than they produce and the synthesis of energy, food and materials for urban areas degrades, discards or pollutes the environment. However, over the past decades, the digital revolution has profoundly affected logistics, trade and international communications, opening doors for new urban flows that are turning our unsustainable industrial paradigm on its head.

In this context, REFLOW aims to provide viable practices aligning public and private actors' interests to enable an effective and meaningful transition to circular and regenerative cities, contributing in turn to the achievement of the Sustainable Development Goals (SDGs). In order to provide critical examples of ways in which cities can become circular and regenerative, REFLOW will explore and test new business models (Distributed Design Market model, On-Demand System, Corporate Hacking and Corporate Pyramid) within the six REFLOW Cities - **Amsterdam, Berlin, Cluj-Napoca, Milan, Paris and Vejle**. The project will make use of blockchain technologies in order to incentivise circular practices in local ecosystems and data visualisation tools to enable continuous monitoring and optimisation of "urban metabolic" processes and rapid decision-making. Networks of sensors, urban computing and geo-localisation will capture data ensuring accuracy, integrity and interoperability of relevant data infrastructures, while data visualisation will help foster effective communication, public consultation, and learning exchange. Furthermore, sound impact assessment methods will be applied to assess the success of the pilot cities and to capture the multiple benefits - environmental, social, economic - that may emerge from circular-based approaches. Lastly, REFLOW will design and implement specific methodologies and models to test new forms of circular governance rooted in active citizen's engagement.

REFLOW operates at the international level, mobilising existing networks and movements that are working towards a new productive model for cities such as Circular Cities, C40 Cities and Fab City Global Initiative.

REFLOW's ambition: multi-disciplinary collaboration at the service of pilot cities

So how can your city begin the transition towards regenerative and circular goals? What knowledge and skills are needed to engage in this journey? What types of technology can make this transition smarter and effective? How can multi-

stakeholder partnerships and citizen engagement be supported to make the most of pooling of resources and collective intelligence? And how can you test these solutions?

Creating and implementing a circular and regenerative city vision is a complex process and requires an interdisciplinary perspective. REFLOW, and tools like this Handbook, approach these objectives through its various Work Packages. Each Work Package is an essential element that your city should tackle in the transition to a circular and regenerative city model. However, the Work Packages themselves are not standalone pieces: they interact with and depend on one another, contributing to creating this multifaceted perspective and, consequently, to assisting your city in navigating its transition. Their goal is to collectively provide potential resources to help you navigate the questions like those listed above. Following an iterative process, these aspects will continue to develop, powered by the insights built throughout the project.

As the content and tools developed by REFLOW will eventually be available to other cities beyond the project's pilots, we avoid using the term "Work Package" in this resource, instead using terms like "element" or "aspect." The different elements of REFLOW are listed below, as well as their Work Package counterpart:

- **Co-Creation Design & Framework (Work Package 1):** This WP will design, deliver and evaluate a series of CE practices responding to urgent citizen and business needs. It will shape and facilitate the people-centred approach at the basis of the project. The aim of this WP is also the alignment of the distributed ledger infrastructure (WP2), circular engineering practices (WP3) and governance and urban planning (WP4) into an overarching activity of business model ideation and prototyping. This task will support and sustain engagement and self-organized CE activities beyond the end of the project;
- **Technical Infrastructure & Softwares (Work Package 2):** The integration of new technological solutions to facilitate the circulation of data and resources;
- **Creating & Managing Circular Flows (Work Package 3):** A sound material management approach to map, identify and redirect circular material flows;
- **Collaborative Governance & Urban Strategies (Work Package 4):** A set of new practices to redesign governance models towards more collaborative and distributed public-private-people alliances;
- **Pilots Framework (Work Package 5):** A structure that acts both as a tool and as a dashboard. It aligns the cities from the understanding of their context, while recording the progress of their journey to discover how to become more circular;
- **Capacity Building (Work Package 6):** A capacity building set of actions to align the skills and needs of all key involved stakeholders with the vision of the city;
- **Communication (Work Package 7):** An ongoing communication strategy to inform and engage stakeholders and create a successful narrative of the circular economy transition.

2. About this Deliverable (Handbook): the 6 W's

This section addresses the what, why, for who, how and when and where of the Handbook. Throughout the document, deliverable and Handbook are used interchangeably.

1) What is this Handbook?

This Handbook is a practical resource designed to assist cities in adopting circular economy strategies and easily find and apply the practical tools necessary to implement the REFLOW methodology developed by the project partners. The REFLOW Handbook aims to be a useful guide for information, tools and other types of materials that can support you and your city to start a transition towards a more sustainable, inclusive and thriving city. Therefore, this Handbook is meant as an open and iterative resource: as REFLOW progresses over the coming years, the Handbook will evolve as well, expanding the resources provided according to what we experiment, co-create, test and learn across the multiple aspects of the REFLOW project.

At this stage, the Handbook is still limited in scope, coherently with the current exploratory and inquiring phase of the REFLOW project. For now, we offer an initial set of information and tools to inspire and inform REFLOW's pilots, which will later be translated into an online GitBook.

Given the early needs of the pilot cities, the first iteration of the Handbook explores opportunities for governance innovation. More precisely, this document builds upon exploratory research conducted during the first months of the project, aimed at identifying starting points for 'collaborative governance design', to be further explored and expanded within the REFLOW pilot cities. For the scope of the research, not only have we looked at governance frameworks and approaches within 'Circular City' initiatives across European cities; these appear to be still relatively few and often at initial stages, with the consequent risk of limiting the range of possibilities and imagination. Instead, we chose to broaden the horizon to other policies and strategic initiatives related to the Smart City, the Sharing City and the Fab City, among others. As the transition to a circular, regenerative city is heavily entwined with aspects such as digitalisation, sharing economy, servitization, urban regeneration and much more, we believe that these different city 'models' and strategies may offer valuable indications and inspiration for creating creative and collaborative urban environments that enable the circular economy to thrive.

The document is organised into the following main sections.
- **About this Deliverable: the 6 W's**
- **Exploring the Urban Governance Element**
  - **Section 1** '**Setting the scene: Cities and Sustainability in the European landscape'** provides an overview of EU policy-making in the field of sustainable urban development, and explores its relation to the circular economy and the transition to circular cities.
  - **Section 2 'Sustainable Development, City 'models' and Collaborative Governance'** provides a selection of relevant city 'concepts' and strategies that - from different perspectives and with different thematic emphasis - broadly address the topic of sustainable urban development. The section highlights relevant characteristics of urban governance across these different city concepts, and introduces a number of

recent or underway thematic policies and institutional initiatives across different European cities (case studies).

○ **Section 3 Practical insights for collaborative governance and cities' circular transition** contains a set of insights and preliminary recommendations for collaborative urban governance supporting the transition to the circular city, as they emerge from the analysis of relevant literature, as well as from cross-comparison of the cases mentioned above.

● **'Library of tools and methods'** presents a set of existing tools and methods that you can use to help your city transition to a more circular and regenerative city. It initially provides potential tools for business models, mapping resources, engagement of communities and co-creation.

2) Why a Handbook?

The complexity of urban innovation needs adaptive and dynamic tools for organisations, governments and citizens to be able to test and experiment at different scales - neighborhoods, districts, city scale, peri-urban scale, etc. In a constantly changing reality, we also need tools that are able to adapt and that can provide updated and validated information and resources, in an open source fashion. As such, this Handbook provides both REFLOW's pilot cities and other interested cities with access to an updated repository of tools, methods and metrics, to embrace the transition towards a more circular and regenerative urban model.

3) Who is this Handbook intended for?

The REFLOW Handbook supports the pilot cities of the project; i.e. Amsterdam, Berlin, Cluj-Napoca, Milan, Paris and Vejle (see figure 1 below) and their local partners. As the project comes to a close, it will also become available to any city interested in transitioning-- or in any step of the transition process-- to a more circular and regenerative city. The Handbook is generally written in a way that is meant to be accessible to a wide range of stakeholders, no matter their background.

Figure 1. REFLOW pilots

4) How can this Handbook be used?

This Handbook currently hosts different insights and possibilities connected to the project's base elements. The information is meant to inspire pilots and external cities and help them initiate the transition to a more circular and regenerative city. You are encouraged to use this information to develop sound, strategic urban frameworks and action plans to approach the circular economy and then use the Handbook's forthcoming tools and indicators to evaluate what is relevant or not to your city's context, adapting frameworks to suit your city's unique strengths and opportunities.

The Handbook is not planned as a stand-alone resource: it will interact with the different elements and outputs of the project. As the project evolves-- and more insights and tools become available-- this relationship will be further defined. While the current iteration extensively explores urban governance, having a basic overview of each of the project's elements (see "About the REFLOW Project") before reading the Handbook in depth will help you contextualise your city and its current status in the transition process. As the elements are highly interdependent and interconnected, being familiar with each one first will help you to link learnings and approaches later on. When reading through and exploring the Handbook's different insights, we invite you to reflect on your city's practices and pinpoint which strategies could contribute to reinforcing your own local initiative.

This Handbook is a practical guide conceived to be easily navigated. We have structured the content so that you can read it in consecutive order, or go directly to certain content, depending on where in the transition process your city is. Finally, sections are written in a didactic style to help clearly guide you.

5) When & Where

This Handbook is initially a tool for the six REFLOW pilots for the project duration (2019-2022). Ideally, a city at any point in the transition process will be able to take advantage of this resource.

The first iteration of the Handbook is provided in this document while the evolving online version will be available at a later stage to REFLOW partners on the online platform, GitBook.

3. Exploring the Collaborative Governance & Urban Strategies Element

Collaborative Governance and Urban Strategies: A set of new practices to redesign governance models

What is it about?

This section of the Handbook element assists you in exploring possible CE approaches, practices and strategies according to your pilot's context. It covers several points: sustainability in European cities-- further broken down into the advancement of cities in sustainable development and the circular economy in EU urban policy making-- and learnings from emerging governance strategies within the context of different 'city concepts' and visions, including the Smart City, Green City, Sharing City, City as a Commons, Fab City and Circular City.

Why is this element useful for your city transition?

This element seeks to help orient your city with respect to governance. We place cities within the context of certain models, but keep in mind that these models are not boundaries, but rather a way to organise and understand the cities and the needs they are responding to. Your own city will likely build on combinations between different concepts: what matters is not which model applies to your city, but rather how the different models can provide relevant and meaningful insights for your own city.

While exploring this section, you will see many examples of cities adopting collaborative governance approaches as a key factor for implementing sustainable and inclusive strategies of urban development, and how such approaches are attempting to make the most of local strengths and capacities. To get the most out of this section, first reflect on your city's own uniqueness. Consider your city's specific cultural, social, political, economic and environmental context. Use these considerations to inform which insights you collect from the following section. For example: Is there another city that is culturally similar to yours? Which approaches have worked for their cultural context? Can you imagine a similar approach also working for your own city's cultural context? Why or why not? Identifying this information is the first step in understanding how your city's current governance model could evolve to support a more circular economy.

Introduction

Why are we starting from governance?

Different collaborative governance approaches comprise strategies and practices devised to foster cities' transition towards circularity. In order to build a foundation of collaboration-- which is the basis for our vision of the circular economy-you first have to evaluate and understand the existing institutions that can assist in developing city-wide co-creation and collaboration. The collaborative governance element is used as an umbrella to understand the complexities

of urban relationships surrounding these institutions: how different stakeholders are involved and what their points of view are as well as what their current relationships are to existing policies and to one another within those policies.

In this section, we not only examine the evolution of sustainability as part of European governance models, but we also provide examples of municipalities and cities that have effectively implemented collaboration-based sustainability initiatives. In addition to the collaborative governance model, these examples also include specific urban strategies, approaches and visions on CE, which involve all the other elements of REFLOW: the methods used to co-create a specific circular framework, the technology used to manage data on material flows or the proposed and implemented circular flows.

This section offers inspiration for your pilot city on how to potentially alter your city's existing governance structures and urban strategies to get them to work for the CE principles. You can think of it as a starting point to help you understand where your city is and which aspects it needs to begin to build. To get the most out of this section, we recommend that you ask yourself the following questions before and while reviewing this section:

1. **What is your city's current governance model?**
2. **What--and where--are the interdependencies in your city?**
3. **Is the context of any of the other urban models similar to your city? How might you adapt and apply these models to your city?**
4. **What methods of co-creation and design can you use in your city, considering its specific governance structure?**
5. **What ICTs do you think might be adapted for your city?**
6. **Which of your city's material flows could be transformed towards a circular model?**
7. **What other specific practices or strategies could be adapted and implemented in your city?**

4. Setting the scene: Cities and Sustainability in the European landscape

This section provides an overview of EU policy-making in the field of sustainable urban development, and digs deeper into its relation to circular economy and the transition to circular cities.

4.1. Cities and sustainable development in EU policy-making

Cities are increasingly recognised as the places where both problems and solutions to the grand challenges of the 21st century can be found. With two thirds of the European population now living in urban areas, the latter often concentrate multiple problems such as pollution and environmental deprivation, unemployment, poverty, segregation and exclusion. And yet, as dense relational networks and complex systems of interaction, connection and transaction, cities are also major sources of innovation and growth, catalysing knowledge, energies and creativity from all walks of society and economy (Batty 2013; European Commission 2016).

The European Union has a long history of sustaining and supporting the sustainable development of urban areas. Back in 1987, the European Economic Community acknowledged the growing importance of the environmental issue and the need to tackle it actively at the level where it shows major negative effects and impacts - i.e. cities. In this context, the 'EU urban policy' **emerged in the first instance as a response to environment-related concerns**, and largely looked at urban areas as contexts of both social and environmental degradation.

The **UN Rio Conference of 1992** - the first Earth Summit ever held - heavily contributed to the shift in understanding cities as sources of major problems, to **cities as contexts of meaningful responses**. Since then, the topic of sustainable urban development has increasingly informed both the general debate and political agendas across the globe, paving the way to a period of vitality and momentum around the urban matter. Although urban planning per se does not properly fall under the EU policy competence, in the early 2000s the topic of territorial development started to shape significantly the European strategies for sustainable development and growth, with the Cohesion Policy acting as the main driver for boosting harmonious and homogeneous development in all Member States and regions.

From then onwards, not only we find growing attention and investment over urban areas across both structural and investment funds; importantly, pioneering initiatives such as the two rounds of **URBAN I and II** (1994-2006), the **European Capitals of Culture**, the **European Green Capital Award**, the **Covenant of Mayors** all witness the extent to which the urban matter is more and more recognised as a strategic priority across sectoral policies. The **Lisbon Treaty** (European Parliament 2009) also contributed to reinforce the territorial dimension of the Cohesion policy, calling for development strategies able to take into account place-based needs, strengths and opportunities.

Key to the pathway towards a true 'European urban policy' has been the debate promoted by the European Commission in 2010, in the context of the **'Cities of Tomorrow'** initiative (European Commission 2011a). Through a series of workshops and wide stakeholder consultation, the initiative brought about the attention on the **key principles and characteristics of a shared 'European' model of sustainable urban development**: the city of the future shall be socially advanced and cohesive, highly inclusive and accessible, respectful of diversities, based on democracy, as well as a place of high quality of life and welfare, good housing and services, environmental regeneration, innovation and growth. All these principles

earmark the main steps of the European Union project itself, as they take into account both foundational acts such as the **Treaty on the Functioning of the European Union** and the **EU Charter of Fundamental Rights**, as well as the progress achieved through urban-related policy acts such as the **Leipzig Charter on Sustainable European Cities** (Member States' Ministers responsible for Urban Development 2007) the **Toledo Declaration on Urban Regeneration** (2010), and the **Territorial Agenda of the European Union 2020** (European Commission 2011b).

Within the ongoing **Europe 2020 Strategy** (European Commission 2010) and its 2014-2020 programming period, the urban dimension plays a fundamental role, as cities are considered as strategic contexts for achieving the Strategy's ambitious targets. The revised regulation on structural funds foresees that at least 5% of European Regional Development Fund (ERDF) shall address the topic of sustainable urban development, via integrated and holistic actions accounting for the multiple economic, social, environmental and demographic challenges that cities have ahead. Programmes such as **URBACT III** (built on the successful experience of URBAN I and II) and **Urban Innovative Actions** (UIA) have also been launched to support cross-cities cooperation and development of bold solutions to common problems. Furthermore, initiatives such as the **European Innovation Partnership for Smart Cities and Communities** (EIP-SCC) and **Knowledge and Innovation Communities** (EIT) (many of them focused on cities and sustainable development) provide cities with the unique opportunity to operate in a logic of an international, multi-sectoral community committed to knowledge sharing and collective capacity-building towards sustainable change. Lastly, we shall not forget the key role played by **Horizon 2020** - one of the largest public investment programmes in research and innovation ever - in driving cities' innovation, with dedicated streams of funding covering a variety of topics and sectors.

The **Pact of Amsterdam** (European Commission 2016) marks, to date, the most recent effort towards the achievement of a European policy for sustainable urban development. Born from a series of informal meetings between the Ministers responsible for urban matters, the Commission, the other EU institutions and relevant organizations and cities' networks, the PACT establishes the **Urban Agenda for the EU**. The Agenda has kick-started a new period of both reflection and action around the urban matters, and opened the way to working methods rooted heavily in **multi-level and polycentric forms of governance**. Key objective of the Agenda is to empower cities in playing an active role throughout the development of relevant EU policies, while fostering coordination and collaboration across all governmental levels. This shall in turn contribute to '*better regulation, better funding, better knowledge*', as key preconditions for anticipating changes and allowing cities to implement more effective strategies. So far, the Agenda has identified **12 priority themes and built as many Thematic Partnerships** (1. Inclusion of migrants and refugees; 2. Air quality; 3. Urban poverty; 5. Housing; **6. Circular economy;** 7. Jobs and skills; 8. Climate adaptation; 9. Energy transition; 10. Sustainable use of land and nature-based solutions; 11. Urban mobility; 12. Digital transition), these in turn constituted by variable alliances of cities, Member States and stakeholders across Europe. The Partnerships are in charge to develop specific Action Plans for each theme covered, in order to '*analyse challenges and bottlenecks and recommend focused, concrete and implementable actions*' (European Commission 2017).

The work developed by the Partnerships will be crucial in the face of the next 2021-2027 programming period, setting a common ground for orienting and guiding cities towards the achievement of the **Agenda 2030 goals**. The **New Cohesion Policy** (European Commission 2018) will offer enhanced opportunities to cities, empowering local authorities in the management of funds, supporting place and people-based development strategies, international networking and capacity-building, also via a dedicated **European Urban Initiative** (European Commission 2019b). This initiative will aim to

strengthen integrated and participatory approaches to sustainable urban development, and will provide a stronger link to relevant EU policies, and in particular, cohesion policy investments. It will do so by facilitating and supporting cooperation and capacity building of urban actors, innovative actions, knowledge, policy development and communication in the area of sustainable urban development.

4.2. The Circular Economy within EU policy-making: from niche to mainstream

The Circular Economy is a relatively recent topic within EU policy-making; yet it is already a well-established and framed political and investment priority. Under the pressure of massive urbanisation and accelerated globalisation, the mainstream make-take-dispose linear economy is increasingly showing its own limits, eroding relentlessly the key resources on which we all depend to live and thrive. In this context, over the past few years, the circular economy has been quickly scaling up political agendas and priorities, positioning itself as a viable, alternative economic model that may also contribute to many of the 'wicked' challenges of the new millennium in meaningful ways.

At the time of its launch in 2014 - in a global scenario of dramatic financial and economic crisis, the Europe 2020 Strategy envisaged a set of programmatic actions that, in an attempt to create the conditions for coming out of the crisis, would have contributed to a *smart*, *sustainable* and *inclusive* growth. In the Strategy's vision, 'growth' is not merely understood in quantitative terms; rather, it contains substantial qualitative aspects, being based on knowledge and innovation (smart), resource efficiency (sustainable), as well as on social and territorial cohesion (inclusive). Amongst the seven flagship initiatives of the Strategy, the **Roadmap to a Resource Efficient Europe** (European Commission 2011c) already laid down the basis for the circular economy to flourish, as it highlighted the need to shift towards sustainable growth via a '*resource-efficient, low-carbon economy that decouples growth from the use of resources*' (European Commission 2011). More in particular, resource efficient development is understood as an economy that '*creates more with less, delivering greater value with less input, using resources in a sustainable way and minimising their impacts on the environment*' (ibidem).

Few years later, the circular economy started to explicitly inform the European debate. Between 2012 and 2013, the **European Resource Efficiency Platform** (EREP) issued a Manifesto and policy recommendations to support the transition to the circular economy, as a way to get out of the crisis via a re-industrialisation of the European economy, which in turn shall be 'circular, resource-efficient, resilient, as well as socially inclusive and responsible' (EREP 2014). EREP's recommendations included the promotion of new (service-based) business models, creation of incentives for SMEs, better information on products, creation of shared products and production standards and labels, awareness raising initiatives, development of new 'green' skills, knowledge and jobs, among others. Furthermore, the **Seventh Environment Action Programme** (European Commission 2013) identified a long term vision by 2050 where the circular economy helps ensure that '*nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience*'. Importantly, the 7th EAP explicitly mentions cities as key contexts for implementing sustainable actions rooted in circular economy principles and practices.

In 2014, the circular economy made a crucial step ahead within EU policy-making, also thanks to the pioneering work developed by major think tanks, consultancies and organisations worldwide - in the first instance, Ellen MacArthur Foundation, OECD, World Economic Forum, among others - which clearly demonstrated the potential of the circular economy to unlock an economically viable and environmentally sustainable socio-economic model. With the

Communication 'Towards a Circular Economy: a zero waste programme for Europe' (European Commission 2014a), the European Commission set up a precise pathway for the circular economy. While noting the emergence of a market trend towards 'circular approaches', the Commission highlighted the presence of several barriers preventing the circular economy from thriving. Therefore, it proposed a number of specific actions spanning from financial support to R&I projects, better use of structural funds, further development of the **Ecodesign directive,** the **Green Public Procurement** and the **Resource Efficiency Scoreboard,** definition of waste targets, and support to job creation and skills development via enhanced policy coordination. One year later, these actions turned into a comprehensive and concrete **Action Plan for the Circular Economy** (European Commission 2015), which largely represents the cornerstone of all actions further developed by the Commission and EU institutions in this field. The 2015 Plan provides detailed proposals for the CE, on the basis of supporting studies which suggested that improving resource efficiency along value chains could reduce overall material inputs by 17–24% by 2030, save up to €630 billion per year for European industry, and a potential to boost EU GDP by up to 3.3% by creating new markets, products and jobs. In subsequent years, the Plan has been further sided by and enriched with a series of revised legislative proposals - the most recent made up in 2018 with a **specific strategy for plastics -**, configuring what is commonly referred to as the **'Circular Economy Package'**.

Overall, the **Circular Economy Package** is a comprehensive and concrete set of 54 measures that all together shall contribute to *closing the loop* of product life cycle: from production to consumption, up to waste management and management of secondary raw materials. Moreover, the Package identifies five priority sectors - **plastics, food waste, critical raw materials, construction and demolition, biomass & bio-based products** - which are considered as crucial for accelerating the transition to the circular economy. For each sector, specific targets are envisaged, together with a **monitoring framework** at EU and national level comprising a set of ten indicators that cover all steps of the value chain. The Package puts strong attention on innovation and investment, and strongly encourages cooperation between Member States, Regions, municipalities, enterprises, R&I organisations, citizens and all actors that have a stake in the circular economy.

In early 2019, the Commission published a **Report on the implementation of the Circular Economy Action Plan** (European Commission 2019a). The Report provides an overview of the state of implementation of the Plan, showing that most of the 54 actions have been realised, contributing significantly to the acceleration of the circular economy. A transition trend is clearly emerging and underway, demonstrating encouraging signals in terms of new jobs and markets created, business opportunities unlocked and investments operated, as well as in terms of increased recycling targets and demand for recycled materials.

4.3. Cities and Circular Economy within the Urban Agenda

The Circular Economy Action Plan and the overall effort of EU institutions have indeed played a key role in mainstreaming the concept of circular economy in Europe. The majority of EU Member States now have a national strategy or roadmap dedicated to this topic, and Regions are increasingly entwining their **Smart Specialization Strategies** (RIS3) (European Commission 2014b) with the circular economy. In the context of the ongoing programming period, structural and investment funds, **Horizon 2020**, the **European Fund for Strategic Investments** (EFSI) and **LIFE programme**, **Interreg**

Europe, offer important financial resources for investing in the circular economy, with a strong focus on the experimentation of circular approaches in urban and peri-urban contexts.

Indeed, cities can be powerful contexts for accelerating the transition to the circular economy. As they see the majority of materials, persons and information flows, they can be meaningful testbeds for redesigning circular value chains across almost all sectors, influencing both consumers and businesses. On the other hand, '*with their high concentration of resources, capital, data, and talent over a small geographic territory, they could greatly benefit from the outcomes of such a transition*' (Ellen MacArthur Foundation 2017).

The circular economy is currently one of the thematic priorities of the EU Urban Agenda. A specific **Thematic Partnership on the Circular Economy** (UAPCE) has been launched in 2017, coordinated by the city of Oslo and involving The Hague, Prato, Porto, Kaunas, Flanders Regions, four Member States (Finland, Poland, Slovenia and Greece), the Commission, European Investment Bank and other stakeholders. As for the other partnerships, an Action Plan has been elaborated and approved in 2018 to provide cities with a set of specific actions and recommendations across the three building pillars of the Urban Agenda - i.e. *better regulation*, *better funding* and *better knowledge*. The Action Plan mainly focuses on four themes, notably **circular consumption**, **urban resources management**, **circular business enablers and drivers**, **governance**.

Although the Plan is considered as an open and in-progress document, a number of specific measures and priority fields of action have been identified, which shall also benefit from post-2020 cohesion policy and its explicit reference to the circular economy. Such actions include revision and improvement in waste legislation, water reuse measures, analysis of regulatory obstacles and drivers for boosting an urban circular bioeconomy, elaboration of a Circular City Funding Guide, preparation of policy options for mainstreaming the circular economy in the post-2020 regulatory framework, set up of a Circular City Portal, among others. Importantly, the Plan also highlights the key role that the **sharing or collaborative economy** may play in driving circular economy initiatives, especially in areas such as circular consumption and CO_2 reduction. Lastly, the Plan acknowledges the diversity of urban contexts across Europe, recognizing that the transition to the circular economy is likely to be different in each European city.

5. Sustainable urban development, city 'models' and collaborative governance | Case Studies

This section provides a general overview of a number of city 'concepts' and models that, over the past few years, have been emerging in response to the major challenge of sustainable urban development (i.e. Smart city, Sharing City, Green city, etc.). Each city concept is generally presented in terms of its main characteristics and approaches to sustainable urban development, as well as in the type(s) of governance frameworks and challenges usually associated with them. Furthermore, for each city 'concept', we provide a couple of city case studies identified for their pioneering strategies within the concept of reference, as well as for their innovative approaches to urban governance.

5.1. Cities, Sustainable Development and Collaborative Governance

Cities are changing fast, both in Europe and beyond. The multiple problems our society faces are increasingly felt within our cities and communities, with major phenomena such as poverty, segregation, exclusion and environmental deprivation, which are showing alarming trends. Besides, the disruptive forces of the fourth industrial revolution are bringing about the promise - and certainly already the case - to reinvent everything across society and economy, with unprecedented threats and opportunities. The topic of sustainable development is now on top of almost all political agendas at different governmental levels, and the objectives of the Agenda 2030 and the Sustainable Development Goals (SDGs) largely underpin ongoing strategies of urban development across big and small European cities.

In this context, over the past few decades, city 'models' and concepts such as the Smart City, the Green City and the Sharing City have emerged - among many others - as attempts to repurpose cities and their functions in their shift towards post-industrial paradigms. Although often entangled in the critics of 'urban marketing operations' to scale up the global competition (Semi 2015), these concepts largely signal an overall trajectory where cities are actively engaging with the challenges brought about by the current innovation age, and are translating them into strategies and plans of sustainable urban development.

Indeed, making cities sustainable is a complex action that encompasses every element of the urban system - from the 'hardware' of its physical infrastructures and assets, up to the 'software' of its social, economic and cultural dimensions. Whether this occurs within goals and strategies of smart, sharing, circular or green city (to mention a few), **urban governance innovation** emerges as a *leitmotif* for cities at a time when they are called to do more, with less resources, and within an overall context of increased uncertainty and complexity.

Governance is a fuzzy term. Hundreds of definitions exist in literature, with no consensus on its key characteristics and meanings (Castelnovo et al. 2015; Meijer and Rodriguez Bolivar 2015). Yet, the increasing attention on governance vs government is largely shaping the ongoing debate around sustainable urban development. Increasingly, governance appears as a more effective and significant layer to interrogate the way urban challenges are framed and tackled in the face of accelerating technological revolutions and the paradigmatic shift in our world-view. To the extent that **governance expands the topic of government towards the whole of socio-technical infrastructures that can contribute to the process of societal steering** (Lemos and Agrawal 2006), it offers a broader and richer paradigm that covers the entire

range of institutions and relationships that take part in the process of governing (Pierre and Peters, 2000). Hence, urban governance offers a new perspective where solving societal problems is not merely a matter of good policy-making, but it rather becomes **a fundamental question of organizing and supporting strong collaboration between government and other stakeholders** (Torfing et al. 2012).

Many European cities are now developing long term and articulated plans to face the major challenges brought about by the new millennium. Strategies of smart, circular, green and sharing city - among many others - are often the ground for designing holistic and comprehensive city visions rooted in sustainability, innovation and social innovation, and for developing cross-cutting experiments that often blend and combine these 'concepts' across vertical policies. While such plans attempt to capture the opportunities stemming from worldwide trends such as the circular and collaborative economy, they often develop locally via unique formula that leverage and combine place-based assets, strengths and capabilities, showing that no univocal interpretation exists of the same city vision(s) and concept(s). Yet, what appears as a recurring element across these visions and strategies is the attention given to **new forms of participatory and collaborative governance not only as a means of consensus-building and better decision-making, but rather as a catalyst for practices of co-creation, co-generation and co-production of the strategies themselves**. Though with a variety of definitions - collaborative governance, participatory governance, open governance, smart governance, stakeholder governance, distributed governance, etc. - that may hinder a clear and shared understanding of what collaborative governance actually is, this 'umbrella term' largely depicts a general landscape where traditional public-private governance arrangements are losing terrain, in favour of **networks and systems-driven approaches that are better able to mobilize and steer the *relational city fabric* towards common goals of sustainable urban development**.

Participatory budgeting, interdepartmental policy labs, open data platforms, citizens assemblies, regulation pacts for urban commons, crowdsourcing practices and living labs are some examples of how cities across Europe are currently experimenting with alternative, more open and co-creative forms of governance. Although with different objectives, emphasis, narratives and tools, these approaches seem to acknowledge that *vis-à-vis* austerity and increased complexity, the so-called 'wicked' challenges require *governance beyond government*, relying on an 'interconnected web of public, private, and nonprofit actors working across organizational, institutional, and sectoral boundaries to deliver public services' (Wachhaus 2013). This evolution in the nature, form and scale of urban governance may bring with it a **new role of the city government as an enabling platform for collective action**, with new and renewed functions spanning identification of place-based missions of innovation, pooling of assets and resources, attraction of talent and creativity, promotion of wide collaborative practices and a general 'hosting' and 'convening' approach towards the city and its actors.

However, this scenario is to be treated carefully. Relatively little is still known about the extent to which this collaborative evolution in urban governance is a generalized phenomenon across Europe, and even less about its concrete effects and impacts. As governance is inherently entwined with regulation and law, a major question mark remains about whether these new forms of collaborative governance come as the effect of profound changes in regulation and decision-making, or are rather residual spaces that do not necessarily transform the *deep codes* of public institutions. Similarly, we may argue that the softer elements of governance such as trust, legitimacy and accountability generally appear in downturn at all governmental levels, undermining the same foundations of both governance and collaboration. Furthermore, governance models shall be understood hand in hand with the specific city morphology, as well as within its broader political, cultural, social and economic context; as cities are very diverse across Europe and governance structures are

heavily path-dependent, the latter might be hard to be compared and elements of transferability hard to be identified likewise.

5.2. Cities and the Circular Transition

The **circular economy** is currently on top of many political agendas across both big and small European cities. The climate emergency is quickly scaling up the public interest, with movements such as **FridaysForFuture**[1] that are convening millions of young people in cities' squares to manifest for nature's rights, and advocate for urgent and structural measures. The European Union is at the forefront of change, working for years on a common policy framework to accelerate the transition to circular cities. A number of specific challenges and barriers have already been identified and are currently tackled via several institutional initiatives, with innovation in urban governance emerging as one of the priorities of action.

The circular economy essentially describes a new economic model. As such, the mobilisation of businesses and of their innovation chains falls indeed under the spotlight of urban governance. Yet, the circular economy may even offer more: micro and 'soft' local economies, new socially purposeful activities, jobs and places, regeneration of urban commons, new alliances between firms and social economy organizations, new membership forms for community-based organisations, new interactions between citizens and the urban environment are some examples of how the circular economy can entrench meaningfully with goals of social inclusion and social impact - thus becoming **a vibrant ground for social innovation**. For this to happen however, urban governance needs to lift up the ambition: a new challenge emerges around how it can enable the creation **of urban environments supporting inclusive, open-ended processes of collaborative transition to circular models**.

About the Case Studies

In the examples provided below, you will discover how cities are experimenting with new forms of collaborative and multi-stakeholder governance across different concepts and strategies of sustainable urban development. Although the REFLOW project tackles the challenge of the transition to Circular Cities, for the scope of this Handbook we have broadened the horizon to other city concepts and models that, although with different foci, are essentially rooted in goals of sustainability and sustainable innovation. As the Circular City is heavily entwined with broader aspects such as digitalisation, sharing economy, *servitisation*, urban regeneration and more, we believe that city 'concepts' such as the Smart City, the Sharing City, the City as a Commons, etc. may all offer precious indications and inspiration for collaborative urban governance in the circular economy. Taken further, we might even argue that an effective transition to a more circular and regenerative city will require these concepts to blend and integrate each other, configuring **holistic strategies and plans that crosscut climate, business development, urban planning, inclusion and citizens participation policies**. In this respect, REFLOW understands urban governance as the **bedrock of public value creation and public good preservation, and looks at circular city governance as a fundamental driver to achieve systemic, inclusive transitions towards more sustainable urban environments.**

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[1] See: https://www.fridaysforfuture.org/

The ultimate goal of this Handbook is to provide policy-makers, city officials, technical figures and all actors that have a stake in the circular economy with a rich, yet not exhaustive picture of insights for infrastructuring creative and collaborative frameworks of circular urban development. Importantly, the Handbook - both in its present version and in its future evolution - shall also contribute to the broader reflection around the future of cities across Europe, tackling the key question of whether and to what extent more collaborative and open forms of governance can better drive the transition to the circular economy, and avoid the risk for the latter to become the playing ground of few big cities and large organisations and corporations.

The cases presented are articulated around a number of city 'concepts' - e.g. Smart City, Sharing City, Green City, City as a Commons, Fab City and Circular City. Each concept has been selected based on its relevance for sustainable urban development and collaborative governance, each offering a specific perspective on the latter - and thus specific opportunities, challenges and risks. As we will see further on, these concepts and 'labels' of urban development are often deeply entrenched and somehow overlapping. Nevertheless, each of them allows to look at multi-stakeholder and collaborative governance through the lenses of different objectives, means and foci, spanning for example connotations and interpretations of sustainability and values behind it, role of ICT, collaboration practices, enabling regulation for co-creation and co-production, public-private partnerships and many more. Other key criteria applied to the selection of cases include a balanced coverage of European Regions, different sizes of cities, as well as direct knowledge of the authors.

5.2.1. The Smart City

The 'Smart City' can be seen as an umbrella concept that essentially describes a **shift in 'urban paradigm' as propelled by the digital revolution**. Although no unique definition exists, the concept of Smart City is usually understood in close connection with digital technologies and their potential to **improve, optimise and innovate services**, as well as to increase **citizens' quality of life** and **environmental performance**.

Digital experiments in cities are not new; however, more recent and disruptive digital innovations such as Internet of Things, big data, artificial intelligence and distributed ledgers have opened the door to radical new ways for transforming the way we live and experience our cities. Per se, the Smart City points to a holistic city vision, where 'smartness' permeates the different components of the urban system. A 2014 study from the European Parliament identified six axes that characterise the smart city: *smart economy, smart mobility, smart environment, smart citizens, smart living, and smart governance* (European Parliament 2014). From another perspective, at European level the concept of smart city now largely underpins ongoing policies for energy efficiency and climate change, witnessing its strategic application for promoting environmentally sustainable economies and societies. Furthermore, the pervasiveness of the **data economy**, which largely stands as the bedrock of the smart city, is increasingly at the centre of urban regeneration processes, whether through the (re)creation of intelligent buildings and neighborhoods, or through the creation of innovation districts and hubs for tech start-ups and enterprises.

Becoming a smart city not only requires heavy investments in physical infrastructures and digital assets; more crucially, it demands the capacity to attract high level knowledge capital as well as to enable a vibrant local ecosystem of research and innovation. Boyd Cohen, a smart cities expert, explains the development of smart cities according to three main waves: the **tech-driven smart city** (or smart city 1.0), which has mainly seen the predominant initiative of tech start-ups

and large IT corporations; the **municipality-driven smart city** (or smart city 2.0), where local governments have started to take an active step to channel 'smartness' towards citizens' needs; and the **citizens-led smart city** (or Smart City 3.0), where citizens are actively involved and engaged in the co-creation and co-production of solutions, and where the development of smart city strategies goes hand-in-hand with open innovation approaches (Cohen et al. 2017).

However, the concept of smart city has attracted its share of critics and concerns. Examples like the massive installation of cameras in New York City after 9/11, China's experiments with facial recognition in public spaces, or the recent Toronto Quayside project, all witness the possible, dangerous drift of the smart city towards mass surveillance and control, privacy violations and algorithmic discrimination, posing a major question mark around 'who' owns the major assets of the 21st century - i.e. data. Moreover, it is worth recalling here the risks of individualisation brought about by digital technologies, platforms and labour, which may dramatically shrink physical interactions and the demand for public spaces. Echoing Garrett Harding and further on the work developed by Nobel Prize Elinor Ostrom related to the commons, this may turn into the *'tragedy of the smart city'* that, in the name of efficiency and performance, risks alienating citizens from their own city.

The topic of governance in the smart city has been largely addressed in literature. Many authors (Misuraca et al. 2010; Gil-Garcia 2014) argue that new governance frameworks are key enablers for the flourishing of 'smartness' in urban environments, and suggest that such frameworks require reshaping the role of governments, citizens and other actors towards increased coordination and cooperation, as well as redesigning relationship, processes and government structures. In that sense, ICT-enabled governance could provide all actors with better evidence (i.e. data) to improve decision-making and service delivery, facilitate direct democracy and foster agile and resilience approaches. 'Smart governance' is also key to citizen engagement and participation in the co-creation and co-production of services, allowing to shift beyond the more traditional customer-driven approaches (Janssen and Estevez 2013). Furthermore, governments implementing smart city strategies face the need to implement actions for the attraction and retention of human capital, which in turn require the need for flexible governance arrangements that are able to mobilize and coordinate local talent across sectors. More recently, the emerging debate around the risks of surveillance and exploitation inherent to the smart city has brought the attention on the fundamental regulatory role of local governments, which in turn calls for clear and reliable data strategies able to ensure control over centralised databases and reduce the risk of third parties' exploitation. At the same time, 'citizens-led smartness' approaches offer an emerging scenario where smart governance can be directed towards structured support to 'the last mile' of our places, mobilising citizens towards the creation of bottom-up solutions that can meaningfully contribute to ignite micro, neighboring economies. Cities such as **Barcelona** and **Helsinki** have meaningfully engaged with this challenge, developing smart city strategies articulated around core values of data sovereignty, open access and ethical digital standards that also account for the emerging do-it-yourself (DIY) practices of makerspaces and local digital-savvy communities.

Nowadays, the concept of Smart City is indeed pervasive, and almost all cities across the globe have extensive, long term and articulated strategies that encompass multiple sectors and urban domains. **Reykjavik** has been ranked 5th in the 2019 IMD Smart Cities Index, thanks to an innovative environmental smart city strategy which has contributed to increase public

transportation use. Through the online consultation forum '**Better Reykjavik (2016)**[2], the city also fosters citizen engagement and involvement in proposing ideas for service improvement. **Paris** also emerges as a frontrunner, with a long term smart city strategy aimed at replacing the entire bus fleet with electric or natural gas vehicles by 2050. **London** stands as the highest-ranking European city, thanks to a comprehensive strategy that encompasses human capital attraction, mobility, economy, governance, urban planning and international outreach.

Indeed, smartness-led strategies of urban development are key to both local and global competitiveness. The European Commission has also been acting on the forefront of change, supporting member states and regions in developing smart specialisation strategies, as well as via pioneering initiatives such as the **European Innovation Partnership on Smart Cities and Communities**[3] and the **smart-city focus in Horizon 2020**.

Explore the Smart City concept: **Barcelona Digital City: trailer**

Smart Cities Case Studies - Barcelona and Warsaw

City, Country	**Barcelona**, Spain
Initiative/policy	**Barcelona Digital City Plan** is an ambitious strategy promoted by the Municipality with the aim of unlocking a New Deal on Data able to ensure high quality and affordable services, while guaranteeing citizens' data sovereignty, ethics and respect of privacy.
Initiative's relationship to REFLOW's elements	● **Co-Creation Design & Framework** ● **Technical Infrastructure & Softwares** ● **Collaborative Governance & Urban Strategies** ● **Capacity Building** ● **Communication**
Level	City level
Period of implementation	2015 - 2019
Core vision	**Barcelona Digital City** **Plan** is the result of a creative and collaborative process of collective policy-making which has actively engaged local communities and the city innovation ecosystem in **rethinking together the concept of smart city**. The plan sets a number of directives that aim at re-establishing shared control over data and information generated by digital technologies, as well as on promoting public digital infrastructures based on free and open source software, open

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[2] See:https://reykjavik.is/en/better-reykjavik-0
[3] See: https://eu-smartcities.eu/

	standards and privacy-enhancing and rights-preserving technologies. The plan has defined a *digital and technological strategy* as a key factor for developing public policies that are geared towards better addressing people's needs, as well as reinforcing citizens' skills and the capacities of the business sector to reinvent a smart city at the service of citizens. **This has brought Barcelona beyond the concept of smart city, making it a more open, fairer and democratic city**, which is an international benchmark for technological policies.
Implementation & Governance	With the ultimate goal of unleashing a digital revolution which 'serves the many and not just the few', the plan builds upon three main pillars: ● **Digital transformation** of the city and the City Council itself, leading to an open, collaborative and transparent government, with projects that include the creation of ethical digital standards, the new **Municipal Data Office** (2019) and the **DECODE** (2019) initiative. ● **Digital innovation and revitalisation of the local innovation ecosystem**, strengthening its capacity to contribute to multiple benefits and impacts through 'a city as a lab' approach, with projects such as **5G Barcelona**, Make in BCN and the **i.lab** in Ca l'Alier. ● **Digital empowerment of citizens**, in order to foster collective intelligence, participatory democracy, digital inclusion and digital skills and competencies, with projects that include **Decidim Barcelona**, the **City Coalition for Digital Rights**, the empowerment of women in technology and **STEAM BCN** (2019). The strategy is based on three axes involving a broad range of actors: Government and City, where digital innovation is directed towards the **transformation of the public administration towards more openness and efficiency**; Enterprises and Social organisations, where digital innovation shall operate as a ground for **viable innovations taking together both economic and social objectives**; Citizens, making sure that they are **actively involved and consulted** in the definition of priorities and needs. Accordingly, the Plan envisages a number of actions and measures spanning e-government, digital democracy, development and empowerment of public digital assets and infrastructures, support for enterprises and social economy organisations, capacity-building for citizens at large, among many others. The Plan sets in place a **large scale experiment of multi-stakeholder and collaborative governance** where the local government activates and **provides stewardship** to multiple actors, with the overall goal of channeling co-creation and collective intelligence towards smarter, inclusive and participatory urban environments. The Plan also positions the Municipality as a key player in enabling market opportunities, also via an innovative approach to public-private partnerships and public procurement that involves private actors in the early definition of the procurement itself. Moreover, the Municipality provides physical space to host workshops and develop solutions, as well as spaces for ideas acceleration and projects incubation (see for example **Barcelona Activa**, the Economic Development Agency of Barcelona City Council) that offer a comprehensive set of capacity building and training activities.

	When it comes to citizens, Barcelona fosters the use of technology to facilitate participatory democracy and a **digital society built with, for and by citizens**. The Decidim Barcelona platform, with more than 40,000 participants, helps Barcelona experiment with new ways and methods for a genuinely participatory democracy, including via collaborative strategic planning, regulatory design and participatory budgeting. In this way, Decidim promotes a new way of distributing common resources and allows citizens to track the executions of approved projects.
	The Digital Transformation Plan of the Barcelona City Council currently has a budget of € 72 MLN, part of which (around € 30 MLN) allocated to flagship projects developed within the Program for Open Digitization: Free Software and Agile Development of Services. These projects are being developed with agile methodologies, and incorporate new practices in the use of data based on free and open source software.
Results, impacts and learnings	Nowadays, Barcelona stands as a benchmark for smart policies that are deeply entrenched with digital social innovation. The Plan has indeed contributed to create an enabling environment for digital-driven and digital social innovation (DSI), while igniting a period of vitality and collective creativity for the common good. Nevertheless, a number of challenges can be highlighted: ● **Financing:** Both public and private sources of funding are necessary for the development of DSI initiatives. This challenge might be critical given the often low economic and financial viability of many initiatives, as well as the time it can take to reap the benefits of network effects. For this reason, a strong commitment by public authorities to support DSI with specific subsidy lines is required. Moreover, a change in the way national and supranational public bodies perceive DSI initiatives would also be beneficial for the replication and scaling up of locally based initiatives. ● **Skills and organisational capacity:** Training and capacity-building activities are crucial to establish a level playing field for all actors in the city. Barcelona's City Council supports a publicly-owned and operated digital fabrication lab called Ateneus de Fabricació. Public facilities are essential as they can better reach and engage citizens at risk of exclusion and from lower socio-economic groups. ● **Media and communication:** Adequate communication is considered as a key enabler for the promotion of DSI initiatives. Media, communication channels and press coverage are fundamental, particularly when it comes to general public outreach, beyond specialist audiences. ● **Public procurement:** Public procurement should be used as a strategic tool to transform the delivery of services, placing residents' needs and demands at the centre. Introducing innovation in public procurement starts by defining the problems, rather than specifying the solutions. This is an invitation for creativity, making public contracts more accessible to smaller providers, such as start-ups and SMEs.
Link(s)	https://ajuntament.barcelona.cat/digital/en

City, Country	**Warsaw**, Poland
Initiative/policy	The #Warsaw2030 Strategy (2005) defines the city development policy until 2030. The strategy is a result of two years of work, which has been implemented via a wide stakeholder consultation regarding the future of Warsaw as a place to live, study, work, spend free time, and pursue development opportunities.
Initiative's relationship to REFLOW's elements	● **Co-Creation Design & Framework** ● **Technical Infrastructure & Softwares** ● **Collaborative Governance & Urban Strategies** ● **Capacity Building**
Level	City level
Period of implementation	2018 - 2030
Core vision	#Warsaw 2030 Strategy builds around the concept of '***Warsaw's residents as a driving force***', focusing on those areas where the proactive action of citizens can meaningfully contribute to the sustainable development of the City. Encompassing core values such as openness, social solidarity, shared responsibility, individual and collective empowerment, the Strategy identifies three main pillars of action - i.e. active residents, friendly spaces and open metropolis. The strategy was developed based on a **participatory model** which engaged the local community, experts and institutions responsible for its future implementation. Open meetings and workshops including debates, conferences, questionnaires, meetings with advisory groups, competitions for children and young people have been set in place in order to implement a collective diagnostic of the main challenges of the City, and to develop a common vision for its near and long term future. While reflecting broader goals of sustainable development and smart city, the Strategy also accounts for the objectives of relevant national and regional policies, and the priorities identified in international agendas (i.e. Agenda 2030 and the EU Urban Agenda). Moreover, the Strategy positions itself as an **overarching policy document** that integrates thematic and more vertical city initiatives, such as Warsaw Social Strategy, the Innovation Warsaw 2020 programme aimed at supporting entrepreneurship, the Environmental Protection Programme, the Strategy for Sustainable Development of Warsaw Transport System, and the Integrated Revitalisation Programme.
Implementation & Governance	The ultimate goal envisaged by the Strategy is to make Warsaw **more inviting for residents, tourists and investors**. The Strategy acknowledges the booming of Warsaw's economy since Poland joined the EU; yet, it recognizes the need to promote homogeneous development across

the City. The City still suffers from low levels of social trust, and there are growing concerns around gentrification processes stemming from recent regeneration processes aimed at creating cultural and creative hubs in Warsaw.

The practical fulfilment of the vision of Warsaw extends across four strategic objectives, along with thirteen operational objectives that correspond to the integrated approach shaping Warsaw's development policy in the social, economic, as well as spatial and functional dimensions.

For each of the three pillars that characterise the Strategy (i.e. active residents, friendly spaces and open metropolis), a number of specific action areas are defined, including:

- **Citizen engagement and strengthening of social ties**, via support to local animator networks and partnerships. The set-up of Local Activity Centres helps foster social competencies and active participation in civic life, while major support is given to cultural and heritage-led initiatives aimed at promoting a sense of common identity and memories of previous Varsovians' generations.
- **Development of joint management models** that actively engage citizens in city-making processes, and that strengthen a sense of common mission among City's officials. This includes civic education measures, information on the local government and city functioning, as well as a core effort to **improve multi-stakeholder and collaborative governance**. In this respect, it is worth mentioning the specific attention posed to integration of the City's digitalisation measures. Furthermore, the Strategy explicitly mentions the need to develop a **compact city with a polycentric spatial structure** comprised of a network of districts and sub-districts rendering a full range of services. This is seen as a key to promote homogeneous development, while contrasting uneven investments.
- **Improvement of basic services** across education, care and health, with the development of multi-functional municipal infrastructures, facilitation to service access and expansion in number and quality of service portfolio;
- **Creation of favourable business development conditions**, with better access to information, business-related knowledge and advisory services, as well as via business incubation and networking measures that also use municipal non-residential premises. In this respect, the Strategy also envisages specific actions for developing/expanding structural partnerships between the business, education, science and culture sectors, as well as for promoting corporate social responsibility (CSR).

The Strategy does not mention specific measures and actions for accomplishing the set objectives; instead, such measures are defined in programmes which function as executive documents for the strategy.

When it comes to governance, the Strategy is implemented via a **multi-stakeholder and collaborative framework that sees the Municipality acting with a leading role**, yet through structured collaboration (via both formal and informal partnerships) with a wide range of local actors. In particular, **the role of the Municipality is to ensure consistency of all measures and actions implemented with the objectives of Warsaw 2030, as well as to monitor, evaluate and report the progress achieved**. Every operational objective of the Strategy has a leading

	implementing body, in charge of the programme preparation, specific partnerships development, as well as of monitoring tasks. The monitoring of the policy implementation is conducted according to a number of predefined indicators referring mainly to quantitative progress in achieving the planned effects. These indicators have been selected so as to reflect the resident-centred concept of the Strategy. The Strategy implementation is mostly financed from the budget of the City of Warsaw, with an overall budget of **around PLN 30.4** BN, with also combinations of public-private funding. The financial resources are distributed across thematic programmes, and then to projects selected via competitive procedures.
Results, impacts and learnings	The City has been successful in pioneering a concept of smart city within a cross-sectoral collaboration. Systemic measures are specified in its strategic objectives in order to engage a broad range of stakeholders in the process, including the establishing of far-reaching partnerships, e.g. with NGOs, institutions, and businesses operating in specific areas, as well as with formal and non-formal resident groups. In order to foster a responsible and engaged community, #Warsaw2030 clearly promotes the active role of residents in decision-making. The Strategy also includes the integration of City's digitalisation measures to unleash more transparent local government actions through open information policies. Digitalisation has been considered as a crucial tool to create innovative and sustainable opportunities in Warsaw. In this direction, the #Warsaw2030 Strategy focuses on key aspects of a Smart City – wide participation, co-decision making, and the growing of creative potential and creative responses to urban challenges. In parallel with the Strategy, the City Council has been supporting several initiatives aimed at improving quality of life and services. These include: ● *Smart mobility*, with urban bike systems **(Veturilo)**, mobile apps for public transport and traffic **(Mapa Targeo)** and systems supporting sharing-based transport solutions ; ● *Smart economy,* with its numerous business incubators and multiple strands of support for developing entrepreneurship and start-ups. In addition, the Warsaw University of Technology is working on the creation of Europe's largest urban living lab - the Kampus Nowych Technologii. The campus will offer the possibility for testing intelligent technologies designed for urban spaces, and its village will have service properties and public spaces where smart technological solutions will be implemented; ● *Smart Environment*, with The Smart Heating Network, one of the largest heat distribution system in the world with the intention of optimising the energy use, and the **"A million trees"** (2017) urban app that enables citizens to designate a location where a tree will be planted; ● *Smart government*, with the participatory budget and local projects to improve the quality of local infrastructure and respond to its specific needs. In addition, Warsaw also has an open data system which contains detailed and unified information of shared collections and records, along with access to APIs. Via a dedicated web platform **Otwarte dane**, the city council has shared more than 200 data collections. As a result, anyone can easily gain

	access to data from official sources on subjects such as transport, education, culture, entertainment, real estate, and social projects. The sharing of open data has also led the development of the **Warszawa 19115** City Contact Centre in Warsaw, in which residents can report issues in the city and share their ideas for improving urban services.
Link to the initiative	http://2030.um.warszawa.pl/bez-kategorii/warsawstrategy/

5.2.2. The Sharing City

The backbone of the Sharing City is the rapid spread of the *sharing* or *collaborative* economy over the past few years, both across Europe and beyond. Sharing, swapping, lending, borrowing and leasing-based practices and business models have been popping up as alternatives to traditional ownership of most assets, often leveraging the potential of **digital platforms and ubiquitous networks to connect people and mobilise information at a scale and scope never seen before**. Within cities, the sharing economy has indeed found a fertile ground of development. Thanks to the typical relational and assets density found in cities, sharing and collaborative-based models have been developing rapidly across different sectors, characterising both production and consumption. From shared mobility and housing, passing through the new practices of peer to peer and decentralized production often crystallised in the so-called 'maker movement', up to the new forms of collaborative finance and governance; the sharing economy has contributed to open the way to **a new city paradigm, defining new opportunities to rethink services in a more efficient and smart way**. Furthermore, well beyond the sole business domain, the sharing economy has often materialised across a variety of citizens-led initiatives (swap markets, urban gardens, social streets, collective management of public buildings, etc.), operating as a viable testbed for exploring alternative models of management and care of urban assets that also contribute to (re)creating social ties and cohesion, while igniting new forms of social interaction.

Amsterdam, Milan, London, Lisbon are some few examples of cities, amongst many others, that have developed specific strategies and policies for the sharing economy, harnessing the potential of platform and sharing-based models to boost the creation of new jobs and enterprises, reduce waste and negative impacts over the environment, strengthen trust-based relationships and promote social innovation. For example, **Milan** has been pioneering the sharing economy as a ground of collective policy-making; the Municipality has developed **specific guidelines** for the sharing economy, clarifying its own role as facilitator and convener across the plethora of actors that have a stake in this emerging field, while making proactive steps to allow the sharing economy to grow and thrive in the city as a means for social innovation. **Amsterdam** has been the first European city granted with the label of 'Sharing City', as well as a pioneer in implementing multi-stakeholder governance approaches that seek to take together both citizens-led initiatives and corporate platforms. **Vienna**, within its 'Innovative Vienna 2020' strategy, recognizes the potential of the sharing economy to create new business, and yet puts strong attention on the need to improve regulation in a way that it ensures a level playing field.

The topic of governance within the sharing city is indeed crucial. Next to narratives and meanings that often tend to polarise the sharing economy between the (bad) capital-led monopolies and the (good) community-led initiatives, the lack of standards, reliable regulatory frameworks, poor awareness on business models, not to mention the rapidly evolving

nature of this phenomenon, make it difficult to implement governance arrangements that fully harvest the innovation potential of the sharing economy. The novelty and ambiguous nature of the sharing economy leaves city governments with complicated questions on how to politically approach the phenomenon (Finck and Ranchordás 2016). From a different perspective, the 'dodgy' nature of the sharing economy is also the focus of the recent debate about **platform cooperativism**, whose focus on the cooperative ownership of platforms is seen as a possible shield against the risks of monopolies, misuse of personal data, deregulation of labour rights and *people farming* brought by some initiatives - often Silicon Valley-based - of sharing economy (Scholz 2014).

City governments are currently experimenting with different governance approaches, varying from active government-led programmes (e.g. initiating and coordinating public-private partnerships, stimulating experiments and encouraging discussion of where the sharing economy should be heading), to implementing strict regulations to hinder the operations of disruptive commercial sharing platforms (McLaren and Agyeman 2015). Neal Gorenflo (2015) identifies two main paths that characterise the policy-making in the field; one in which the latter may risk to reproduce social hierarchies via profit-oriented approaches (*transactional sharing economy*), and one that instead attempts to unlock the potential of the sharing economy for promoting wide practices of collective city-making and management of urban commons (*transformational sharing economy*). Whatever the path, though, the various strategies of 'Sharing City' have contributed to bring attention to new forms of **collaborative governance** as a strategic means to recreate new structures and spaces of dialogue, decision-making and consensus-building.

The term 'collaborative governance' is far from being univocally defined and understood. Besides a wide number of definitions that can be found in literature, many authors (Salamon 2002; Bingham and O'Leary 2008; Osborne 2010) notice its interchangeable nature with other terms such as participatory management, collaborative public management, new public governance, stakeholder governance. Ansell and Gash (2008) look at collaborative governance mainly as a collective decision-making process that is initiated by public agencies, and that implies two-way communication and influence between agencies and stakeholders. Other authors (Agrawal and Lemos 2007; Emerson and Murchie 2010) further expand the characteristics of collaborative governance, highlighting the emergence of cross-boundary, 'multipartner governance' frameworks and hybrid arrangements such as public-private and private-social partnerships and co-management regimes. More recently, the concept of '**quadruple and quintuple helix**' (Carayannis and Campbell, 2009) has started to pervade the debate around innovation, with organizations such as the OECD and the European Union that are actively promoting the adoption of *government-academia-business-people* partnerships as more effective to achieve knowledge-based and innovative societies (e.g. [EU-OISPG](#)). To many extents, collaborative governance can also be seen as an expansion of the concept of smart governance, thanks to its **focus on the processual elements** that underpin the governance structure, and the role that **ICT can play in enabling, fostering or amplifying collaboration at different scales and scopes** (Meijer and Rodrìguez Bolìvar 2016)**.** From this perspective, collaborative governance mainly becomes a matter of 'how' the various city actors experience relationships and interdependencies in the broader process of solving public problems or creating public value, and stimulates local governments towards **the creation of new or renewed 'interfaces' through which such actors can convene, build common understanding and collaborate on common goals**. Interagency and intergovernmental partnerships, public-private-people design policy labs and living labs, crowdsourcing, hackathons and competitions for public sector innovation, dedicated offices for civic collaboration or the engagement of local governments in design-driven and prototyping approaches to tackle urban challenges, are all concrete ways through which

cities are seeking to (re)create collaborative and participatory urban environments. Accounting for the growing complexity and interdependency of today's urban challenges, these approaches may signal an overall trajectory of '*cities as platforms*' (Bollier 2016), where the act of governing the city transforms itself into an **action of networking and infrastructuring of socio-technical resources,** so that it can support and facilitate diffused collaboration and collective action. As we will see later on, the City as a Commons brings this vision even further, entwining sharing and collaborative-based models with polycentric forms of governance as a means to unlock collective action of care, management and regeneration of urban commons (Iaione 2015; Foster and Iaione 2016).

Indeed, nowadays the sharing economy is an arena of both **encounter and collision**. The rapidly evolving nature of the phenomenon and the variety of existing approaches make it difficult to fully embrace its complexity, both in terms of regulation and supporting measures. This controversial relation between the demand of clear rules and standards on the one hand, and the need for experimentation and learning by doing on the other hand, is what actually makes the governance of the sharing city as an interesting ground for regulatory and collaboration experiments. While the Sharing City is taking off at the citizen and business level, its next step is to add administrative and government support: the sharing city needs to create regulation for the sharing networks as well as to change underway regulation that prevents participation in sharing.

Explore the Sharing City concept: Sharing Cities - Inspiring examples from Milan, Lisbon and London

Sharing City Case Studies - Milan

City, Country	**Milan**, Italy
Initiative/policy	The City of Milan has been the first public administration in Italy that has adopted specific guidelines for the sharing economy. During 2014, the Municipality carried out a public consultation with operators, citizens and experts which has led to the approval of the '**Milan Sharing City**' document. The objective of Milan Sharing City is to identify a series of actions to create in Milan a '*collaborative institutional ecosystem, conducive to the development of a regulated, inclusive and sustainable shared economy and to bring out, enhance and connect socially and economically innovative territorial initiatives*'. The document identifies the characteristics of the Sharing Economy initiatives to be supported and the objectives to be pursued through a specific action plan. The core vision of Milan Sharing City is that of a city that **leverages sharing and collaborative practices as a means for social innovation**, and that puts strong attention on citizens and co-creation practices as drivers of social and economic value. The Municipality has been proactively supporting the spread of sharing models, especially across **mobility, youth entrepreneurship, access to shared working facilities, and neighboring initiatives such as social streets and initiatives in the field of food waste reduction**.

Initiative's relationship to REFLOW's elements	**Co-Creation Design & Framework** **Collaborative Governance & Urban Strategies** **Pilots Framework** **Capacity Building** **Communication**
Level	City level
Period of implementation	2014 - ongoing
Core vision	In order to foster innovation and promoting social inclusion, the City of Milan has welcomed external incitements on the topic of the sharing economy. The first step came from outside the administration, with the birth of **Sharexpo**: Milan shared city for Expo 2015, launched by a group of foundations, research centers and observatories. The starting idea was to make a **collective reasoning around the sharing economy, in order to provide inputs for its regulation and support across the city**. The project originated in the event **Sharitaly** (the first edition held in November 2013), the first national event on the topic. The event was followed by a number of round tables involving a large variety of local actors, which in turn led to the creation of a Steering Committee and to the elaboration, in 2014, of the Sharexpo official launch document. Importantly, the document identified critical issues and opportunities in five sectors (mobility, hospitality, food, leisure and work), as well as areas for improvements in regulatory, cultural and organizational dimensions. Based on this work, actively supported by the Municipality throughout its development, a public consultation was launched in 2014, which brought the City to the adoption, in the same year, of the **'Milan Sharing City'** initiative. A set of specific guidelines were approved as an integral part of the initiative, representing the foundation of a series of experiments carried out by the City in the following years. Furthermore, in November 2016, Milan hosted the Eurocities annual conference on "Sharing Cities", on the ground of its prominent position in acknowledging the potential of the sharing economy and in developing policies endorsed by its citizens around the shared economy principle. Lastly, in November 2018 the Municipality of Milan joined the **Sharing Cities Declaration** (Sharing Cities 2018), signed by 30 cities across the globe.

Implementation & Governance	In its overall architecture and design, 'Milan Sharing City' largely exemplifies the general approach that has characterised the City's policy-making (and governance approach) over the past few years, especially *vis-à-vis* emerging trends such as the sharing or the circular economy. Often via pioneering policies which have not remained stuck in the fear of failure, the City of Milan has been actively tackling major urban challenges, positioning itself as a vibrant lab of experimentation which is increasingly acknowledged as a benchmark both across Italy and beyond. Milan Sharing City can be considered as an **overarching initiative that provides a framework of reference for all sharing economy-related projects in the city, which in turn connects to the broader Milan Smart City strategy.**
	The overall objective of Milan Sharing City is to identify and promote a set of actions aimed at transforming Milan into '*an institutional collaborative ecosystem, conducive to a sharing economy that is regulated, inclusive, fair and sustainable, and that provides the ground for enhancing and connecting local initiatives that are socially and economically viable and innovative*'. A specific **Action Plan** has been elaborated as an integral part of the initiative, which clarifies the characteristics of sharing economy's initiatives to be sustained, and establishes a set of objectives which, at its core, seek to create an enabling environment for the sharing economy, including via increased awareness-raising, capacity-building and better knowledge of the territory in terms of projects and organizations already active in the field. Importantly, the Action Plan also accounts for the need of achieving a **better understanding of the impacts** stemming from sharing economy's practices and models, as a key precondition to develop **effective and meaningful regulation** that ensures a level playing field. Furthermore, the Plan aims to promote a **system of quality recognition and validation of virtuous realities, while creating specific support measures and infrastructures for new entrepreneurship in the field.**
	Milan Sharing City has been the foundation of a set of experiments further implemented or supported by the Municipality, including: ● **coHub** - physical space that offers free orientation and guidance about the opportunities stemming from the sharing economy, as well as specific training and consultancy services; ● **Civic crowdfunding** - an experimental approach launched by the City to support bottom-up proposals that contribute to sustainable and inclusive neighborhoods; ● **Sharing Economy School** - a training programme dedicated to grassroot organizations; ● **Sharing Economy catalogue** - which provides a list of sharing economy operators in the city and the services offered, and which in turn builds on an extensive mapping of sharing economy projects and initiatives present in the city; ● **Qualified Coworking Services List and co-working vouchers -** a register of coworking spaces accredited by the City, together with financial incentives to

support the access to shared making and co-working facilities.

The Municipality has also worked extensively on R&I projects, utilising specific funding lines such as Horizon 2020 to allow larger scale experimentations and testing. In this respect, it is worth mentioning the **Sharing Cities H2020 project**, which aims to **develop smart solutions and pilot projects in the energy, transport and ICT sectors to improve citizens' quality of life.** This project specifically targets specific city districts, where the application of cutting-edge technologies shall contribute to create real **"open-air labs" of urban regeneration and innovation.** This project is also an example of how the City looks at sharing practices within a broader vision of smart city, recalling the key role to be played by citizens to achieve long lasting impacts. Moreover, at the local level, the project relies on an extensive network spanning businesses, universities, research centres, social economy organizations and grassroots associations, witnessing the clear commitment of the Municipality to facilitate and support multi-stakeholder partnerships and collaborations.

Furthermore, the Municipality has worked to enhance and valorise its physical infrastructures, particularly in the context of urban regeneration processes that have been directed towards the creation of spaces for social innovation, social inclusion and social business that also work as smart city living labs. In this respect, it is worth mentioning the recent **Manifattura Milano** programme, which aims to bring manufacturing back to the city also via the creation of a structured network of fablabs and makerspaces.

Lastly, coherently with its Smart City and Urban Resilience policies, Milan has made proactive efforts to develop sharing mobility models, with current plans to develop a **macro sharing mobility project** which will cover the sharing of a variety of transportation means, including cars, motorbikes, bikes, hoverboards, etc. This groundbreaking mobility strategy is enabling Milan, which has one of the highest car ownership rates in Europe, rise to its congestion challenge. Innovative integrated sharing schemes mean fewer cars on the road and better quality of life for all. This project won the **EUROCITIES award for innovation in 2015**.

| Results, impacts and learnings | Milan Sharing City is a valuable example of how the Municipality is increasingly attempting to set in place collaborative governance frameworks. Over time, the City has been investing heavily in the development of a culture of collaboration, both internally and externally. The creation of cross-departmental bodies and units, as well as of specific task forces dedicated to 'hot topics' such as data, urban resilience, urban manufacturing (to mention a few) has been pursued alongside integration of vertical policies, so as to streamline a shared vision across city officials. In addition, the Municipality has made recourse to external consultants and international advisors, such as in the case of sharing economy expert April Rynne. The need to train staff and to collaborate with experts on the topic is considered as one of the basic preconditions to starting a meaningful discourse on the sharing city.

Furthermore, the focus on multi-stakeholder collaboration pursued by the City is particularly evident, especially when it comes to the key role to be played by public institutions. The path leading to the Milan Sharing City initiative demonstrates, once again, the participatory and open contributory nature of policy-making adopted by the Municipality, as well as its capacity to steer an overall 'community of practice' approach. City officials often refer to Milan as a 'Human Smart City', a label that stresses the importance given to the human factor rather than one of technology, which remains an enabling element but not the ultimate goal. |
|---|---|
| Link to the initiative | **Comune di Milano. Linee Guida Milano Sharing City**
Sharing Mobility Strategy in Milan (2015)
Sharing Cities Milano |

5.2.3. The Green City

The concept of the 'Green City' - often referred to as 'Eco-city' - is certainly not new in Europe, as it is largely rooted in the broader debate of sustainable urban development that has characterized EU policy-making for at least two decades. At its core, the 'Green City' understands the urban environment as a living ecosystem, and considers environmental sustainability as a key precondition for just and thriving societies. **Energy efficiency and environmental performance** are the main pillars of the Green City, which are generally articulated across goals of CO_2 emissions and municipal waste reduction, shift to renewable energy, promotion of biodiversity and support to more environmentally-friendly production and consumption modes and lifestyles. Accordingly, Green cities' strategies are typically oriented to the 'greening' of the built environment, as well as to the preservation, restoration and regeneration of natural ecosystems - thus developing mainly across sectors and fields such as **urban mobility, real estate and property development, waste management and utilities** (water and energy in the first instance). Policies and plans of urban forestation, green facading, buildings retrofitting, urban gardening together with practices of **Green Public Procurement**, green financing and eco-friendly labelling are some recent trends that characterize green city strategies, which often couple with policies and initiatives for smart and shared mobility - thus signaling the strong connection of the green city with both smart and sharing city concepts. Importantly, the green city is also acknowledged **in its potential to support and boost the green economy**,

operating as a viable testbed for the emergence of new enterprises and jobs that are intentionally directed towards decoupling growth from the use of natural resources, while reducing social and health disparities that often affect poor and marginalized communities in urban contexts (CSIR 2014). Furthermore, the green city is often the ground for specific **resilience-oriented interventions**, which specifically aim at improving the capacity of cities to adapt to climate change while mitigating its risks, particularly in relation to issues such as increase in precipitation, flooding and heating phenomena and their effects over vulnerable categories such as children and the elderly.

To the extent that the green city concept deeply roots in sustainability-related issues, it often gets associated to the circular economy and to circular cities. In the context of the expert consultation and interviews developed as part of the research for this report, we found that green and circular cities often tend to be understood as similar - not to say overlapping - concepts, with greening measures such as urban forestation and energy retrofitting often referred to as circular practices. This confusion in terms and understanding is clearly mentioned in recent reports and studies (Circular Cities Hub 2016; Jonker and Montenegro Navarro 2018), which clearly demonstrated the need of further research and of clear definitions that would help cities in developing better and more targeted strategies, as well as in sourcing the knowledge and capabilities required. Nevertheless, the empirical evidence seems to show that these concepts are often taken in synergy, with the circular economy that usually stands as a building pillar for making cities greener, healthier and more sustainable.

The European Commission has been active in promoting the development of green cities for at least two decades. The **Resource Efficient Europe** flagship initiative[4], the **Seventh Environmental Action Programme (EAP)** or the establishment of the **European Green Capital Prize** and **European Green Leaf Award (EU Policy on the Urban Environment)** are some examples of how the Commission is supporting cities in developing urban strategies of '*living well, within the limits of the planet*'. More in particular, the European Green Capital Prize - launched in 2008 and awarding, over the years, forefront eco-friendly cities such as Stockholm, Copenhagen, Nantes, Bristol, Ljubljana and, the most recent, Oslo - has played a key role in providing cities with a clear and wide set of both quantitative and qualitative indicators to develop, monitor and assess their green development strategies. These indicators span local contribution to climate change, noise, green urban areas, water waste treatment, eco-innovation and sustainable employment, energy performance, amongst others. Moreover, we shall recall here the recent **Rockefeller Foundation's initiative '100 Resilient Cities'**, which provided financial and technical support to the establishment of dedicated Resilience Offices within municipal governments across the globe.

A vibrant movement of green cities is currently underway both across Europe and beyond; **Copenhagen** has been awarded several times for its eco-credentials, presenting one of the most developed cycling infrastructures across Europe which has also contributed to unlock a micro economy and local vibe of cyclers-related services and lifestyles. **Oslo**'s commitment to prioritizing people over cars and lowering fossil fuel emissions have earned it the title of European Green Capital 2019; the city has been extremely successful in supporting public transportation usage, as well as in pushing the shift towards electric vehicles. **Amsterdam** also stands as one of the most bicycle-friendly cities in the world, and is often recalled as

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[4] See Section 1 of this Report for a full recognition of main policies and initiatives developed by the European Commission and other EU institutions in the framework of environmental sustainability in cities.

'hosting more bicycles than people'. **Essen**, located in Germany's Ruhr valley, has proven successful in regenerating its coal and steel-based town into one of the greenest cities in the world, also leveraging culture and creativity - with the creation of cultural hubs and districts - to repurpose the city and its own identity in the broader post-industrial shift. **Prato**, a city well known across Italy and beyond for its textile district, is currently championing the 'green transition' in the country, with a complex and structured plan that combines green facading of public buildings, massive urban forestation and district-based circular practices to drive the city towards sustainable, healthier and thriving urban environments. Interestingly, the city is now working in close collaboration with Universities and research centres to develop a comprehensive monitoring and evaluation plan able to capture the multiple benefits stemming from green and circular interventions, well beyond the sole environmental performance.

The topic of governance in green cities has a number of challenges and opportunities ahead. During interviews with a number of city officials developed for this report, a key point has repeatedly emerged, dealing with **how climate-related policies and plans can be framed, communicated, funded, monitored and assessed in a way that they prove to be much more than an investment with no or weak returns**. Indeed, a still poor awareness of climate and environment-related issues across society often hinders consensus and decision-making, and may risk reducing the ambition of policies and plans to objectives and actions that do not really tackle the scope and scale of the problems we face. Furthermore, while the environmental benefits of greening interventions seem to be largely acknowledged and understood, broader benefits falling for example under the domains of health and preventative health, jobs and enterprise opportunities and reduced pressure over social services are often not or poorly considered. This factor has at least two major consequences: on the one hand, the **missed opportunity to shape new markets and mobilise businesses** towards viable, eco-friendly services and products; on the other hand, **the difficulty (often a structural limit) to pool financial resources from different city (and in turn regional and national) departments around a unique, cross-cutting strategy**, which in turn risks to result in under-financed interventions. In this respect, some key informants involved in our research have mentioned how cities often attempt to find complementary sources of funding, for example via crowdfunding, corporate social responsibility (CSR) and sponsorship. And paradoxically, some of our informants have also highlighted how these complementary sources (especially when entailing the direct involvement of citizens) **often become a ground of conflict and misunderstanding between the Municipality and citizens**, who might perceive such attempts as a step back of the public authority from its key responsibilities. Indeed, this latter point also calls for a general need of cities **to develop new, more engaging and comprehensive narratives around green and climate-related policies**, making them attractive for the entire array of actors who can both contribute to and benefit from them. Under this perspective, the governance of the green city shall indeed build on wide collaborative and multi-stakeholder approaches; yet, it needs to face a fundamental question of what environmental sustainability and healthy cities mean in the current scenario, and how these concepts can be reformulated so as they are able to drive and steward vertical policies and budgets towards integration and pooling. This may also entail a massive work for cities to understand current gaps in data, and to provide open data sets that better allow for multi-dimension impact assessment and evaluation.

Explore the Green City concept: [Oslo: Green City 24/7](#)

Green Cities Case Studies - Oslo and Copenhagen

City, Country	**Oslo**, Norway
Initiative/ policy	**Climate and Energy Strategy for Oslo** (Oslo Kommune 2016) is the City's initiative to reduce the overall emissions and the need for fossil based energy. The Strategy sets a roadmap that outlines how the green shift should be implemented in order to achieve Oslo's climate targets to reduce 50% of greenhouse emissions by 2020 and to reach the level of 95% by 2030. Within this broader initiative, the City is currently developing a new strategy on Waste Management and another strategy on reduced material consumption, to support its ambition to be an international leader in waste prevention, reuse and recycling.
Initiative's relationship to REFLOW's elements	● **Co-Creation Design & Framework** ● **Technical Infrastructure & Softwares** ● **Creating & Managing Circular Flows** ● **Collaborative Governance & Urban Strategies** ● **Capacity Building** ● **Communication**
Period of implementation	2016 - ongoing
Core vision	The Oslo Climate and Energy Strategy has been developed in alignment with the City's Municipal Master Plan **"Oslo towards 2030: Smart, safe and green"**, which is the municipal government's overarching strategy for future development in the city. The Climate and Energy Strategy states that 'the City of Oslo shall have a regional perspective in its long-term plans for treatment of waste and wastewater and strive to achieve zero discharge from energy recovery from residual waste by increasing recycling". Besides the focus on behavioral change, the successful integrated waste management system is based on a legacy waste collection system through the innovative use of technologies. Furthermore, the European Commission awarded Oslo the **European Green Capital title for 2019**. As a part of a **long-term vision**, the city of Oslo introduced the first-of-its-kind European **Climate Budget** (Oslo Kommune 2019)**,** which has two main functions: - to show whether the existing measures to reach climate targets are sufficient; - to impose an obligation on all municipal bodies to submit regular status reports on the climate measures for which they are responsible. Finally, the current city government has also launched a **new political platform**[5] stating that the city should develop a separate strategy on Circular Economy.

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[5] See:
https://www.oslo.kommune.no/getfile.php/13346154-1571735406/Tjenester%20og%20tilbud/Politikk%20og%20administrasjon/Politikk/Byr%C3%A5det/Oslos%20byra%CC%8Adserkl%C3%A6ring%202020 19-2023.pdf

Implementation & Governance	The Climate and Energy Strategy builds on **16 initiatives addressing four main subject areas:** ● **Urban development and transport;** ● **Buildings;** ● **Resource utilization;** ● **Climate governance.** Within the Energy Strategy the **engagement of citizens at a micro-level** represents a crucial aspect to reduce consumption in households and for this reason the communication process is fundamental to increase awareness within the citizens. This takes place formally and informally through announcement platforms, such as **European Green Capital 2019** and **Oslo Kommune.** Besides the recycling strategies, the Strategy includes additional incentives to increase citizen awareness: ● **Mini-recycling stations.** Due to the low percentage of cars, small recycling stations are located in several central boroughs and easily accessible by public transport or walking. The concept of the small recycling stations is based on resource hubs with a special emphasis on social aspects, where the focus is on re-use, training session and repair workshops. It represents a small incubator for circular economy. ● **Small kiosks** around the city of Oslo to encourage re-use and share things; ● **Green Friday** (in return to Black Friday). Aiming to reduce consumption in private households, avoid waste production and promote citizens engagement, Green Fridays are supported by apps to share food, co-working spaces, organize repair workshops. ● **Education for waste management** is crucial to promote the vision of consumption reduction. Schools, universities and other educational organizations are offering classes on avoiding waste in private households and everyday life. About the governance process, the Climate and Energy Strategy has been **developed in dialogue with and involvement of 40 organisations from the City of Oslo, the business community and state-owned enterprises.** This involvement process has mainly been undertaken in five sector groups: **Transport, Energy, Buildings, Resource Utilisation** and **Cross-Sectoral Energy Issues.** The Norwegian Institute for Energy Technology and Oslo Renewable Energy and Environment Cluster have contributed with technical advice and modelling tools (TIMES NORWAY) for the strategy development. An important element of the work involved **identifying expected changes in technology and framework conditions**. Moreover, in order to frequently assess GHG emissions in Oslo, a **set of indicators** collectively known as the **Oslo Climate Barometer have been developed**[6], which is publicly accessible and gives early notice of positive and negative trends, indicating the extent to which measures and instruments are achieving their intended effects. The Climate Barometer also forms the basis of the City Government's ordinary reporting to the City Council.

[6] See: https://www.klimaoslo.no/klimabarometeret/

	Oslo's **Climate Budget** supports to **measure the impact of the Climate Strategy**, asking all the agencies within the city administration to report on CO2 emissions. Although the Climate Budget 2019 is Oslo's third climate budget, it remains a pioneering project. **The Climate Agency has been established as a strong new specialist entity within the City of Oslo:** it plays a central role by supplying the analytical basis for the preparation of the city's Climate Budgets and by advising on, and actively encouraging, the implementation of climate measures. The introduction of **climate budgets represents a key instrument** in ensuring that all the City of Oslo's agencies assume responsibility for climate initiatives. Furthermore, international projects and partnerships on Circular Economy and the URBACT initiative help the City of Oslo to constantly define a testing ground for strategies and initiatives. Moreover, Oslo is leading the EU Urban Agenda Thematic Partnership for the Circular Economy (UAPCE). This will create the ground to identify new actions and collaboration projects that will contribute to accomplish the vision of Oslo to become internationally leading in its work with waste prevention, re-use and recycling.
Results, impacts and learnings	Oslo has made significant progress in a number of areas. Greenhouse gas emissions per capita are falling, and the number of people travelling by public transport, cycle and on foot is rising – at the expense of car traffic. Statistics show that Oslo's total GHG emissions fell by nearly 14% between 2009 and 2016. From 2015 to 2016, Oslo's emissions fell by 8%. The reasons for this change include measures and instruments that are **encouraging a move towards fossil-free transport**, together with the impending ban on fossil oil-based heating. The statistics also show **a significant decline in emissions from non-road mobile machinery** (which in the case of Oslo relates mainly to the volume of sales of diesel fuel for construction machinery). In 2017, the public transport company Ruter recorded its largest annual increase in passenger numbers, ever. Passenger journeys increased by 5.9% in the total area served by Ruter and by 6.1% in Oslo. There is a **high level of satisfaction with public transport services among Oslo's population.**
	During the preparation of the Climate Budget 2018, it became clear that the assessments of the effects of implemented and planned measures did not provide adequate reassurance that attainment of the 2020 target was within reach. This prompted a decision to commission **studies of four packages of measures** with an aim to assess potential for achieving larger emissions cuts. Measures that could give significant emissions cuts by the end of 2020 were identified in two sectors in particular: the **construction sector and the transport of goods and services**. Several of these measures are included in the budget proposal for 2019. The level of expertise now present within the Climate Agency has therefore improved the municipality's ability to assess and control the individual measures in the Climate Budget.
Link(s)	**https://www.oslo.kommune.no/english/**

City, Country	**Copenhagen**, Denmark
Initiative/policy	**Copenhagen 2025 Climate Plan** (City of Copenhagen 2016) is an ambitious strategy to turn Copenhagen into the first carbon neutral City capital in the world. The City aims to show that it is possible to combine growth, development and an enhanced quality of life with lower CO2-emissions. The Plan builds on four pillars: *energy consumption, energy production, green mobility* and *City administration*. The Plan is heavily rooted in interdisciplinary and collaborative approaches, as it recognises the crucial role played by local authorities, Copenhageners, universities and businesses to reach the targets set in the Plan.
Initiative's relationship to REFLOW's elements	**Co-Creation Design & Framework** **Technical Infrastructure & Softwares** **Creating & Managing Circular Flows** **Collaborative Governance & Urban Strategies** **Capacity Building** **Communication**
Period of implementation	2012-2025
Core vision	The topic of environmental sustainability and 'eco-city' has largely characterised local policy-making over the years, and the City has been repeatedly awarded and acknowledged at the international level for its eco-credentials. However, the origin of the Plan can be dated back to 2009, when the City hosted the **COP15 Summit**. The conference played a key role in raising climate change to the highest political level. Building on the COP15's aftermath - in the first instance, the Copenhagen Accord which settled short and long term goals for reducing global temperature and greenhouse gas emissions -, the City started a participatory process aimed at gathering ideas and inputs for improving the environmental performance of the City, based on four priority areas: - energy consumption, - energy production, - green mobility, and - City administration. This participatory process led to the identification of 19 overall goals and targets, and 60 initiatives. These have been launched in close collaboration with businesses, utility providers, grassroots organizations and Copenhageners. **The CPH 2025 Climate Plan is therefore the result of collaborative efforts of the City of Copenhagen and numerous external players who have all played a critical role in designing and implementing the**

	Plan. Indeed, the Plan stands as one of the most ambitious climate strategy across the world, with a stated goal of becoming the first carbon neutral capital by 2025. The city has **prioritised low-carbon alternatives** such as mass transit and biking over automobiles helping to support a "green wave". Key to the strategy is an **overall vision of smart city that leverages Intelligent Transportation Systems (ITS)**, linking data from a variety of sources to create new types of mobility solutions and services. Furthermore, the Plan is also working on making national framework conditions supportive for the City to achieve its targets, for instance by experimenting with approaches and practices of **green public procurement, reduced or removed taxation for electric cars, stricter requirements in green areas, congestion pricing, as well as annual 'heating label' measures**.
Implementation & Governance	The City of Copenhagen has approached its Climate Plan **within a broader vision of sustainable and quality urban environments**. This vision is implemented through a set of synergistic policies and linked to other local master plans - including Waste and Resource Plan, Action Plan for Green Mobility, Cycling Strategy 2025 and the Municipality Eco-Metropolis 2015 -, each pursuing specific objectives, but with strong efforts in place to turn environmental and climate change goals a horizontal priority across sectoral domains. The Climate Plan specifically addresses environmental objectives and decarbonization targets, via 60 initiatives identified and further initiated in close collaboration with local stakeholders, including utility companies, enterprises, social organizations and citizens. The Plan is therefore **the result of collaborative efforts of the City of Copenhagen and numerous external players**, who have all played a critical role in framing and implementing the Plan itself. Among the key actions envisaged, we find: ● Support to the transition towards **green energy supply**, which also includes improvements of energy infrastructure so that it becomes more resilient to wind and weather conditions, while allowing to store greater amounts of renewable energy. ● Boosting **green mobility**, favoring biking and walking in the first instance, but also strengthening quality and access to public transport system. Support shall also be given to sharing models, electric and hydrogen-powered cars as well as to make traffic flows smooth. ● Support to **energy efficient buildings**, both in the context of new developments and regenerations. ● Wide **capacity-building and awareness-raising actions** targeting citizens at large, also via demonstration projects and provisioning of trainings for children and families.

	The Plan is articulated into a clear list of initiatives to be taken accordingly to the thematic areas prioritised for intervention, each comprising target goals and specific KPIs (mainly environmental and health-related ones), and showing opportunities for both public and private investment. Transversally, the City is working to identify and overcome regulatory barriers that may hinder the development of the Plan, while making sure that sound coordination is applied to make the Plan work in close synergy with the other City's initiatives in the field of environmental sustainability.
	Despite the fact that the City of Copenhagen is responsible for implementing many of the initiatives proposed, the majority of them involve building owners in partnership with the Municipality, and are implemented in tandem with other stakeholders, also accounting for data-driven approaches to make services smarter and more tailored to citizens' needs. The Plan has been concretely developed via 3 roadmaps, each conceived flexibly. **Every year, the municipality - in collaboration with the specific initiatives' project leaders - identifies annual milestones and eventually revises targets accordingly. The Plan and the targets are therefore a combination of analysis and stakeholder involvement.**
	Investments in the Climate Plan are mostly made by the City of Copenhagen, in particular by municipally-owned utilities companies, and by private individuals. The government however funds projects to make new bike lanes for instance. Overall, the Plan is expected to lead to a funding requirement of around DKK 2,6 billion in the period 2013-2025.
	When it comes to governance, the Plan is being implemented through a **quadruple helix model** which actively involves businesses, universities and citizens at large. The Municipality has taken a strong leadership in mobilizing all these actors, and facilitating an overall culture of shared experimentation and learning which has pushed 'out-of-the-box' thinking.
Results, impacts and learnings	The implementation of the Plan, although underway, has indeed proven valuable in supporting the transition of Copenhagen towards a carbon neutral City. The City has already reached relevant targets in reducing CO_2 emissions, and indeed created a vibrant ecosystem of multiple initiatives (both public and private led) pursuing goals of environmental sustainability. Combining multiple interventions articulated around clear objectives, the City has been able to set an overall framework for coordinating local initiatives, and to drive them towards shared goals and targets. Besides, the adoption of a flexible approach based on constant review of steps made as well as on evidence analysis is generally perceived as a meaningful approach that allows to account for the broader context of rapid change and uncertainty. Yet, a number of challenges have been

	underlined. First, the regulatory aspects remain a major barrier, especially when it comes to aspects that are regulated at national level. Second, decarbonization actions cannot be set in place meaningfully without fostering and supporting behavioral change; however, this aspect requires in turn a huge effort that the Municipality cannot achieve alone, and that can be tackled partially through specific regulation. Funding also emerges as a major challenge, considering that decarbonization measures - to reach the set goals - should be implemented at a scale and scope which in turn require massive investment against long term period returns. Moreover, the finances that the Municipality gets is decided every year at the budget negotiations. Climate issues are therefore competing with other goals of establishing schools to children or offering better facilities for disabled children. However, there is increasing interest and commitment from businesses in engaging with greening and eco-friendly models and products - particularly as they see a "win-win" - which lets assume that the City will experience a positive path in the coming years.
Link(s)	**CPH 2025 Climate Plan** **https://international.kk.dk/**

5.2.4. The City as a Commons

The current institutional systems are largely based on the private-public dichotomy, hence the commons have been largely ignored by our legal and political system. However, within the 'City as a Commons' concept, citizens are making a claim to govern urban resources according to their own rules and norms, and as commons, outside of the public-private dichotomy. Indeed, today we are witnessing a rise in the number of commons-oriented civic initiatives in cities. In this setting, the city is understood as a shared resource and all inhabitants are considered to be productive commoners, co-constructing the various commons that fit their passions, skills and needs. Among others, Michel Bauwens, David Bollier, Sheila Foster, and Christian Iaione have looked into the concept of the 'city as a commons' and the role of and the possibilities for a city government to strengthen citizens' initiatives of this kind.

Many cities in the western/northern world have taken turns towards participatory, commons-oriented policies. **Bologna** is the exemplary case for developing new institutional processes for public-commons partnerships. **Barcelona** is also significant since, through the En Comú coalition, it illustrated how movement activists can work with political parties to create new platforms that foster greater participation in governance. Further, the case of Frome illustrates how local councils can play a key role in enabling communities to increase their resilience and face their challenges. Last, **Ghent** was the first city that attempted crafting an urban commons-focused transition plan on the city level. However, it should be highlighted that there is an increasing number of integrated citizen coalitions that operate in cities with little or no support from local authorities.

In terms of governance, the commons requires: a **'partner' city that enables and empowers** commons-oriented civic initiatives; **generative market forms** that sustain the commons and create livelihoods for the contributors; and **facilitative**

types of support from civil society organisations (Bauwens and Niaros 2015). These **poly-governance structures of participation and deliberation consist of at least three levels (commons, state and market)** but can be even more, as the work of Foster and Iaione (2016) has suggested referring to the **'quintuple helix' model**.

The emergence of the city as a commons responds to the modernist urban model, which brought about the transformation of small and public to large and private, replacing the citizen as the owner of the city. As Saskia Sassen - a sociologist recognised for her analyses of globalization and urban development - asked: "Who owns the city?" In this trend, the citizens take the city back. Key to this vision is creating cooperation among citizens, so that they are able to participate in the decision-making processes concerning their environment and the politics that manage it. This model emerged partly out of the need to consider the city to be a *process* as opposed to a fixed system. As a process, the city and its citizens, as well as their needs, are understood to be constantly adapting and evolving. The city itself is then created to respond to these changes, reinforcing the need for a governance structure that is capable of doing the same.

The emergence of contributory communities around the commons is a challenge to the existing system. First, the commons becomes a challenge for the city that should enable and empower the emerging commons-oriented civic initiatives - how can a city respond to this and what are the implications of this for city policy? Also, how could the market sustain the commons and create livelihoods for the contributors? Last, could civil society organizations, which still have bureaucratic forms of organization and management that are not in line with the commons initiatives, adapt to this context? Another challenge posed to the city as a commons is how resources are governed. For a city government, the commons represent a challenge since they constitute a new claim with regard to the exercise of power. To understand and determine governance, it is essential to take into account the features and diversity of the resources themselves, the social context and the institutions that form part of the society, each of which provide a set of challenges.

Explore the City as a Commons concept: The City as a Commons

Cities as a Commons Case Studies - Bologna and Ghent

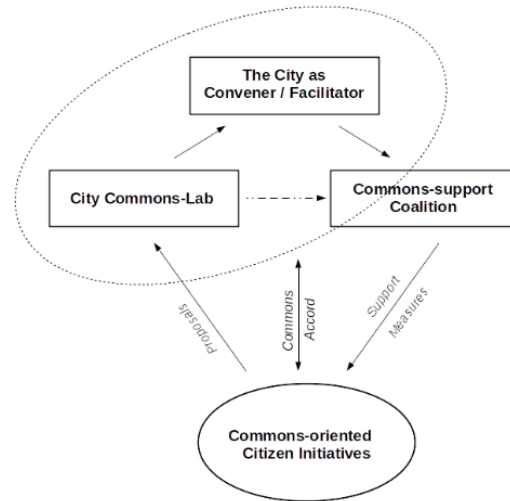| City, Country	Bologna, Italy
Initiative	The **Bologna Regulation for Public Collaboration on Urban Commons** (Comune di Bologna 2014) is a regulatory framework launched by the City of Bologna in 2014. The Regulation acts as a reference for local authorities, citizens, grassroots organizations, associations and informal groups willing to set in place collaborative processes of management and care of urban commons, providing them with clear guidelines and procedures. The Regulation has been the first of its kind in Italy, pioneering an innovative approach of collaborative urban governance which has led many Italian municipalities to follow up with similar initiatives over the following years.
Initiative's relationship to REFLOW's elements	● **Co-Creation Design & Framework**

	● **Technical Infrastructure & Softwares** ● **Collaborative Governance & Urban Strategies** ● **Pilots Framework** ● **Capacity Building**
Level	City Level
Period of implementation	2014 - ongoing
Core vision	As many Italian cities, Bologna has a long tradition of active citizenship, and it has been operating over decades as a vibrant lab for innovative urban solutions grounded in citizens engagement and active participation. While the Regulation can be seen as deeply rooted in this long-standing culture of public participation, it has also emerged from the acknowledgment - by the local authority - that new forms of public engagement, voice and agency are needed at a time when citizens' disaffection and mistrust towards public institutions are generally and dramatically increasing. The origin of the Regulation can be officially dated back to 2012, when the municipality started to implement three small scale experiments of public-people collaboration. Thanks to the positive results obtained, the municipality followed up with a specific work aimed at developing a regulatory framework allowing to scale up this type of collaboration at the whole city level. The Regulation defines Urban Commons as those tangible, intangible and digital goods that both citizens and the public administration recognize as functional to collective wellbeing. The overall vision that emerges from the Regulation is that of **a local authority that acts as an enabler of collective and shared responsibility over the care and regeneration of city assets, transforming the regulatory dimension from a purely 'bureaucratic' and administrative aspect, into a lever of active participation in the co-management of the urban fabric**. The Regulation has represented a cornerstone of the path that Bologna has been implementing since years, towards the creation of a **'collaborative city' that leverages creativity, energy and strengths from the last mile of its own territory**.
Implementation & Governance	The Regulation is implemented via **Pacts of Collaboration**, which are formal agreements between the municipality and citizens, the latter organized into both formal or informal groups. The Pacts can cover actions of care, regeneration, reuse or management of urban commons, and each Pact clearly defines goals, duration, commitments by the parties, roles, insurance and guarantee arrangements, etc. Moreover, each Pact (and the Regulation

itself) puts strong attention on the topic of co-responsibility, highlighting that citizens-led initiatives shall be understood as additional and integrative actions that by no means substitute the role and responsibilities of the municipality. Instead, they are seen as a means to make public-led actions more personalized and tailored to actual needs, as well as to intercept new needs and demands from the bottom.

Proposals leading to Pacts can emerge from either the municipality itself or from citizens; yet, to date, the majority of Pacts have been signed from bottom-up proposals. In turn, proposals are made published via the online platform **Iperbole**, which works as a **one-stop-shop for participation and collaboration initiatives**, including access to open data and participatory budget voting. To date, the main 'urban commons' and related actions covered by the Pacts include green spaces and squares, public kindergartens, 'social streets' and crowdfunding initiatives, educational activities, creation of digital platforms to support commons-based projects, among many others. For each initiative, the Municipality makes available a small budget to cover expenses related to basic equipment and insurance (for a total amount of around 150,000 euros each year), as well as a **dedicated staff** in charge to work as the interface between the citizens and city offices of relevance throughout the development of the initiative, from co-design to implementation. Importantly, a **specific office** (Active Citizenship office) is in charge to manage the Pacts and their actual development, mainly constituted by an Urban Coordinator and six neighborhood reference points - one for each neighborhood in Bologna. This governance structure helps keep the development of the initiatives smooth, while maintaining continuous dialogue between citizens and the local authority. Although at its launch the Regulation did not envisage a specific roadmap with a predefined set of indicators, the municipality has been following a strong **learning by doing approach**, improving from time to time particularly in terms of governance approaches and capacity to adapt to an increasing vibrant and collaborative local ecosystem. Nonetheless, over time, a specific monitoring and evaluation system has been set in place, reporting on key data and aspects such as number of initiatives, locations and neighborhoods covered, type of actors, typology of initiatives, etc.

Results, Impacts and learnings	To date, more than 400 Pacts have been signed and +200 are currently active, covering initiatives and actions across the whole of the city. These numbers indeed prove the success of the initiative, as well as its capacity to unlock and fuel the co-creation and co-generation capacity of the city and its actors. Importantly, the Regulation has been key to **unlock an open-ended process of institutional learning and adaptation**, which in turn has led to new initiatives that have further enriched the Regulation itself, while generating positive spillover effects over sectoral policies. A major example is provided by the Civic Imagination Office, set up within the Fondazione Innovazione Urbana (in turn participated

by the City and the University of Bologna). The Civic Imagination Office acts as a **permanent lab whose goal is to experiment with and support wide participatory practices in response to contemporary urban challenges**, with particular attention to the involvement of people who may have fewer chances to have their say in participatory practices. Furthermore, more recently, the City has established the so-called '**Neighborhood Labs**', which operate as place-based hubs of meeting, convening, discussion and activators of projects, with a transversal approach that pursues integration across sectoral policies. Indeed, all these initiatives depict an overall attempt of the city to foster and empower legitimacy and trust in new ways, investing heavily in 'proximity' approaches as well as in tools of public communication and reporting towards citizens.
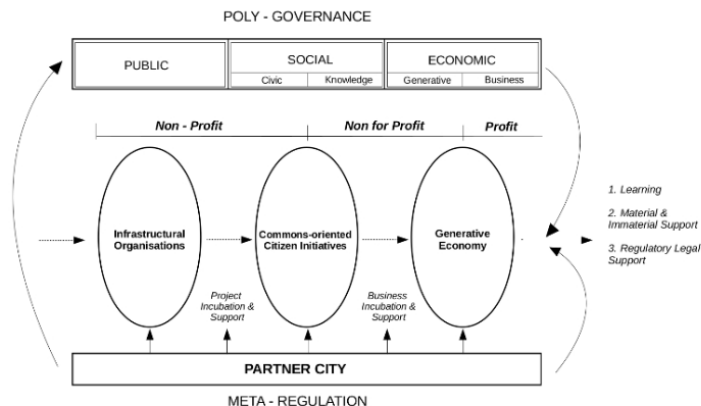
City, Country	**Ghent**, Belgium
Initiative/ policy	In 2017, the City of Ghent commissioned and financed a **Commons Transition Plan** (Bauwens and Onzia, 2017). The main aim was to document the emergence and growth of the commons in the city and to identify strategies and policies in support to the empowerment of such initiatives. The study included the mapping of 500 commons-oriented initiatives in Ghent; 80 interviews with commoners; 70 questionnaires; and 9 open workshops divided per theme (e.g. food as a commons, transportation as a commons etc).
Initiative's relationship to REFLOW's elements	**Co-Creation Design & Framework** **Collaborative Governance & Urban Strategies** **Pilots Framework** **Capacity Building**
Level	City level
Period of implementation	2017 (Plan development)
Core vision	The City of Ghent has long invested in enhancing participation and co-creation. During the past few years, the municipality has been constantly re-examining its own role *vis-à-vis* the fast growing number of commons-based initiatives across the city, investigating new ways of supporting and funding. The key question underpinning the study was **how to develop a mix of political, relational and regulatory framework** for the local government and its citizens, so as to facilitate the further development of the commons in the city.

	The study well documented the existence of plenty of commons initiatives in all sectors of human provisioning, in turn evidencing the presence of forms of '*do-ocracy*' based on both individual and collective contribution. However, the study also highlighted a number of barriers, including the high **fragmentation** of the initiatives, **hindering regulation**, **membership dynamics often 'closed'**, general perception of the initiatives as mainly directed towards vulnerable categories and **not as general productive resources** (Bauwens and Onzia 2017).
Implementation & Governance	Ghent is a dynamic city that, over time, has been able to create a vibrant political and administrative culture that engages many city officials at different levels. A network of **facilitators, connectors and street workers is actively engaged at micro-levels**, playing a fundamental role in terms of creation of social tissues, as well as a broader atmosphere that is conducive to civic autonomy. Indeed, this atmosphere has been crucial to the emergence and growth of the commons in the city. Moreover, the city is active in the support to bottom-up initiatives for the temporary use of vacant land and buildings, pioneering a specific policy on this and also coordinating a pan-European network of cities in the context of the recent Refill project. Acknowledging this positive and vibrant atmosphere, the Commons Transition Plan focuses on the kind of **institutional innovations** needed to further develop and support the urban commons in the city. It proposes **public-social** or **public-partnership** based processes and protocols to streamline cooperation between the city and the commoners across different sectors. The Plan proposes a concept of the local government understood as '**partner city**' which acts as a facilitator and convener of commons projects, while setting in place and maintaining an enabling regulatory framework. Among the various proposals, the plan suggests the creation of a **City Lab** that prepares a 'Commons Accord' between the city and the commons initiative. Based on this contract, the city sets-up specific support alliances which combine the commoners and civil society organisations, the city itself, and the generative private sector, in order to organize support flows. Furthermore, the plan is also proposing the establishment of a cross-sector institutional infrastructure for commons policy-making and support, divided in 'transition arenas' (i.e. food as commons, energy as commons, etc).

The City as
Convener / Facilitator

City Commons-Lab

Commons-support
Coalition

Proposals

Commons
Accord

Support
Measures

Commons-oriented
Citizen Initiatives

Source: Bauwens and Onzia, 2017

Key to the Plan is the implementation of polycentric governance arrangements which enable the creation of support coalitions between local authorities, commoners, civil society organizations, businesses and knowledge institutions.

POLY - GOVERNANCE

PUBLIC | SOCIAL | ECONOMIC
Civic | Knowledge | Generative | Business

Non - Profit | Non for Profit | Profit

Infrastructural
Organisations

Commons-oriented
Citizen Initiatives

Generative
Economy

1. Learning
2. Material &
Immaterial Support
3. Regulatory Legal
Support

Project
Incubation &
Support

Business
Incubation &
Support

PARTNER CITY

META - REGULATION

Graphic 6: Polygovernance model.

Source: Bauwens and Onzia, 2017

| Results, Impacts and Learnings | Although the Plan has been raising wide interest at international level, it has not been applied locally. Indeed, its application appeared challenging from the very beginning, requiring a massive shift in mentality, shared intents towards a courageous, yet unexplored path, not to mention the reorganization of the city administration towards more flexible, adaptable and distributed forms of governance. While Ghent is indeed a frontrunner city in terms of citizens' engagement, participation and collaborative governance, the full |

realization of the Plan probably required a political mobilization which was hard to be achieved. Nevertheless, the Plan offers valuable insights on how similar issues could be addressed in other cities; it has inspired other cities to follow on similar paths, such as in the case of Sydney with its **Commons Transition Plan** approved in 2019 .

5.2.5. The Fab City

Fab City is a global initiative supporting the development of **locally productive and globally connected self-sufficient cities**. At its core, the Fab City concept aims to change the way cities source and use materials and resources, by shifting from a 'Products in Trash Out' (PITO) model to a 'Data in Data Out' (DIDO) model. The DIDO model is not circular but spiral: materials flow inside cities, while information on how things are made circulates globally. This means that, on the one hand, more production occurs inside the city, along with recycling materials, creating added value in every iteration of a new product and meeting local needs through local inventiveness; on the other hand, the city's imports and exports are mostly found in the form of data (information, knowledge, design and code).

The Fab City project was first launched in 2011 at the **FAB7** conference in Lima by the Institut d'Arquitectura Avançada de Catalunya, the MIT Center for Bits and Atoms, the Fab Foundation and the Barcelona City Council. This initiative is open for other cities, towns or communities to join in order to collectively build a more human and livable new world, and join the Barcelona pledge: a countdown for cities to become self-sufficient by 2054. It currently includes 34 cities across the globe. In order to become a Fab City Network Member, the consortium comprises obligation to include at least one Fab Lab, civic and city council component.

In response to top-down and exclusive policies, Fab City emerged to create inclusive, holistic, and bottom-up open source solutions to meet the complex needs of the contemporary city, considering interdependencies between issues. Fab Cities are not only created for everyone: they are also co-designed collectively through an inclusive and equitable **Commons Approach** that engages all citizens and empowers them to create change. The process of co-creation and co-design is based on the Full Stack model (Diez 2018), which engages stakeholders across all levels of practice. To ensure inclusivity, technology that supports the creation of the Fab City is people-centered and also uses the Digital Commons Approach. In a Digital Commons Approach, information and technology used to create the city is both open source and open access. The Fab City also reacts to policies and practices that are marked by theoretical, hands-off approaches by testing research through a prototyping process, which focuses on innovative experimentation in pilots to prototype, test and develop solutions and particularly new relationships between stakeholders. Prototyping takes place in experimentation sites, which range from neighbourhoods to cities to whole regions, and are supported by the global Fab Lab (Fabrication Laboratory) Network and includes an international think tank of civic leaders, makers, urbanists and innovators. When prototyping, the Fab City initiative also makes specific reference to including, collaborating with and supporting small and medium sized enterprises (SMEs), a group that has faced large barriers to participating in more traditional Circular Economy initiatives.

The Fab City Global Initiative (FCGI) comprises the Fab City Network, organisations and public bodies (cities), and the Fab City Collective, which is composed by action researchers from different groups of the Fab City Full Stack model. Together, the FCGI members operate across the multiple levels of full-stack approach to change the mainstream urban paradigm. By means of the distributed Full Stack approach, the aim is to strengthen new collaborations between the government and citizens. An Advanced Manufacturing Ecosystem of urban solutions from citizens, companies, educational institutions, and governments shapes options for governance, regulatory, funding and other policy responses at city level. One example of a Fab City prototype is located at the Barcelona's Poblenou district. The neighborhood, which is considered as the city's maker district, follows a model of resilience where citizens are empowered through access to digital fabrication tools, collaborative projects and knowledge. In Poblenou, digital social innovation is fostered through the use of open technologies with the goal of transforming the district into a collaborative, democratic, inclusive and creative area for local innovation. The ecosystem is composed by a strong network of a community of workshops, maker spaces, Fab Labs, universities, research institutions, restaurants, businesses and active social movements.

Explore the Fab City concept: Fab Labs in the City: Tomas Diez at TEDxZwolle (2013)

Fab City Case Study - Paris

City, Country	**Paris**, France
Initiative/policy	**Fab City Grand Paris** (FCGP) is a local network of creators, designers, architects, urban farmers and innovators engaged in the rise of the circular and collaborative economy in the Parisian urban area. Formally established as a not for profit association, FCGP aims to show the possible scenarios of local, circular and distributed production, and the challenges and issues of a viable model at the scale of the city.
Initiative's relationship to REFLOW's elements	**Co-Creation Design & Framework** **Technical Infrastructure & Softwares** **Collaborative Governance & Urban Strategies** **Pilots Framework** **Capacity Building**
Period of implementation	2018 - ongoing
Core vision	FCGP aims to contribute to the transition towards the Fab City, supporting the creation of dedicated knowledge, capacity, infrastructure and community at the city level, while seeking continuous dialogue and cooperation across the global network of Fab Cities. In line with the concept of Fab City, the association is committed to bringing production back to cities, developing a local network of production points where shared **making**

	facilities, peer to peer collaboration and open source hardware and software help turn manufacturing into a more sustainable and democratic process.
Implementation & Governance	The **Fab City Summit 2018** set a tone for the FCGP activities in that it exemplified the need to engage people in the maker movement of Fab City. In a general sense, the core co-creation processes of FCGP happens at the association level, with inputs from public sessions. The agenda of the association is created by its members with inputs from the Advisory Board and decisions are taken by majority vote. The Advisory Board is a key source of knowledge and represents stakeholders from the Parisian Maker and SME ecosystem. This event played a crucial role in propelling key ideas and visions connected to the Fab City, as well as to support the further development of the global Fab Cities network. Each project implemented by FCGP aims to test and further develop the Fab City 'Full Stack' model, which roots in a multi-scale approach to reaching the goals of the Fab City: distributed infrastructure, peer to peer and collaborative learning, distributed design, place-based prototyping, platform-based models, polycentric governance. FCGP implements the Fab City concepts via three main stream of actions: ● **Management of shared making and urban farming facilities and community-building** engaging Parisian makers, artists, architects, innovators and passionate people - with the goal of supporting an open and vibrant movement of people across the city committed to support the spread of the values and key principles of the Fab City; ● **Training activities** dedicated to create awareness and capacity-building on open source and peer to peer production models; ● **Small and medium scale experiments and prototyping activities** which serve as action research for the Fab City challenge (Fab City Research Hub). FCGP also manages the **Fab City Store**, an online marketplace dedicated to supporting a network of responsible designers, manufacturers and resellers. Furthermore, the Association has also been active in the organization of large scale events, such as the **Fab City Summit**. Summarizing, the work is based on the key incentives of fundamental clarification of scopes and objectives, and support local initiatives. The new model of Management Board and the ongoing Advisory Board defines the focus to distribute performance and accomplishments. In a general sense, the core co-creation processes of FCGP happens at the association level, with inputs from public sessions. The agenda of the association is created by its members with inputs from the Advisory Board and decisions are taken by majority vote. The Advisory Board is a key source of knowledge and represents stakeholders from the Parisian Maker

	and SME ecosystem. Importantly to the context of FCGP, the FCGI approach to capacity building and innovation takes a multiscale approach, from citizens to policy makers. FCGP processes membership to the association using the online tool Helloasso.com. There are two kinds of annual membership offered: Supportive and active member for an organization, and Supporter member and active individual. At the association level, membership by payment is used as a method of inclusion and voting is used as a decision making method.
Results, impacts and learnings	FCGP is a good practice of how local and global actions can support and reinforce each other. The co-construction of the summit between FCGP and FCGI, the diverse partnerships in EU projects and regular contacts has enhanced the proximity between the stakeholders. The Fab City case-study shows the need to diversify the funding strategies, to be agile to both EU funds and private-public partnerships. Behind the difficulty of the ongoing system to effectively fund long term initiatives, the members of Fab City look for diverse ways to pursue their project, with the objective to be as self-sufficient as possible. FCGP highlights the fact that co-creation goes beyond workshops and relies on a coherent innovative infrastructure organised in networks, with decision-making processes and governance structures that need to be adapted to the values of the project. The fuzzy front-end of innovation is highly depending on the people involved in each node and the funding opportunities.

5.2.6. The Circular City

Growing awareness that our current linear model has resulted in over-exploitation of materials and increased pollution levels is fuelling the need for alternative production and consumption patterns. The Sustainable Development Goals (SDGs) actively encourage cities to experiment with innovative circular ideas and methods, driven by their unique social, cultural, economic, technological or regulatory contexts. According to the Ellen MacArthur Foundation (2017) – the forerunner organization in the advancement of circular economy principles and practices - "*a circular city embeds the principles of a circular economy across all its functions, establishing an urban system that is regenerative, accessible and abundant by design*". Translated into practical objectives, circular cities need to be upheld by a set of interconnected pillars (Metabolic 2017):

- Materials are incorporated into the economy in such a way that they can be cycled at continuous high value.
- All energy is based on renewable sources.
- Biodiversity is structurally supported and enhanced through all human activities.
- Human society and culture are preserved.
- The health and wellbeing of humans and other species are structurally supported.
- Human activities generate value in measures beyond just financial.
- Water is extracted at a sustainable rate and resource recovery is maximized.

Although no city has yet scaled all seven pillars in an integrative manner, a growing number of cities in Europe are showing increasing commitments to the concept of circular city. Big and small cities such as **Amsterdam**, **Rotterdam, Brussels**, **Paris, London, Glasgow, Prato** - to mention a few - are tackling specific facets and making leading strides in those areas, with articulated strategies and plans.

Cities' interest in circular solutions is driven by a set of global trends (WEF 2018). First, as urban areas expand, infrastructure and services put growing strain on the environment and limited resources must be stretched to accommodate greater activity and population. Urban economies, as complex ecosystems, can also be vulnerable to disruptions in the supply of virgin raw materials, and to high and volatile prices. **Circular practices can thus mitigate this risk by developing trade for input components**. From an environmental perspective, as more waste ends up in landfills, ecosystems already degraded by climate change, loss of biodiversity, land degradation and pollution are becoming more and more burdened, which calls for a change in redesigning material flows. From a business perspective, companies become increasingly aware of intensified demands for accountability, and the reputational threat to brands from an adverse ecological footprint. **Including circular economy principles in their business models provide opportunities to redefine value creation beyond a narrow financial perspective**. At the citizen level, hyper-consumerism has resulted in products being disposed of before their full value is extracted, increasing pressure on waste-removal processes. This trend can be mitigated by **new business models (e.g. product as a service, collaborative consumption) in which users take a more central role in creating value**. Experimentation with such models in transportation and hospitality is increasing interest in their applicability to other sectors. Finally, the **emergence of technological platforms are enabling circular economy principles to be applied on a larger scale** by improving access to information, management of materials, tracking and logistics, transparency and accountability, facilitating deployment of innovative circular solutions. Adopting a circular economy framework at city level can provide concrete benefits for various reasons. As more than 80% of global GDP is generated in cities, urban areas are indeed an ideal testing ground for circular economy models. The pragmatism and physical proximity in cities makes it easier to implement policy changes than at a state or national level, where bureaucratic structures and legislative timelines can hamper institutionalizing novel circular concepts. Cities can indeed be more agile and adaptive when implementing pilot initiatives, allowing them to stimulate change faster.

The confluence of business, citizens and government actors creates live innovation labs for addressing the complex challenges of linear economic models. This rich ecosystem of producers, consumers and intermediaries, as well as the goods themselves and the constant flow of information, create an opportunity to introduce new practices, including facilitation of the reverse logistics sector, material collection, waste processing, energy and natural resource conservation and new business models and product design that incorporate circular thinking. For instance, as technical and biological 'nutrients' become aggregated within city boundaries, they can be found in quantities worth harnessing through urban mining (Li 2015), thus becoming sources of new value creation. Additionally, as stakeholders are geographically close, this in itself can facilitate collaboration to close resource loops (Morlett 2014).

At conceptual level, the circular economy models and frameworks that have emerged recently in literature (Lieder and Rashid 2016; Braungart and McDonough 2009; Stahel 2010; Bocken et al. 2015) are very specific in scope, largely conceptual and generally targeted at the micro (e.g.: product design, Bakker et al. 2014) or meso-level (e.g.: buildings, Pomponi and Moncaster 2017). These **frameworks however lack transferability** to a macro-level, at city context. Beyond

the conceptualization and implementation of CE at city level, city policymakers are grappling with the **ambiguous relationship between the concepts of circular cities and sustainable cities** and are often unable to clearly articulate this relationship. Similarly, policymakers have difficulty grounding the concept of circular economy in day-to-day practices. The differing range of views is symptomatic of the ambiguity about what circular is and is not. A clearer understanding of CE and its manifestations in a city is needed to initiate impactful circular projects, in line with a given city's overarching future strategy (Kennedy et al. 2011).

Furthermore, specific values and principles are fundamental for the adoption of circular practices. A culture which values environmental protection, inter-generational equity, co-operation and cultural localism is more likely to adopt circular practices and by extension enable a post-material, circular society. However, current cultural norms present a real challenge to the delivery of circular practices. **Materialism and consumerism** create cultural barriers to the effective implementation of circularity (Williams 2017).

When it comes to governance, political support for a circular agenda is essential for a successful transformation. A **lack of strong political leadership** on environmental agendas is a challenge to implementing all the circular strategies. A **long-term vision** is needed for the transformation to be successful given the scale of the cultural and economic shift required to deliver a circular city. This however contradicts with the prevalent short political cycles. Constant changes to political agendas and instruments can humper investment in new business models, technological innovation and infrastructural transformation which require a long-term vision. **Public engagement** of civil society in decision-making processes and implementing circular strategies is critical to success. The co-production of solutions, involving a range of urban actors, can ensure resource consumption reduces but that strategies remain context appropriate. Yet public engagement in decision-making and implementation is still limited.

Cities are both embedded in a natural and built environment. This embeddedness greatly influences the circular potential to be adopted by a city. The **inflexibility of existing infrastructure** (due to cost of adaptation and socio-technical lock-in) can reduce the adaptive capacity of a city. For example, it is timely and costly to adapt highly centralized energy grid systems to decentralized energy systems based on renewable energy or waste (Williams 2017).

Furthermore, the circular economy is often only regarded from a waste or environmental management perspective, instead of from a wider multi-sectoral economic development perspective. The concept demands a **paradigmatic change** towards a new economic system with (nearly) zero waste that encompasses value chains in all sectors of the economy. This can only be achieved by a resource approach to the circular economy, not a waste management approach.

Constant innovation transformation makes the management process of circularity dynamic and requires a flexible and open approach. Prendevillea, Cherim, and Bocken (2017) argue that **governance in a circular city is structured by a dual approach, combining a set of top down changes and bottom up changes**. On one hand, top-down change is institution-driven (in this case municipal/local government) change such as strategy and policy decisions including public-private partnership projects concerned with developing and facilitating market initiatives. On the other hand, bottom-up change describes social movements and social innovation such as initiatives and entrepreneurial activities initiated and run by civil society, NGOs, communities and businesses. The concurrent development of these two directions, 'bottom up' and

'top down' fosters the creation of a circular ecosystem, where everyone is in the condition to contribute, with ideas and actions, to the transition to a circular economy.

Explore the Circular City concept: **Views about Circular Economy & Circular Amsterdam - Marjolein Brasz, Amsterdam Economic Board (2018)**

Circular City Cases - Brussels, Amsterdam and Prato

City, Country	**Brussels**, Belgium
Initiative	The **Brussels Regional Programme for the Circular Economy** - BRCPE (in French PREC) is Brussels' central circular economy initiative. Launched in 2016, it aims to turn environmental objectives into economic opportunities that will optimise the use of resources, create new jobs and markets, and add value for local communities.
Initiative's relationship to REFLOW's elements	**Co-Creation Design & Framework** **Technical Infrastructure & Softwares** **Creating & Managing Circular Flows** **Collaborative Governance & Urban Strategies** **Capacity Building** **Communication**
Level	Regional level
Period of implementation	2016-2020
Core vision	The Brussels government, in its 2025 Strategy, outlines its vision for the circular economy as deeply anchored to the concept of **environment as a key resource for creating new jobs and markets, as well as a means to contribute meaningfully to citizens' wellbeing**. The intention was to formulate a clear and mobilizing vision, able to operate as a vehicle for change that federates the actors of the territory and guide them towards a common goal. The Strategy acknowledges the need of managing city resources in a holistic and comprehensive way, looking at the city as a living ecosystem. The regional strategy aims to bring this holistic vision of circularity, and to offer a practical translation via involvement of different ministerial competencies (environment, economy, employment, training, scientific research, waste management, etc.), as well as of different actors (public and private) at regional and city level, with a view to responding to cross-cutting challenges alongside sectoral policies.

Key to the development of the Strategy has been a first **study on Urban Metabolism realized in** |

	2015, which offered an evidence-based picture of material flows circulating in the city-region. The study helped identify the materials mostly suitable for circularity, particularly in the construction field. On the basis of this study, the Brussels government undertook an expert consultation to refine and improve the strategy and its action plan. During this process, five priority sectors were identified, namely in **retail, logistics, waste and resources, food, construction, and the built environment,** and **111 measures** got approved spanning pilot experiments, policy and regulatory measures, business models innovation measures, among many others.
	The Programme was officially launched in 2016, as a joint initiative of three Ministers - i.e. Housing, Quality of Life, the Environment and Energy; Economy, Employment and Vocational Training; Waste Collection and Treatment and Scientific Research.
Implementation & Governance	The Programme is articulated into the following strategic goals: ● to promote the **relocalisation of production** within Brussels' borders, boosting new entrepreneurship and jobs in coherence with local environmental policies, as well as adaptation and resilience of enterprises; ● to stimulate **technological and organizational innovation**, the creation of new products and urban circular economy services; ● to promote **waste prevention, safe collection, and reuse of products at the end of their first life**, particularly via optimization of business flows through industrial ecology. These goals are pursued via 111 measures articulated across four axis: 1. A cross-functional approach which mainly concentrates over the creation of a favourable regulatory framework; 2. A sectoral approach which targets the five priority sectors mentioned above; 3. A territorial approach which seeks to integrate the circular economy at the local level, fostering new urban economies; 4. A multi-stakeholder governance approach which supports the programme by fostering multi-actor dialogue and coordination. Among the 111 measures developed in the plan, we highlight the following actions: ● **Policy development measures**: The Circular Regulation Deal brings together private and public actors in topic-specific workshops to identify legal and administrative barriers to the circular economy transition. Topics for discussion range from the use of space and buildings, to the designation of waste. This action is supported by legal and administrative experts. ● **Business support measures**: Be Circular – Be Brussels enterprise call offers advice, financial and marketing support to entrepreneurial circular economy projects that are economically viable and beneficial for local employment. An annual call for projects is issued with a budget of approximately EUR 1.5 million; between 2016 and 2018, 60 projects have been funded. Other measures include coaching services to business incubation and acceleration, as well as the establishment of the Circular Economy cluster CircleMade.Brussels and Innoviris' living labs for circular economy research projects. ● **Training and capacity-building measures**: The Circular building training tools offer circular economy education modules for Brussels and construction workers. They are run

by the Brussels training centres CDR-BRC and EFP as the MODULL 2.0 and BRIC projects.

- **R&I measures**: An academic chair in urban metabolism & circular economy was created at the Brussels Free University to link private and public Be Circular participants with academia. It also allows urban metabolism studies to be integrated into the evolving strategy.

A budget of € 12,839,500 was allocated to the implementation of the initiative as part of the 2016 budget of the Brussels-Capital Region, this in turn stemming mainly from environment and innovation budget streams. The budget is reviewed annually according to needs and priorities. Moreover, several projects referred to in the Program have been or are funded by the European Regional Development Fund (ERDF).

The programme has been designed with **clear objectives, milestones and KPIs** which are monitored and evaluated every 18 months by a specific Steering Committee. KPIs are mainly regulatory, business and work-related, though there is an effort in place to create an evaluation framework able to capture the broader, multiple benefits stemming from the transition to the circular economy.

The governance of the programme involves multiple public and private actors, along with 3 regional ministries, 15 public administrations, regional advisory committees and around 60 stakeholders between businesses and social organizations. A Steering Committee has been created to strengthen multi-stakeholder coordination, which is also in charge of monitoring and evaluation. The Coordination Committee ensures day-to-day coordination and management and supervises the implementation of the actions also via regular reporting. This inclusive approach has created a strong sense of ownership and helps ensure the initiative is resilient and systemic.

Results, impacts and learnings	After 18 months of implementation, the average rate of achievement of the measures is 45%. Only 14 measures are yet to start, while 20% of the measures are fully completed. Overall, 196 people belonging to 91 organizations take part in the development of the programme, and 49 cross-sectoral collaborations have been already set in place. The programme has indeed contributed to foster inter-ministerial governance approaches, developing collaborative and multi-stakeholder networks that in turn support pooling of capacity and resources around a shared vision. The programme has been developed with a strong learning by doing approach, which regularly convenes all stakeholders in exchanging lessons and identifying rooms for improvement. Thematic coordination meetings are generally perceived as useful occasions to create and build trust, as well as to spot opportunities of joint effort. A mixture of top down centralized coordination and bottom-up participation has also helped create a positive climate for cross-cutting innovation. The programme has been framed primarily as an economic development tool, with a strong focus on businesses, including start-ups. The demand side is not directly targeted, therefore, citizens, users/consumers are not the main target of the programme, and not directly integrated in the co-

	creation aspects of the programme nor in its objectives. Instead, the consumption aspect mainly falls within the resource management and waste plan, which runs in coordination with the circular economy programme. A number of weaknesses have been identified from the first rounds of evaluation, including in terms of sectoral approaches that still persist, as well as the scale of intervention which, for certain sectors and themes, is perceived as not particularly effective. Moreover, the lack of consumer involvement in the programme is likely to limit the impact of the programme in the long run. Furthermore, other weaknesses have been identified in a general fragmented knowledge, at the administration level, around the circular economy concept, as well as in the difficulty to turn the various actions of the programme into clear mandates across its organizational chain. In this respect, efforts are in place to understand the feasibility of specific circular economy professionals operating across departments, as well as the structuring of external facilitators acting as 'hubs' of connection and convening across the plethora of stakeholders.
Link(s)	**www.circulareconomy.brussels**

City, Country	**Amsterdam**, Netherlands
Initiative/policy	The City of Amsterdam has committed to the circular economy as a key pillar of its medium and long term sustainability strategy, as presented in the Sustainability Agenda adopted in 2015. The Agenda sets the **ambition for Amsterdam to become a global leader in the transition to the circular economy,** leveraging wide collaborations with all the plethora of city actors and 'reinforcing energies and powers of perseverance already present in society'. In the same year, the City commissioned a comprehensive report into the potential for transitioning to a circular economy that was presented in the publication **Amsterdam Circular: Vision and Roadmap for City and Region** (City of Amsterdam 2016). The report shows that a circular economy offers new opportunities for the city, identifying areas in which circular business models can be applied and highlighting strategies to accomplish practical implementation of sustainable solutions. Within a clear and well-articulated strategy for long term sustainable urban development, the Municipality has been pioneering an **experiments-based approach** to the circular economy, supporting a constellation of both public and private-led projects and initiatives. One example is the **Circular Buiksloterham programme** (Metabolic, Studioninedots, and DELVA Landscape Architects 2015) promoted by the Municipality with the goal to create a circular urban district in a former industrial district. The programme serves as an incubator for circular, smart and biobased development, developing across multiple sectors and domains such as energy, biodiversity, quality

	of life and mobility.
Initiative's relationship to REFLOW's elements	● **Co-Creation Design & Framework** ● **Technical Infrastructure & Softwares** ● **Creating & Managing Circular Flows** ● **Collaborative Governance & Urban Strategies** ● **Pilots Framework** ● **Capacity Building**
Level	District level
Period of implementation	2015-2034
Core vision	The vision underpinning Buiksloterham is to give life to a circular, smart and biobased district with exemplary performance on a set of systemic measures of urban development and environmental quality. This vision is articulated into eight overarching goals spanning energy self-sufficiency, zero waste with a near 100% circular material flow and recovery from waste water, regeneration and restoration of natural ecosystems, zero-emissions mobility, vibrant local economies, high quality and livable environment that are inclusive and respectful of diversity. The vision of a Circular Buiksloterham therefore reflects in an area of continuous innovation and experimentation through a strong civic engagement and a resilient local economy.
Implementation & Governance	For the purpose of understanding the current scenario of material flows in Buiksloterham and Amsterdam at large, the Metabolic's Urban Metabolism Scan methodology was applied in the territory. A comprehensive picture of this urban area was complemented with architectural and landscape scanning and a series of stakeholder interviews. The study included an evaluation of energy and material flows, biodiversity, environmental conditions, socio-economic factors, an assessment of local stakeholders, policies and strategic plans, and the health and wellness of citizens. The urban metabolism scan allowed the stakeholders the fundamental inputs to develop a vision for a circular Buiksloterham, an action plan and roadmaps identifying key aspects and its potential interventions. **Buiksloterham's Action Plan** provides a framework for a long-term transformation to be achieved through clear steps. Such steps are prioritized in terms of their potential impact and provide further insight into the potential pathways for achieving the vision. Actions fall under a plethora of domains, including energy and material flows, biodiversity, environmental conditions, socio-economic data, assessment of local stakeholders, policies and strategic plans, and factors that may influence health and wellness of individuals living in the area.

Defined through co-creation and systemic design-driven processes, the Buiksloterham's Action Plan refers to a set of resources from the local residents to developers. This clear guidance provides ambitious goals into everyday activities for local residents, both in the short and long run. The Action Plan focuses on five systemic interventions:

- **Buiksloterham Living Lab,** that reflects to the experimental part of the district by exploring new technologies and management approaches;
- The implementation of **inclusive governance structures** for managing the development and stimulate the process of Circular Buiksloterham in a collaborative approach;
- New financial vehicles and incentive structures for investment, through tax and credit schemes, the implementation of a local incentive system and the establishment of reverse tenders for challenges and goals;
- The use of urban sensing and open data infrastructure to support communication and monitoring processes to improve efficiency and transparency to the public;
- Implementation of neighborhood Action Plan, which provides up-to-date guidelines to follow the long term goal and its vision.

Circular Buiksloterham is working on the establishment of an inclusive governance structure for the successful development of a circular neighborhood. The goal of this structure is to keep a collective enforcement of progress towards the defined area's goals, following a governance system that reflects a consistent voice of both large and small stakeholders in the development process. It consists of a steering committee that guards the vision, sets the ground rules, monitors progress, decides on tenders and experiments; a territorial association with focus on stakeholder involvement and development of pilots and; and a local utility cooperative that supports large scale investments projects for energy production, mobility or nutrient recovery.

Other methods of stakeholder engagement have also been applied over the Action Plan development. One example is the Circularity Manifesto, which is a commitment from the manufacturing companies in Buiksloterham to putting in their best effort at managing the full life cycle of their products. This manifesto is part of a strategy for making Buiksloterham a truly zero-waste neighborhood, by supporting the local manufacturing of products, which should be designed for disassembly, remanufacturing, and optimized material recovery.

Results, impacts and learnings	Buiksloterham is well-known for its strong community and civic participation. District relationships have been strengthened through a huge variety of shared services including the online community portal, the use of local time-banking tool, shared mobility and sustainable self-building. Citizens in Buiksloterham participate in the care and governance of the neighborhood actively. The results presented in the Action Plan are the outcome of an interactive process of analysis, modeling, and stakeholder consultations. Many stakeholder sessions were carried out in order to co-create a shared vision for a Circular Buiksloterham and to define the interventions for the circular

	transition. A group of decision-makers was also invited to align around an Action Plan with interventions options for bringing the vision into reality.
Link(s)	**https://www.amsterdam.nl/en/policy/sustainability/** **https://www.amsterdam.nl/bestuur-organisatie/organisatie/ruimte-economie/ruimte-duurzaamheid/circular-economy/report-circular/** **https://amsterdamsmartcity.com/projects/circulair-buiksloterham**

City, Country	**Prato**, Italy
Initiative/policy	**Prato Circular City** is the official Municipal-led initiative for the circular economy in the City. Rather than shaping as a 'vertical' initiative, the Municipality has developed an integrated and holistic approach, looking at the circular economy as a horizontal priority within its long term urban agenda.
Level	City level
Initiative's relationship to REFLOW's elements	● Co-creation ● Technical Infrastructure & Softwares ● Creating & Managing Circular Flows ● Collaborative Governance & Urban Strategies ● Capacity Building
Period of implementation	2018-ongoing
Core vision	The topic of the circular economy is certainly not new in Prato, as it is deeply rooted in its configuration of textile district which has allowed, over time, to federate local SMEs and enable competitive advantages based on a larger and interconnected mobilisation of knowledge and assets. However, due to the economic boom in the 60s - which brought about rapid urbanization - and later on the increased dynamics of global competitiveness which heavily hit the entire industry, Prato has been increasingly confronted with major challenges such as lack of quality services, public spaces and green areas, degradation and environmental deprivation. Over time, the environmental issue has increasingly informed local political agendas, till to become the driving topic for the current City's long-term strategy for sustainable development. With the new

Operational Plan[7] approved in 2018, **Prato has fully embedded the circular economy in its urban agenda, with the overall goal of turning the City into a national and international benchmark for circular practices**. Key to the elaboration of the Plan has been the participation of Prato to the EU Urban Agenda Thematic Partnership on the Circular Economy (UAPCE), which provided the City with the unique opportunity to design a solid vision and strategy, as well as to participate in a specific task-force dedicated to the circular city governance. Importantly, the Plan has undergone **a structured process of multi-stakeholder participation** - called **'Prato al Futuro'**[8] -, with a dense programme of both physical and virtual meetings which have gathered the local administration, citizens, entrepreneurs, grassroots associations and the broader plethora of local actors into a collective discussion about the future social, economic and cultural development of the City. The whole process has been documented and reported openly via Prato al Futuro's platform, which also contains clear and systematized information about the main policy initiatives that contribute to the City's urban agenda.

Implementation & Governance	The City's Operational Plan is entirely based on the concept of Prato as a '*paradigmatic city for recycling and reuse practice*'. Developing in close synergy with Prato's Smart City Plan, the unique feature of this Plan lies in coupling economic growth with sustainable development, **leveraging Prato's industrial heritage and history to shape an eco-district** entirely focused on reuse and recycling practices. The strategy shall be developed through territorial marketing operations able to promote an overall image of Prato as a vibrant and virtuous territory, based on high level research & innovation, dense partnerships between local enterprises, as well as on international competitiveness. Key priorities and actions include: ● Promotion of **circular practices in urban regeneration**, via new regulation on property development and standards which favour the reuse of construction materials and opens to new uses such as for co-working and co-housing; ● Establishment of **specific economic incentives and reduced taxation for service-based reconversion** of previous industrial buildings, as well as for **virtuous firms** that adopt circular practices; ● Improvements in the calculation and application of punctual tariff mechanisms; ● Improvement and extended adoption of **green public procurement**; ● **Regulatory improvements** in specific areas such as water waste and textile waste, also via close collaboration with UAPCE; ● Identification of '**paradigmatic areas**' in the city which shall operate **as testbeds for circular and greening experiments**. In this context, we shall mention the Urban Innovative Actions project 'Urban Jungle', where Prato is currently experimenting with green facading intervention in a number of city areas.

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[7] Operational Plans are one of the most important tools of urban planning for Italian Municipalities, regulated at the national level.

[8] See: http://www.pratoalfuturo.it/

The Municipality has approached the circular economy within a broader objective of environmental sustainability, coupling specific circular-related interventions with greening and climate-change related initiatives. In this respect, it is worth mentioning the urban forest programme developed by the Municipality in collaboration with neurobiologist Prof. Stefano Mancuso, which is currently setting a framework for measuring and assessing the multiple impacts stemming from circular and greening interventions, and their key contribution to health prevention and climate change resilience.

The Municipality has also invested heavily in communication, awareness-raising and outreach measures; the **RECO Festival**[9] held in 2019 represented a first occasion to test the viability of large events as a means for convening actors and support wide reflection and exchange about the circular economy. The success of the event led Prato to further develop the Festival as its annual showcase on the topic, with operations currently in place to scale it up to the regional level and to all regional districts, in close collaboration with the Tuscany Region.

When it comes to the governance, the Municipality considers collaborative governance as a key precondition for the success of the strategy. **A specific mandate for circular economy has been created, managed within the Department for Urban Planning and Management**. A multidisciplinary team from different departments is overseeing and coordinating the development of the Plan; moreover, this same team participates in the work of UAPCE, ensuring that inputs are provided to the European Commission based on evidence and learnings. Locally, the governance structure attempts to follow a **polycentric model**, with the establishment of a number of thematic working groups which, depending on the topic, include different actors from industry, research, social economy and citizens associations. This model also makes use of **living labs** to support wide involvement, participation and constant dialogue with citizens. Overall, the Municipality plays a c**oordination and steering role, also making particular effort in documenting and openly reporting the whole process**. Importantly, the City is also leveraging these working groups to facilitate a better preparation of the whole territory to the next EU programming period, making sure that all actors are ready to **respond to the Green New Deal with competitive proposals that are in line with the City's Urban Agenda**.

| Results, impacts and learnings | Although the development of the initiative is still at initial stages, a number of preliminary insights appear relevant when it comes to how 'infrastructuring' integrated strategies for the circular economy at the city level. First, the City has been successful in promoting a **renewed urban identity and boosting a narrative that, while acknowledging its industrial past, attempt to project the latter into the future** through new meanings and understanding. The emergence of dedicated co-working spaces, shared making facilities, new projects and a vibrant community of young makers and entrepreneurs over the past few years can be seen as a result of the efforts |

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[9] See: http://www.recofestival.it/

	made by the Municipality to create an enabling and supportive environment in this thematic domain. Furthermore, the approach to the circular economy as a **horizontal topic of the City's urban agenda** has been key to pooling resources and favour integration and shared intents across city departments; the recent UIA Urban Jungle project, the participation to the Urban Agenda Partnership on the Circular Economy or the collaboration with Prof. Mancuso and architect Stefano Boeri in the context of the City's urban forest programme, are all pieces of a broader 'puzzle' that the City is developing towards sustainable and innovative urban environments, **leveraging capacities and strengths that are diffused in the territory**. In this context, it is also worth mentioning the specific effort led by the Municipality for creating **sound, multi-dimensional impact frameworks for measuring and assessing the multiple benefits stemming from circular and greening initiatives**, in order to foster evidence-based understanding and open rooms for new investments and co-management regimes of urban assets. Lastly, in terms of governance, the adoption of **multi-thematic working groups** can be mentioned as a good practice to involve a variety of actors in the construction of partnerships and shared interventions, which shall also boost **capacity-building and territorial coordination in the face of the next EU programming period**.
Link(s)	http://www2.comune.prato.it/piano-operativo/ http://www.pratoalfuturo.it/

6. Practical insights for collaborative governance and cities' circular transition

6.1. Methodological approach to the development of insights and recommendations

The topic of 'circular city governance' is relatively new, as it generally reflects the initial stage of the broader 'transitioning' phenomenon to circular cities across Europe. While the circular economy per se has already reached a well-developed level of conceptualization and analysis, concrete circular experiments in cities (especially municipal-driven) generally appear at designing or 'prototyping' stages, with relatively few cities that have already reached mature developments (Jonker and Montenegro Navarro 2018). While this limits the possibility to build our own reflections on governance based on evidence-based insights, we recognize that cities across Europe are active since decades in the development of innovative policies addressing the major challenges of our times, and indeed hold a unique knowledge and experience capital when it comes to 'good governance' and effective policy-making. As mentioned above, exploring such knowledge capital has been a key pillar of our work, in order to fuel and enrich the debate with possible new insights and perspectives.

With this in mind, this section aims to highlight a number of preliminary indications for infrastructuring creative and collaborative governance arrangements at urban level, enabling in turn a systems-driven and holistic transition to the circular city.

The insights provided are built on desk research covering the topic of circular city governance, combined with a number of interviews with experts from different organizations (including OECD, P2P Foundation, Universities, Cities' officials and technical figures, consultancies and local enterprises across Europe), as well as with a 'loose' cross-comparison of the case studies presented in this Report. When it comes to desk research, a number of recent studies provide well-structured indications for 'good governance' in the circular city; in particular, the 2018 EIB-funded study *'Circular City Governance: an explorative research study into current barriers and governance practices in circular city transitions across Europe'* (Jonker and Montenegro Navarro 2018) offers a comprehensive set of specific indications and suggestions, with the specific goal of supporting the work of the EU Urban Agenda Partnership on the Circular Economy. Besides, Ellen MacArthur Foundation has developed a rich library of tools and resources aimed at supporting local governments in the definition of circular economy plans and strategies (Circular Cities Project Guide); amongst them, the 2019 Report *'City governments and their role in enabling a circular economy transition'* (Ellen MacArthur Foundation 2019) offers a straightforward framework of policy levers that may turn out to be key for enabling a meaningful transition to the circular economy. Furthermore, we have considered a number of specific studies and conceptual frameworks for collaborative governance, including environmental governance and conflict resolution (Agrawal and Lemos 2007); collaborative governance (Ansell and Gash 2007); cross-sector collaboration (Bryson, Crosby and Stone 2006), quadruple helix governance (Carayannis and Campbell 2009); Integrative Framework for Collaborative Governance (Emerson, Nabatchi and Balogh 2015) and polycentric governance for urban commons (Iaione and Foster 2016; Bauwens and Niaros 2015). Lastly, we found particularly relevant the work developed by Prof. Ezio Manzini and DESIS Network around the concept of Collaborative Cities[10], which offers a design-driven perspective to structure creative and collaborative urban environments for collective city-making. Therefore, what follows is an attempt to build on the insights provided by these different perspectives on collaborative governance, and to rearticulate them into a preliminary governance framework for REFLOW.

6.2. Towards the REFLOW Collaborative Governance framework for the circular transition

In setting the boundaries of the REFLOW Collaborative Governance framework, our reflections have been rotating around the concept of *infrastructuring*, understood as '*the socio-technical scaffolding around which organizational and personal collaborative networks and relationships are built, including the ways of working, structures, artifacts, activities and attitudes that contribute to creating a supportive framework for both present and future collaboration*' (Thorpe and Manzini 2018). This concept is particularly useful as it may help frame and design collaborative governance arrangements that, while coordinating and organizing actors, assets and resources around pre-identified goals and paths of change, **leaves the space open to new initiatives and projects to emerge and feeding into the system over time**. In other terms, our interpretative lens of collaborative governance goes towards the definition of a *loose* **coordination framework that organizes collaboration across three main dimensions or layers of infrastructuring -** *strategic, operational and relational* **-, these interacting continuously with each other and contributing to forming the actual shape of the social, cultural and economic fabric of the city**. When it comes to creating a circular and regenerative city, this framework can help organize,

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[10] See: https://www.desisnetwork.org/2018/03/28/the-making-of-collaborative-cities-ezio-manzini/

activate and coordinate not only those key resources that are deemed essential to kickstart the transition - and which might be articulated via a more top-down approach led by Municipalities -, but it can rather account for the constellation of all those projects - often citizens-led and bottom-up - that can meaningfully contribute to the transition itself. Therefore, this framework largely looks at collaborative governance as a means for inclusive and participatory circular economy in urban contexts, leveraging all assets and strengths that may exist in cities. Moreover, the framework attempts to take into account the **processual dimension of urban governance**, concentrating not only on how the three layers entrench and mutually reinforce each other, but also depicting **an open-ended design process that embeds learning by doing as a means to improve scale and scope of collaboration over time**.

Our preliminary framework is shown in the figure below (Figure 2).
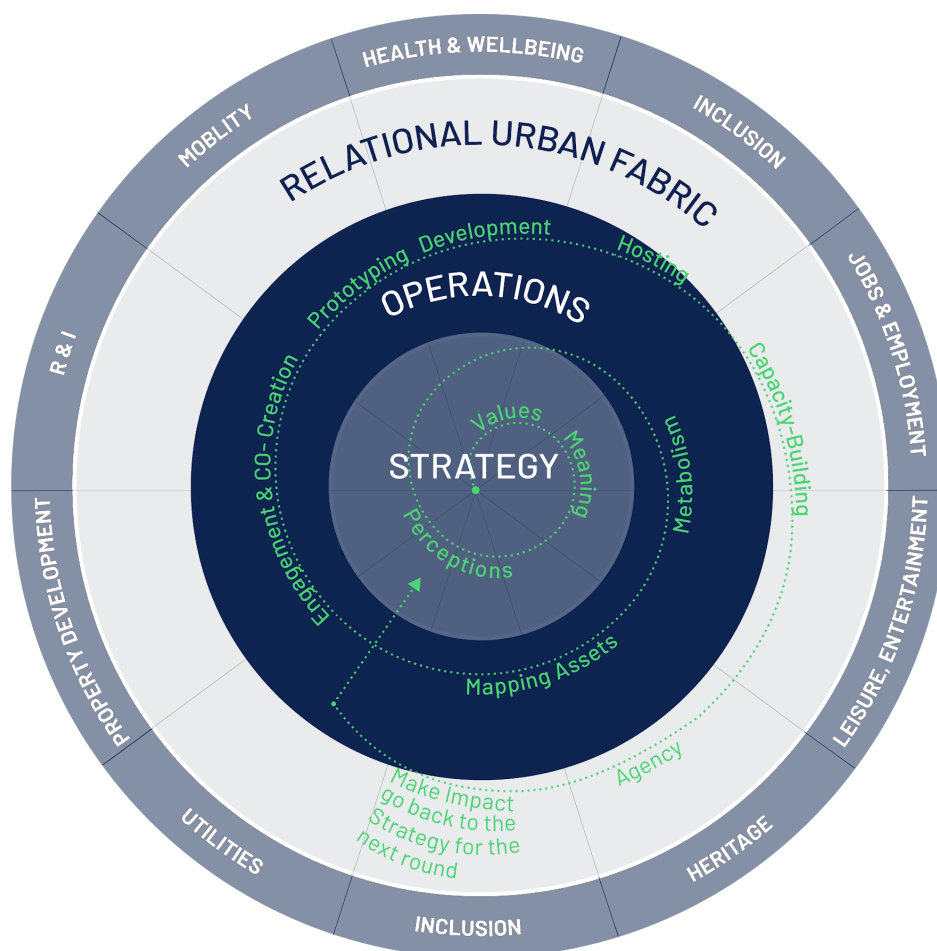
Figure 2. REFLOW Collaborative Governance Framework

The framework is depicted as a pie chart where the segments reflect the different sectors traditionally governed by cities[11], while the three concentric circles describe the three layers of the infrastructuring action:

- **Strategic**: which starts from recognizing a set of external drivers, and further translates them into a strategic vision and roadmap;
- **Operational**: which covers all the various operations and tools - regulatory, economic, tech and knowledge assets, etc. - that help turn vision and roadmaps into concrete actions;
- **Relational**: which covers softer elements such as awareness, values, trust, capacity-building, and that can also be seen as the outcomes stemming from the articulation and deployment of the two previous layers.

The spiral describes instead the process of going through the three layers as an open-ended process, adopting an overall iterative method that, in line with the REFLOW approach, uses 'portfolio experiments'. These are in turn conceived as small scale experiments that allow to test circular initiatives in one or more sectors, and further expand and scale them up at every iteration. The spiral also reflects an open-ended process directed towards expanding the level and scope of collaboration at every iteration, onboarding new actors over time, deploying new activities for different audiences and/or allowing new initiatives that emerge from the bottom to plug-in in the system. So conceived, this framework may serve as **a general map** for Cities to organize a clear, yet flexible transition root, as well as a 'checklist' to make sure that all ingredients for an effective transition to circular and regenerative cities are considered and actively explored.

Current Limitations and Future Work

This framework shall be considered as preliminary and not exhaustive of all the dimensions that might be relevant in terms of urban governance and collaborative governance for the circular transition. Moreover, the framework does not provide any indications in terms of how collaborative governance can look like as a whole, and how it can develop across the three layers identified. Instead, it limits itself to set a starting boundary of dimensions that may turn out to be key when designing collaborative governance frameworks.

Indeed, collaboration can take plenty of forms, and be developed according to different goals. As we have generally seen across the different city concepts presented in the previous section, collaboration can range along a spectrum that goes from service efficiency and governments' better performance, towards unlocking collective intelligence and capacity to respond to shared problems and issues. It can happen through bridging and connecting actors via more formal arrangements such as public-private partnerships, or by building on soft processes of 'engineered serendipity' in self-organization and self-coordination. Accordingly, every dimension identified within each layer - technology, regulation, vision, narrative, etc. - can be approached with different levels of intensity, depending on the level and scope of the collaboration that we aim to achieve and - all in all - according to which ultimate city vision. **Exploring and defining the actual shape of collaborative governance across the three layers and their own dimensions (with the new ones that may emerge as the project evolves) is exactly the next step of our work, which will require close cooperation with the REFLOW pilot cities**.

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[11] Importantly, the sectors identified are to be further interrogated over the course of the project, to make them tailored to the pilot cities as well as to their specific policies and initiatives in the field of sustainable urban development and circular cities

To help you, tips and recommendations are organized and described according to the three layers of infrastructuring. For each of them, we provide concrete examples stemming from the case studies, in order to facilitate exchange of practices and approaches, and foster reflection around opportunities and room for transferability. Similarly to the framework described above, the indications that follow should be considered as preliminary and not exhaustive of the complex array of factors that may characterize urban governance per se, and its role in enabling the transition to circular cities. For now, such indications shall serve a starting ground for conversation and reflection for the REFLOW pilot cities, coherently with the current design stage of the project. In the course of the project development, we will have the chance to collaboratively explore and 'test' some or all the indications provided below, in order to improve and make them tailored to the concrete challenges, barriers and opportunities that REFLOW cities face.

6.2.1. Strategic infrastructuring

Essential 1 | *Build a shared definition and narrative around your circular city vision*: Working on a **shared definition** of what the circular economy is and how it might look like in a given city is fundamental to boost common understanding and coherence in goals and actions. Cities are uniquely positioned to 'test' official definitions in their everyday operations, and to eventually enrich them according to their strengths and opportunities. Cities that have developed frontrunner circular economy plans have often gone through **structured participatory processes**, which in turn have involved a wide array of non-governmental actors in the definition and design of the plans themselves, and hence in a shared construction of meaning and understanding. Moreover, the definition of an **engaging narrative** that is accessible and attractive for different stakeholders also appears as a crucial factor. In this respect, cities should develop narratives that go beyond the understanding of the circular economy purely in terms of waste management and environmental management perspective; **new market potentials, new enterprises and new jobs are opportunities that should be communicated more** and more clearly, for example by leveraging partnerships with local incubators, co-working, makerspaces and innovation labs that could help reach young people and startups. In this respect, it is also worth mentioning how the circular economy can be a booster for new, more sustainable lifestyles, thus offering the opportunity to develop specific services such as swapping corners in neighborhoods, repair cafés, peer to peer initiatives for food waste reduction, etc.

Examples from our case studies:

- ❖ **Warsaw 2030** has largely made use of a combination of round tables, workshops, seminars, online surveys and multi-disciplinary advisory groups, in order to combine both expert contribution and citizens' inputs. These activities have been implemented over two years, showing the importance to give enough time to wide mobilization and engagement.
- ❖ **Prato Circular City** has been developed via leveraging a number of thematic living labs (in turn managed through public-private partnerships) where each living lab has operated as a sub-community, exploring the specific challenges and opportunities related to the specific topic of reference (ex. Regulation, etc.), and convening multiple actors.
- ❖ **Copenhagen 2025 Climate Plan** has put strong attention on the creation of engaging narratives, attempting to target in particular young people and using languages and meanings that focus on sustainable and green lifestyles as 'cool' ones. This has also contributed to create micro economies of services and spaces in the City dedicated to this topic.

Essential 2 | *Design holistic and multi-thematic strategies***:** The achievement of circular cities cannot happen without specific plans and strategies that account for its complexity and the need to articulate over long terms. Yet, 'in silos' circular strategies may not be able to encompass the scale and scope of the circular challenge at city level. Increasingly, we notice how the most advanced cities have elaborated structured and articulated strategies that, within an overarching long-term city vision, often **blend and combine** concepts of circular, sharing, resilient, creative, green city (among many others), which in turn cross-cut across thematic policies and sectoral domains. This also reflects the need to drive city departments towards common objectives and hence increased integration, as a means to make the most of pooling of financial resources and thematic expertise. Indeed, this point also recalls the major challenge of organizational redesign and innovation that local governments face in order to become more flexible and adaptable.

Examples from our case studies:

❖ **Milan Sharing City** is a fundamental pillar of the broader Smart City strategy. The approach used by the Municipality – which is typical of its general policy making approach – is a 'soft' one, where a set of loose guidelines are provided in order to mobilize and activate the entire social and economic fabric of the city, going beyond a sectoral perspective. Moreover, the City is making a strong effort in mapping local initiatives and projects on a constant basis, and to facilitate networking and connection via provisioning of open databases and catalogues that foster information and awareness.

❖ As a joint effort of three Brussels' Ministers, **Brussels Regional Programme for the Circular Economy** is a concrete example that drives the circular economy well beyond the sole waste management and environmental domain, setting goals that span across business-related and capacity-building areas. In the attempt to go beyond in silos development, the Programme builds on a sound public-private governance framework, which makes use of multidisciplinary groups that involve actors from different sectors and domains.

Essential 3 | *Articulate circular city strategies with a circular hotspot approach***:** The deployment of the circular city is often approached via a hierarchy of intervention scales from the neighborhood to the metropolitan area. However, a viable circular economy can emerge only when these scales are nested. In **Brussels**, the first evaluation of the regional circular economy programme highlighted the need to territorialise the strategy through a Hotspot approach. Territorialising circular economy from emblematic places can play the role of catalyst to scale up the territorial deployment of the circular economy. A circular economy hotspot can then be defined as a relatively small perimeter (a wasteland or large plot, a neighborhood) that plays the role of strategic node in the spatial organization of current or future physical flows of the larger urban system. The hotspot approach provides several advantages: It makes it possible to territorialize the deployment of the circular economy, but without confining it to a restricted area; furthermore, the reflection on the trajectory of the hotspot can then integrate larger scales by addressing issues of market opportunities, the scale of markets, the extent of the loops for identified flows, the presence of regional actors for the operationalization of solutions. Therefore, the hotspot approach is a way of anchoring the deployment within a concrete perimeter while leaving the possibility that its activation will expand to wider or extra-regional territories. The hotspot approach also makes it possible to advance on the thorny issue of measuring the circular economy in a more anchored and less abstract way compared to a theoretical reflection for the whole city. The concrete case of a hotspot can facilitate the emergence of relevant indicators and the formulation of quantified objectives. The territorialisation of the circular economy from a hotspot perspective inevitably mobilize other actors who are not yet directly affected by the transition to the circular

economy in municipalities, neighborhoods and regional administrations. By working with them on the deployment of a concrete hotspot, this measure is then a way to "colonize" other areas of public action, including that of urban projects.

Essential 4 | *Set in place clear yet flexible roadmaps*: Defining specific roadmaps, although flexible, is of fundamental importance to coordinate all actors that have a stake in the circular economy, and to facilitate pooling of both material and immaterial assets (i.e. knowledge and financial resources, in the first instance). Effective strategies and plans for sustainable urban development are often structured across measurable objectives, and endowed with evaluation frameworks that build on a specific set of pre-identified indicators. Nonetheless, keeping plans and roadmaps open to ongoing revision and adaptation also emerges as a 'must have', in order to foster learning by doing dynamics.

Examples from our case studies:

- ❖ **Warsaw 2030 Strategy** has been built based on a number of both strategic and operational objectives that encompass the vision of the City by 2030. In turn, these objectives are implemented across a number of programmes that work in synchrony, and that follow cross-cutting, yet general, indicators. Periodically, the Strategy is subjected to collective evaluation, in order to adjust and improve it based on evidence.
- ❖ **Copenhagen and Oslo's Climate Plans** are both based on clear targets associated to different strands of activities. Nonetheless, the implementation of the Plans is subjected to constant monitoring and evaluation, with collective moments of discussion and exchange that are used to eventually adjust annual milestones and targets.
- ❖ **Bologna** has been adopting a strong 'discovery' approach in the implementation of the Pacts of Collaboration. This has allowed the City to remain alert to new opportunities, relying on a flexible governance structure that has made strong use of neighboring assemblies and participatory budget.

6.2.2. Operational infrastructuring

Essential 1 | *Understand your local system - Urban diagnostic and metabolism*: Collective sense-making of city's strengths, opportunities, existing assets and gaps is key to any strategy, as it helps build the starting baseline upon which to design, set in place actions, monitor and evaluate progress. When it comes to circular cities, urban metabolism approaches - which seek to understand cities from the lens of material and energy flows - help identify and visualize the interactions between natural and human systems in a given urban environment. The concept of urban metabolism refers to the "collection of complex socio-technical and socio-ecological processes by which flows of materials, energy, people, and information shape the city, service the needs of its populace, and impact the surrounding hinterland" (Currie and Musango 2017). Urban metabolism studies aim to address sustainability challenges and the requirements to achieve dematerialisation, decarbonisation and the closing of material loops (Musango, Currie and Robinson 2017). These studies generally include constructing indicators, identifying sustainability targets and developing decision support tools for strategies to dematerialise or decarbonise. Various methods are offered to quantify resource flows: accounting approaches; input-output analysis; ecological footprint analysis; life cycle analysis and simulation methods. Specific studies take a flows approach, in the attempt to incorporate human activities into the understanding of the urban metabolism. The cities are analysed in terms of inputs and outputs of resources, materials, and energy. As cities have typically designed their infrastructures following linear metabolisms (e.g. resource-consumption-waste), shifting from a linear metabolism to a circular metabolism perspective provides new opportunities in light of planetary resource

constraints. A circular metabolism can be shaped like a natural ecosystem with efficient consumption, recycling and reuse of resource flows (Doughty and Hammond 2004), thus reducing dependence on the hinterland and other cities.

Examples from our case studies:

- ❖ The metabolism scan in **Brussels** allowed to identify the materials that could be valued to minimize the need for new inflows. Economic activity in the Brussels-Capital Region is mainly tertiary (services, administration, etc.). With the exception of activities related to construction, the industry occupies a marginal place in the Brussels economy. The flows it generates can, however, be relatively homogeneous and have economic value. These residual materials or co-products were prioritised in the sectoral focus of the regional programme.
- ❖ The urban metabolism scan in **Buiksloterham** allowed to map material flows from an integrated perspective, via three main layers of analysis: current context, by evaluating existing activities, strategies, policies and initiatives in the area; stakeholders' vision, by identifying relevant actors, their interests and level of participation in activities; and the actual urban metabolism, which included the scenario of energy, material, ecological and socioeconomic flows and conditions in the area.

Essential 2 | *Understand gaps in data and technological assets*: While we increasingly recognize the 'systemocracy' underpinning major urban challenges, our capacity to understand interdependencies and causal loops in systems is still generally limited. Paradoxically, cities have available large amounts of data which often tend to remain in silos, and whose value is often captured by third parties and privatized digital markets. Moreover, while technological innovation is largely acknowledged as a key enabler for the circular transition, there is still poor knowledge on which technologies can be used and for what specific purpose(s) and benefit(s). Moreover, in order to manage data more transparently and effectively, citizens' participation has become crucial to improve cities' digital infrastructure, not only by allowing wide data collection and capture but also enabling citizens to take decisions more democratically and achieve improvements in public services. The interplay between circular economy, new technologies and citizens distributed intelligence can provide a fertile ground for innovation and shared value creation. When seeking to extend the useful life and maximise the utilisation of assets, technologies can provide useful knowledge about assets' location, condition, and availability, thus enabling a broad range of opportunities. While it is a hard task to predict all possibilities going forward, there are already numerous conceivable ways in which this interplay can drastically change the nature of both products, business models and city functions.

Examples from our case studies:

- ❖ **Barcelona Digital City Plan** strives for a more transparent, participatory and active governance in the city. The plan brings the importance of data and technology for transforming the city and this idea goes beyond the smart city concept. Within this plan, Barcelona City Council aimed to co-create an innovation ecosystem that rethinks a model that prioritises citizen participation. The plan includes a wide range of customised digital training and capacity-building in order to give back to the citizens' greater control and power over their data, enabling them to discuss, articulate and decide their own priorities. To achieve the goal for technological sovereignty, the City Council supports the idea of **data as a common asset**, in order to make certain datasets available to individuals and organisations. In this direction, different initiatives have been developed in the city, fostering a pluralistic digital economy based on the transformation and digital innovation of the public sector and its implication with companies, organizations, universities, people and communities.

- Accessible data may inspire and encourage municipalities and institutions to build applications based on open public data. In **Warsaw**, the 19115 City Contact Centre application was created to allow the use of open data for collecting and categorising issues in the city. By encouraging citizen participation, the city was able to develop a more efficient and transparent tracking system. Many other platforms have been developed in the city in which residents are able to share ideas to improve the public services and make decisions on participatory budget.

Essential 3 | *Develop multi-level impact frameworks*: while the benefits stemming from the circular economy are largely conceptualized in literature, there is still poor empirical evidence demonstrating how far such benefits can go beyond the purely environmental aspect. Developing multi-dimensional impact framework is thus beneficial not only to advance scientific knowledge on the topic, but more crucially is a key precondition to drive further investment, as well as to support increasing integration. For example, measuring and assessing the impact of circular practices over health, living conditions in neighborhoods, education or service provision can help improve both horizontal and vertical strategies of urban development, identifying 'cross-cutting' goals that are pursued across city departments, as well as 'cross-cutting' indicators that drive spending and budgeting.

Examples from our case studies:

- **Circular City Prato** is an ambitious policy that combines both the smart and green city strategies. The City is working in close collaboration with local universities and research centres to develop an extensive diagnostic of all green infrastructure of the city, and - based on that - to design an articulated impact assessment framework able to combine multiple benefits stemming from the adoption of circular and green initiatives and practices promoted by the Municipality itself.

- **Amsterdam** embraces the approach of a circular economy and is keen to adopt different sustainable strategies in order to reduce pollution, create a participatory environment and boost the economy. To do so, the city has been incorporating the combination of smart mobility, ICT solutions, and collaborative governance in many of its initiatives. In 2015 Amsterdam was the first city in the world to present an in-depth study on the potential for transition towards a circular economy, the publication Amsterdam Circular: Vision and Roadmap for City and Region. Its results were used to launch two programmes centred around the concept of 'learning by doing': Amsterdam Circular, Learning by Doing and the Circular Innovation programme. Both programmes went through an interdisciplinary evaluation in which were identified the main lines of the project results and the lessons learned. The **Report Amsterdam Circular Evaluation and Action Perspectives** was commissioned by the Municipality of Amsterdam and carried out by Circle Economy and Copper8. The evaluation indicates which action perspectives are possible to further accelerate the transition to a circular economy and include roles for market parties and issues for the municipality during the next years.

Essential 4 | *Establish strategic alliances for overcoming regulatory barriers*: When applied to the context of the circular economy, a number of rules, including environmental ones, can lead to the creation of legal-administrative barriers to innovation and hinder the development of new activities which are environmentally friendly. There is therefore a real opportunity to organize a process of identification of legal-administrative barriers and to develop adapted solutions. The hotspot approach mentioned above can help prioritize regulatory analysis in a specific sector or for specific materials, also via strategic partnerships with utility and service providers.

Examples from our case studies:

❖ In the context of **Prato Circular City** initiative, the Municipality is currently implementing a number of strategic partnerships at the district level, in order to overcome regulatory barriers that hinder the reuse of specific materials (ex. Wool waste) that could be meaningfully re-entered in production processes. Importantly, as a formal partner of the Urban Agenda Thematic Partnership on the Circular Economy, Prato is working in close collaboration with the European Commission and the other cities involved in the Partnership to create a more favourable environment at EU level.

❖ The **Brussels** circular economy programme is seeking to address this issue by developing a governance scheme involving the private sector. The measure seeks to identify, prioritize and provide solutions to the legal administrative aspects that are necessary for the deployment of the circular economy (through the deployment of incentives) and those that constitute legal-administrative barriers and must be eased, while still maintaining a high level of environmental protection in accordance with the standstill principle.

Essential 5 | *Develop business case scenarios*: Poor understanding and awareness around existing opportunities for business model innovation is often a major barrier to make emerging markets thrive, be they related, for example, to the circular, sharing or green economy. Combining training, awareness-raising, entrepreneurship support measures with the set-up of open source repositories and catalogues can help create a vibrant ecosystem for business model innovation, targeting both traditional and new enterprises. Moreover, existing assets such as networks of makerspaces and innovation hubs can be leveraged into 'urban programmes' for circular-based innovation, tapping into local talent and innovation champions.

Examples from our case studies:

❖ **Milan Sharing City** has invested massively in the creation of an enabling environment for the sharing economy in the city. Combining measures such as the establishment of one-stop-shop services and dedicated shared working facilities, open catalogues, incentives for young people and social entrepreneurs - while developing a transversal action of networking and community-building -, Milan has indeed become one of the most vibrant cities in Italy in terms of spreading of sharing-based models and services.

❖ **Barcelona** is a pioneer in generating new practices in the market in terms of business models that pivot on open code and open-service practices. The city has become very attractive for technological companies of many sizes as it counts with a dedicated department that supports entrepreneurs, professional improvement and job creation in Catalonia. Barcelona Activa offers a comprehensive model including technical coaching, feasibility assessment, tailor-made training and incubation programmes. These incubators have different areas of business work, including the topics of artificial intelligence, the internet of things (IoT), robotics, space technology and nanotechnology. By supporting business development, the city council promotes the creation and growth of companies with high technological impact, which contribute to economic development and to generate qualified jobs in the city.

6.2.3. Relational infrastructuring

Essential 1 | *Boost awareness through open movements of interest and practice*: Citizens awareness on the circular economy is an essential step to make it spread and thrive in cities. Specific communication on social media, campaigns and events may be valuable approaches to increase awareness and knowledge across different city actors. Many frontrunner cities are also showing major investment in annual festivals, which help convene all actors that have a stake in the circular economy, review the state of the art, create information on existing initiatives and boost a local movement

of community of interest and practice in the field. Many cities report the adoption of an 'open movement' approach that can account for experimental and learning by doing dynamics.

Examples from our case studies:

- ❖ **Prato Circular City** has invested energy and resources in the organization of events dedicated to the circular economy. The first RECO Festival organized in 2019 - gathering a large and diversified audience at both local and national level - has proven successful in gathering experiences and facilitating the development and strengthening of new networks and collaborations. This event is going to become the annual 'state of the art' event for the circular economy in the City, with plans in place to scale it up to the regional level.
- ❖ The **Green City Oslo** and its Waste Management Strategy is focusing on incentives to increase the awareness of citizens. Besides annual events, Green Friday (an alternative to Black Friday) is an organised gathering by Oslo's neighbourhood cafes and community centres. This event invites to learn about creative reuse and redesign. This initiative is supported by apps to share food, co-working spaces and repair workshops.

Essential 2 | *Develop wide capacity building*: New knowledge and capacities are critical elements for creating sound circular strategies and Plans. The circular economy defines a new field for the development of new expertise and professions, which in turn requires increased multidisciplinarity. Collaborative engineering, systemic design, strategic design, environmental engineering and management are few of many other examples of key disciplines which will require to enter in dialogue and integrate each other. The establishment of dedicated task-forces that incorporate a meaningful set of competencies may turn out to be a key factor, together with the development of specific training courses for city officials to increase awareness and knowledge across different city departments.

Examples from our case studies:

- ❖ **Brussels Regional Programme for the Circular Economy** has followed a dual approach to capacity-building, creating a specific task-force on the one hand, and simultaneously building competencies on circularity for existing roles and positions on the other hand. Moreover, Brussels is making use of facilitators who have the specific mandate to engage with different stakeholders, without being attached to one single administration. The capacity building section of the Brussels programme includes 16 measures and involves 9 training institutions. The activities carried out in these measures made it possible to train and sensitize 1,423 people in the first two years of the programme. Measures include the development of learning tools for eco-design, the establishment of pilot training for the "valorist" profession and pilot projects to include circular economy competences in qualifying education.
- ❖ **Copenhagen and Oslo's Climate Plans** have dedicated particular attention and investment over citizens' awareness-raising and capacity-building actions.

Essential 3 | *Unleash the potential of citizens and social economy organizations as active contributors towards circular and regenerative cities*: The role that individual citizens, grassroots organizations and social economy organizations can play in the transition to circular cities is still poorly understood. This also comes as a paradox if we consider that these latter organizations have been key in pioneering circular practices, well before the explosion of the circular economy debate at the international level. Practices such as 'reuse' markets, neighboring services, new socially purposeful activities, jobs and places, new alliances between firms and social economy organizations, new membership forms for community-based organizations are some examples of how the circular economy can entrench meaningfully with goals of social inclusion and social impact. Moreover, urban regeneration may stand as a crucial field where to develop meaningful,

citizens-led experiments of circular economy, creating new physical spaces that drive the latter towards to creation of new urban functions and experiences.

Examples from our case studies:

❖ **Bologna Regulation for the Management and Care of Urban Commons** is a pioneering initiative that catalyzes citizens' strengths towards the social good. The City turned regulation - often perceived as the 'boring thing' - into a driver of bottom-up participation, providing all citizens with a clear framework of action. Thanks to the regulation, more than 400 projects have been active in the city over time, many of them contributing to advance the city towards practice of sharing, reuse and recycling. This clearly demonstrated the possibility to design a loose governance framework that, while providing a common vision and some basic rules, leaves huge space to citizens' inventiveness and proposition.

❖ **Ghent** has a long history of citizens' participation and engagement. Through the Refill project, it pioneered an interesting approach to urban regeneration, leveraging temporary uses as a means for collective city-making. This has allowed many social organizations across the City to test new, also circularity-rooted activities and services. Moreover, although not implemented, the Commons Transition Plan commissioned by the City witnessed its own willingness to scale up the scope and scale of commons initiative in the City.

Essential 4 | *Hosting and Convening*: Well beyond regulatory and administration aspects, frontrunner local governments are moving towards unedited roles of facilitators and conveners. Multi-stakeholder collaboration is indeed increasingly recognized as a fundamental factor for unlocking the strengths and capacities that are largely diffused in society, and to make them converge around shared goals of sustainable urban development. Many local governments are adopting approaches of 'community of practice', organizing flexible governance arrangements that foster public-private-people alliances for experimentation, prototyping approaches and collaborative learning. Engaging and connecting local talents and innovation champions is often key to create a vibrant urban movement that can in turn support a shared sense of commitment. Similarly, leveraging already existing communities such as those revolving around living labs, fablabs and makerspaces or other innovation hubs may turn out to be as a key to achieve and amplify networks effect.

Examples from our case studies:

❖ *Milan Sharing City* initiative relies on three main topics: people, place and platform. The connection between the topics is based on the development and implementation of successful integration between physical, digital and human systems in the city to deliver sustainable forms of urban management and a more collaborative environment for communities and citizens. To achieve this synthesis, Milan City Council has encouraged the dialogue and exchange of ideas between the public, private and civic sector through communities of practice. Within this innovative participatory model a sense of shared identity is created through working and doing together. Many living labs, maker spaces and fab labs in Milan are concrete examples of communities that collaborate using digital technologies to co-create knowledge and solutions for a wide range of urban needs.

❖ **Fab City Grand Paris (FCGP)** and the City of Paris hosted the annual Fab City Summit in July 2018, an international gathering of the global community. Besides facilitating the co-creation of the hands-on and citizen centric activities, the Fab City Summit 2018 was conceived as the kick-off of the Fab City prototype areas in Paris, specifically the Fab City Campus. This event is the basis of a strategy for a series of long-term local initiatives in different urban areas that will shape Paris' future as a more locally productive city composed by several communities of practice within a circular economy strategy. Local political leaders, experts in innovation ecosystems and companies, members of the Fab City network as well as Paris' citizens had the opportunity to share their experiences and best practices during this event that was considered as a sort of ephemeral living lab.

They could interact with each other, immersed in future models of production and new way of living building new partnerships and exploring tangible activities.

7. Key Takeaways

So far, this iteration has presented the project and its context and begun to delve into the element of urban governance, particularly focusing on collaborative governance. However, our hope is that this open and iterative tool will evolve as well, expanding the resources provided according to what we experiment, co-create, test and learn across the REFLOW project.

Below, we recap the key points that have emerged from our preliminary research. Each point should be considered when approaching ambitious plans and strategies for the transition to circular and regenerative cities:

- **Takeaway 1**: The circular economy can go well beyond an economic paradigm rooted in environmental sustainability. It is an opportunity for social regeneration, social cohesion and inclusion, which can open to new socially purposeful activities, jobs and enterprises.
- **Takeaway 2**: Effective circular strategies and policies at the city level need to embrace the whole spectrum of domains and sectors traditionally governed by cities. As such, cities can be unique testbeds for overcoming 'silos' in policy-making and boost inter-departmental collaboration. Equally, they can open to new partnerships and alliances built on public-private-people approaches and governance arrangements.
- **Takeaway 3**: Citizen engagement in the circular economy is a fundamental element to igniting an inclusive transition and making it thrive. Cities are uniquely positioned to work with local communities in order to create and support a mesh of citizens-led initiatives that, all together, can form a vibrant and self-sustainable environment supporting circular and regenerative practices.
- **Takeaway 4**: No circular transition can meaningfully happen without creating an enabling regulatory framework. Cities are uniquely positioned to work with local actors in order to understand hindering factors and barriers, and thus to provide informed and aware insights at different governmental levels - with a key focus on the EU level.
- **Takeaway 5**: Tech innovation can be either directed towards corporate-led transitions, or rather support more inclusive and participatory processes that also contribute to make cities smarter. Distributed ledgers, smart contracts, smart regulations, open data and digital commons are some examples of digital assets that can be used to turn the circular economy into a ground for public value creation.

- **Takeaway 6:** Governance is not an isolated concept. It interacts with the many different elements of REFLOW-- from technological developments to skill and knowledge building and more-- and in fact depends on their development in order to be successful.
- **Takeaway 7:** There is no one size fits all solution to governance. The inclusion of different urban models and case studies illustrates the different approaches and best practices that currently exist. However, the idea is not to copy a model or initiative but rather to notice the practices in your own city and adapt the models and initiatives according to your city's own local context to best meet your needs.

Following this section, we also include an initial library of tested tools that may be able to assist your city in its first steps towards regenerative circularity.

8. Library of Tools and Methods

About this section

This section provides a series of existing tools and methods that you may use to design, activate and foster the transition to more circular and regenerative urban environments. The initial library will be continuously updated in the online version of this document as new information is found and becomes available.

We break each tool down into three sections to help you understand and make use of them. The sections cover:
- "What is it?";
- "What is it useful for?";
- And a "Description from the authors."

Why this library

The tools included in the library represent assets that have been tried and tested in other projects and initiatives. To be included, a tool must be:
- Relevant: the tool supports the REFLOW initiative to assist cities in transitioning to more circular and regenerative models
- Practical: the tool is based on, and offers, practical applications
- Accessible: the writing and graphic style can be understood by large audiences, beyond specialists
- Open: the tool is free and available to anyone interested

8.1 Systemic Design Toolkit

> ### *Quick info*
> Resource: Systemic Design Toolkit

Project: Systemic Design

Developed by: Namahn and shiftN

What is it?

The Systemic Design Toolkit was officially launched at the RSD7 conference in Turin by a collaboration between Namahn and shiftN. This toolkit provides a set of systems and design thinking tools to support a coherent, but flexible and collaborative process to understand complex problems and design more viable alternatives.

What is it useful for?

- Identifying leverage points
- Applying participatory tools
- Co-creation of solutions with different stakeholders (from government to private organisations)
- Create alignment among different ideas
- Creating visualizations tools and prototyping

Description from Authors:

The toolkit was developed from the understanding that the current society is in the midst of a fundamental shift where the conventional ways of problem solving do not work anymore. In this sense, this toolkit provides step by step and hands-on tools to analyze complex challenges and co-create systemic solutions following seven main steps:
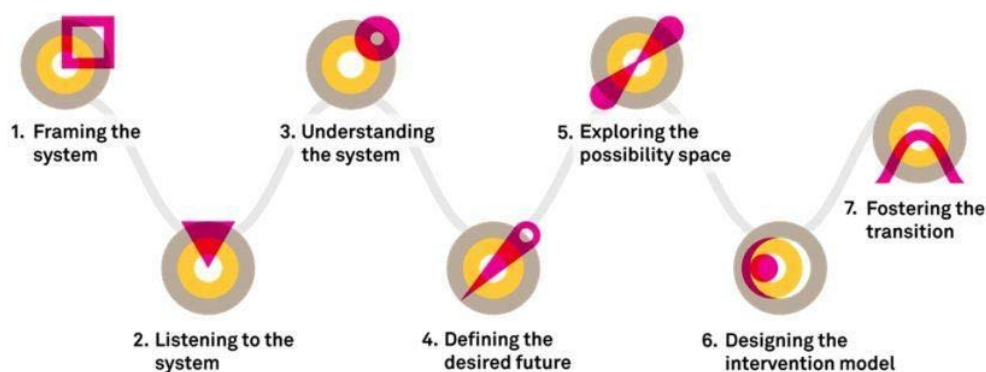
Source: Systemic Design Toolkit Framework, https://www.systemicdesigntoolkit.org/

1. Framing the system

Setting the boundaries of your system in space and time and identifying the hypothetical parts and relationships.

2. Listening to the system

Listening to the experiences of people and discovering how the interactions lead to the system's behaviour. Verifying the initial hypotheses.

3. Understanding the system

Seeing how the variables and interactions influence the dynamics and emergent behaviour. Identifying the leverage points to work with.

4. Defining the desired future
Helping the stakeholders articulate the common desired future and the intended value creation.

5. Exploring the possibility space

Exploring possible ideas for intervening on the leverage points. Empowering the ideas by working with the paradoxes in the system.

6. Designing the intervention model

Defining the engine for change and its variations. Iterating by envisioning its implementation in different contexts.

7. Fostering the transition

Defining how the interventions will mature, grow and finally be adopted in the system.

Useful Links

Explore the Systemic Desing Toolkit
Download GUIDE & TEMPLATES

Source: Systemic Design Toolkit Guide, https://www.systemicdesigntoolkit.org/
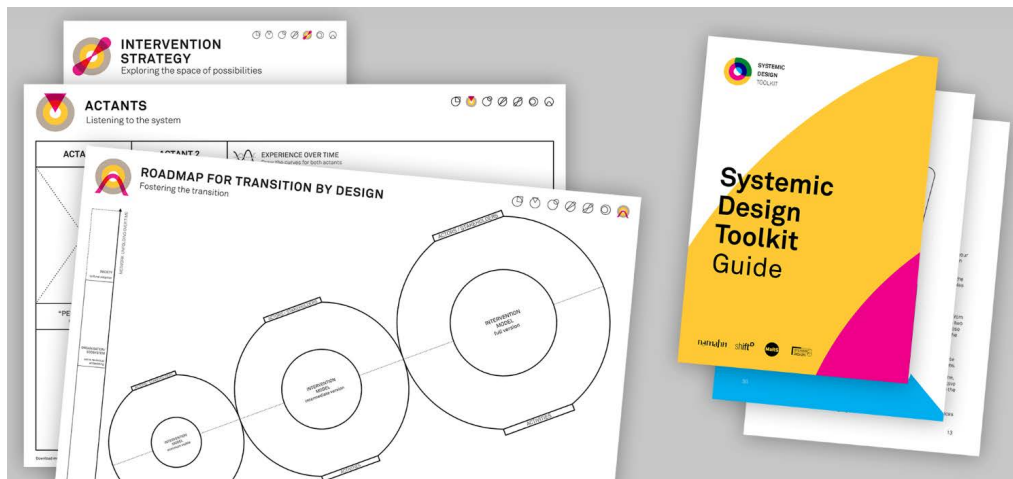
8.2 Circular Design Guide

Quick Info
Resource: Circular Design Guide
Developed by: Ellen MacArthur Foundation and IDEO

What is it?

The Circular Design Guide is a collaboration between Ellen MacArthur Foundation and IDEO, which offers circular innovation methods as well as interviews with designers, creative exercises and worksheets, case studies and links to technical tools.

What is it useful for?

- Understanding circular flows
- Engaging organizations
- Learning about design thinking practices for circularity
- Circular business models
- Regenerative thinking
- Materials mapping
- Digital systems

Description from Authors:

This guide is a free online resource that aims to raise awareness of the circular economy, nurture a "systems perspective," and share practical innovation methods.

It includes 24 methods, grouped into four areas, loosely aligned with the flow of a circular design process: Understand, Define, Make, Release. The methods include introductions ("Understand Circular Flows") and helpful techniques for those struggling to engage their organization ("Circular Buy-In"). Some adapt traditional design thinking practices to circularity ("User-Centered Research," "Rapid Prototyping," "Circular Business Model"), while others—such as "Service Flip" and "Imagine New Partnerships"—have been created specifically. Wild-card methods—including "Learn from Nature" and "Regenerative Thinking"—are designed to inspire readers.

The Circular Design Guide is packed with extras: interviews with designers; worksheets for each method; illustrative, inspiring circular innovation case studies; and links for helpful technical tools, such as material selection.
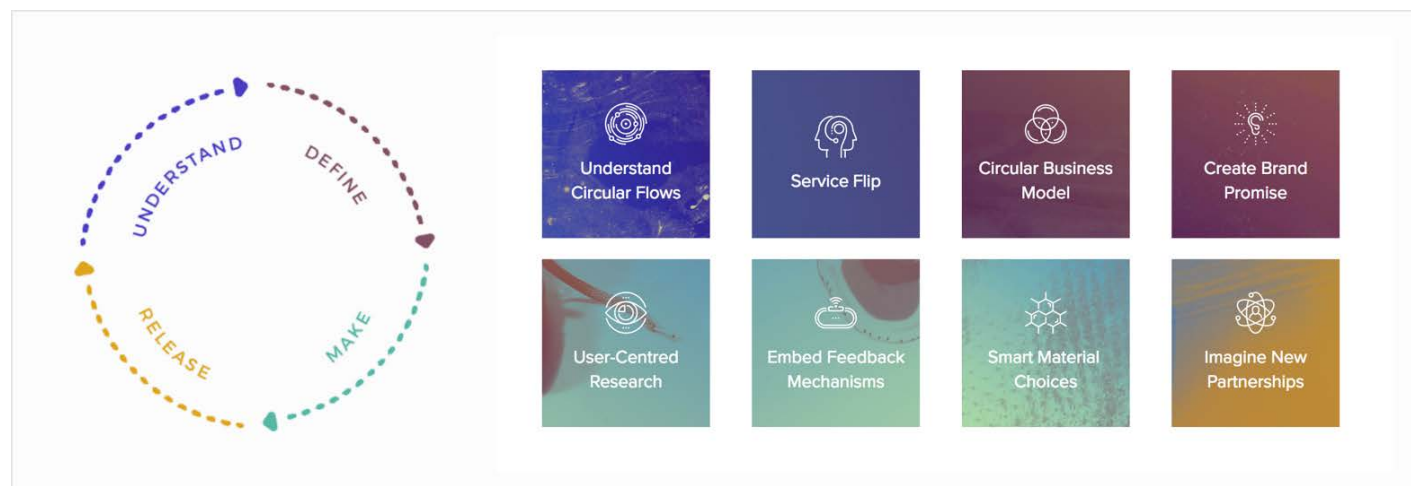
Source: The circular Design Guide Framework, https://www.systemicdesigntoolkit.org/

Useful links

Explore the Circular Design Guide

Download the ASSETS & TEMPLATES

8.3 Make Works Platform & Handbook

Quick Info
Resource: Make Works Platform & Handbook
Project: Make Works
Developed by: Founded by Fi Scott. Led by the Institute for Advanced Architecture of Catalonia (IAAC), Fab City Research Lab Barcelona.

What is it?

Make Works supports opening up manufacturing and making local, sustainable production accessible to everyone. An open access factory finder, Make Works maps local manufacturers, makers, material suppliers and workshops. The online platform allows designers, makers, artists, engineers, entrepreneurs, micro-businesses and anyone else interested to search for listings in their local area so that they can find someone who can assist them in creating, building or repairing physical things. Make Works believes that making this information open and accessible will not only connect people directly to making and repairing things, but will also democratise access to production and generate investments in local economies, skills and community: how to transition to this system is elaborated on in the project's Handbook. The Handbook specifically supports small scale, local manufacturing, or distributed manufacturing, as an alternative to the consumption of mass manufactured products.

What is it useful for?

- Mapping local ecosystems and sourcing local manufactures, workshops and materials
- Developing and supporting small scale production networks
- Environmentally sustainable systems for the future
- Accessible information about manufactures to inspire to make, build, create and repair things locally
- Setting incentives for conscious decisions about consumption habits
- Improving the quality and integrity of design and understanding how to source materials and production processes

Description from Authors:

Make Works builds small scale production networks to help develop environmentally sustainable systems for the future. From distributed production reducing the carbon emissions released in transportation and shipping; supporting local, resilient economies; through providing communities with access to tools and skills needed to repair existing things. On a practical level, simply source local manufacturers, craftspeople, workshops and materials. Create accessible information about manufacturers to inspire people to make, build, create and repair things in the world. Give citizens access to information about manufacturing means they can make more conscious decisions about their consumption habits. Improve the quality and integrity of what can be designed and made by understanding the materials and production processes used. Allow businesses to take more responsibility for the working conditions and the environment that any manufacturing they commission locally affects.

Useful Links

Explore Make Works

We highly encourage all the REFLOW Pilots to become a Make Works Region!

Learn how to do it by filling out the online template with basic inputs for the region home page at the Make Works website, or alternatively you can get in contact with make.works@fablabbcn.org.
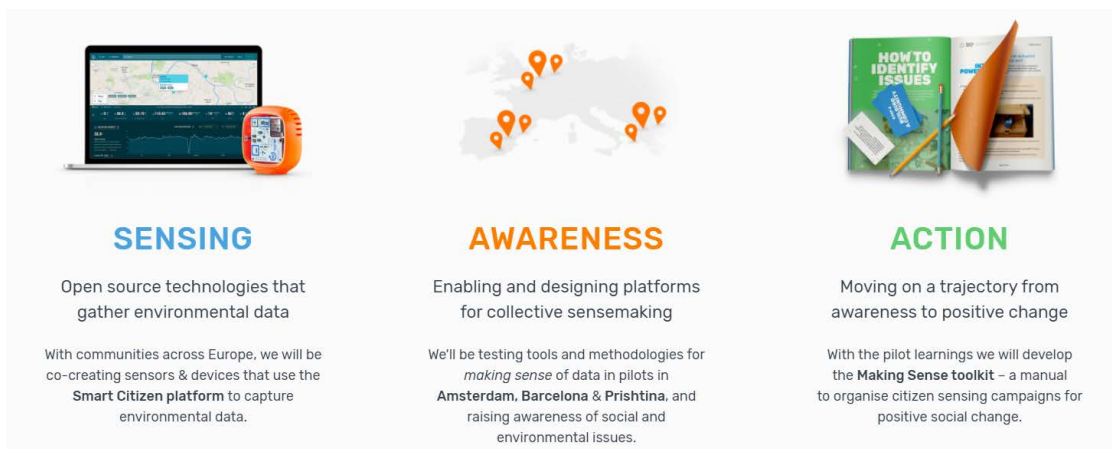
8.4 Making Sense Toolkit

Quick Info
Resource: Making Sense Toolkit
Project: Making Sense
Developed by: Fab Lab Barcelona, WAAG Society, NL Dundee University, UK EC Joint Research Center, BE PEN Educational Network, KS

What is it?

The Toolkit was developed through the EU funded research project Making Sense, which develops activities for participatory citizen sensing by leveraging open hardware/software technologies and engaging communities of interest and practice on environmental issues in three European cities (Barcelona, Amsterdam and Prishtina).
The project and toolkit push for citizen-driven innovation by harnessing the increasing popularity of maker spaces and fab labs, which work on the principle of open source hardware, software and design. The data gathered from the Making Sense toolkits is now used to inform a methodological framework for participatory environmental practices.

SENSING

Open source technologies that gather environmental data

With communities across Europe, we will be co-creating sensors & devices that use the **Smart Citizen platform** to capture environmental data.

AWARENESS

Enabling and designing platforms for collective sensemaking

We'll be testing tools and methodologies for *making sense* of data in pilots in **Amsterdam, Barcelona** & **Prishtina**, and raising awareness of social and environmental issues.

ACTION

Moving on a trajectory from awareness to positive change

With the pilot learnings we will develop the **Making Sense toolkit** – a manual to organise citizen sensing campaigns for positive social change.

What is it useful for?

- Establishing collective awareness in local communities
- Community engagement and co-creation
- Identifying critical environmental issues: air, water, soil and sound pollution
- Hands-on transformation of the (urban) environment

Description from Authors:

The key stages of activity are described with their corresponding set of cross-cutting principles. These stages and principles are specifically geared towards projects aimed at supporting community action. The stages of the framework provides an idea of who is involved at which point, what usually happens at that time, and key objectives or milestones to be achieved at each stage. Alongside these stages, principles are defined which lie at the heart of this process, and these should be used as a guide for participants at any stage, and for citizen sensing as a whole. These principles are co-creation; empowerment; openness; and changemaking.
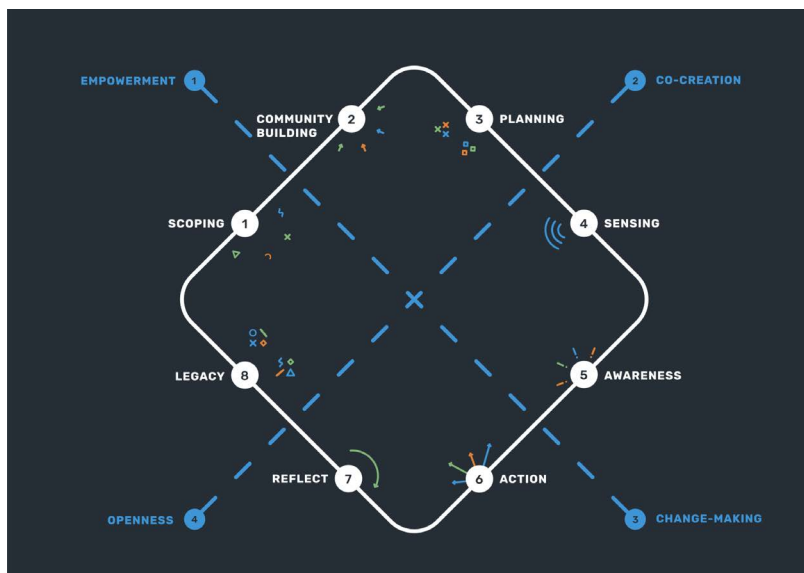
Source: The Making Sense Framework, http://making-sense.eu/

Toolkit

1. Scoping

Important issues are discovered, mapped and discussed by the key participants. Information is gathered by internet searches; collecting articles, news reports and literature; or by conducting surveys and interviews. At this time existing communities are found and new ones start to form.

TOOLS: Geographical mapping, commons mapping, collaboration pilot schedule

2. Community building

All participants to come to a shared understanding of the issue, the goals of the campaign, the organisation of the project and how to document activities The skills of the participants are identified and new skills are developed. Additionally, other stakeholders are brought on board if there are any skills or expertise missing.

TOOLS: Onboarding, empathy timeline, recruitment

3. Planning

Participants decide collectively on the project goals, on sensing strategies and on protocols for collecting data. This includes a plan for collecting other types of indicators. It is when the sensing tools are created or developed from existing resources and are tested and calibrated.

TOOLS: Community level indicators, sensing strategy canvas, calibration, targeted measurements

4. Sensing

Everyone collects data on the issue i.e. environmental pollution. The data can be uploaded to a publicly accessible online platform. Participants can also take notes and record observations about how their lives are affected by the issue. Collecting these indicators can support the sensor data and be used to demonstrate the impacts to external individuals and government officials.

TOOLS: Sensing guides, data journals, operation manual, open hardware

5. Awareness

Using all the data and complementary indicators gathered during the sensing phase, the information is analysed and discussed amongst the community. The aim is to build a collective awareness from the data. The analysis stage can include activities such as data visualisation, and people from professional science or academia.

TOOLS: Awareness sheet, data discussion sheet, data dashboard

6. Action

After the issues have been identified, participants work together to propose courses of action. The aim is to devise, organise and deliver an action, or series of actions, that can generate recognition of the issue, make an impact and make change. Actions can range from an individual change to public-facing activities (e.g. a protest) aimed at widening awareness, or even policy change.

TOOLS: Digital presence, future news paper, co-creation assemblies

7. Reflection

Participants reflect on the process to date, and consider what worked well and what could be improved. This can include looking at the data and seeing if there was change as a result of the action. This might require the participants to repeat stages, or return to previous phases.

TOOLS: Questionnaires, pilot appraisal, graduation ceremony

8. Legacy

A legacy is created by looking towards the future of the project and making a plan for lasting impact. Plans for sharing information and news should be included to ensure that the project is sustainable, the project's tools are being reused, and uptake continues.

TOOLS: Storylines, next generation training

Useful Links

Download the Making Sense Toolkit
Read The Making Sense Framework

8.5 PSS Toolkit

Quick Info

Resource: PSS Toolkit

Project: part of the TURAS programme, which is supported by the EU's Seventh Framework Programme

Developed by: *By Brussels Environment, Ecores, Groupe One, Strategic Design Scenarios and Egerie Research*

What is it?

The PSS toolkit is a tested, methodological toolkit that facilitates the development of innovative business models in a sustainable city context. The toolkit explores hybrids combinations between product and service systems in order to develop new creative and sustainable business opportunities that are both economically viable and create new jobs.

The Toolkit is unique because it combines a territorial approach with individual business support. The first step (Phases 1 to 4) ensures synergy between the territory and the users (public authorities, non-profit making organisations, residents and businesses) through the co-creation of innovative business models. Meanwhile, the second step (Phase 5) provides business with individual support to develop an appropriate economic model that can respond to the real, local context.

What is it useful for?
- Setting up a "benevolent ecosystem" made up of a wider circle of indirectly involved players (owners of other related projects, indirect stakeholders, public or private financial backers, etc.) capable of directing, advising, synergising, disseminating and communicating the project under development;
- Identifying challenges and opportunities to integrate the functional economy model into the transition to a sustainable and resilient city
- Identifying and developing alternative business models highlight access, mixed ownership, sharing, etc.

Description from Authors:

The methodology proposed is structured around an approach which is firstly territorial then followed by an individualised approach towards the project owners and businesses.
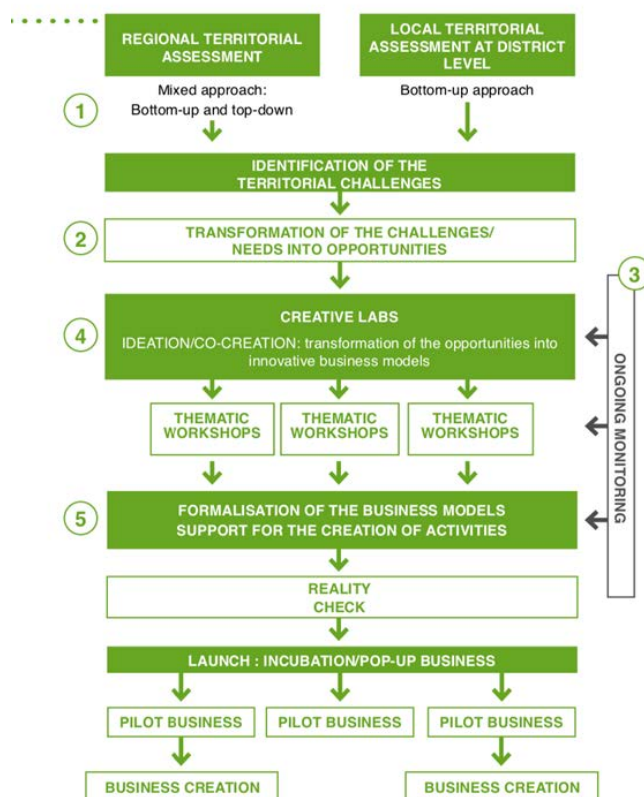
The territorial approach provides:
- entrenchment in a local context, making it possible to create solutions which meet
the needs and expectations of the territory's users (public authorities, residents, businesses, associations, etc.)

- a pooling effect (collective coaching, peer-to-peer exchange of experience, grouped dissemination, etc.) and a synergy effect (hybridisation between innovations, communication on
all the initiatives in addition to individual communication, etc.).

The owner/initiator of the process can be a local authority (Region, Municipality, etc.) or a structure which represents businesses (e.g. chamber of commerce). All the ideas generated must feed a "pool of ideas". In addition to the ideas exploited (meeting with an owner, suitable marketing window, etc.), all the ideas must be retained (open collaborative platform), firstly, to stimulate the territorial process and, secondly, to encounter other opportunities for them to be put into practice (new owners, marketing window).

The individualised "reality check" tools are the opposite of traditional consultancy/ tutoring: they are stimulating (owners authorised to carry out a participative co-design development: consultants as process facilitators) and directed towards experimentation (rapid simulation of solutions; full-scale trials; modelling used as the first stage of launch, etc.).

The methodology is presented in the form of various key phases (Phases 1 to 5) represented in the diagram below.

Source: PSS Toolkit, https://www.strategicdesignscenarios.net/toolkitpss/

Source: PSS Toolkit, https://www.strategicdesignscenarios.net/toolkitpss/

Useful Links

Here a description of the Toolkit here and then explore the PSS Toolkit

Learn from new business models developed in the project: http://www.sustainable-everyday-project.net/pss/2013/05/22/the-short-film/

8.6 Circular Economy Playbook

Resource: Circular Economy Playbook
Project: Circular Economy Playbook
Developed by: Sitra, Technology Industries of Finland and Accenture

What is it?

The circular economy playbook is a set of tools developed to support companies in understanding the circular economy and identifying the most relevant circular business model(s). The playbook provides a Business Model

Development Toolkit-- a set of exercises for identifying inefficiencies and customer pain points, assessing relevance of circular business models, and prioritising them-- and tools for calculating high-level business cases for circular business models.

This playbook is tailored to companies in the manufacturing industry giving examples for the following four sub-sectors: (1) Machinery & Equipment, (2) Marine, (3) Energy and (4) Transportation

It specifically addresses companies that want to:
- Better meet customer expectations and deliver customer outcomes;
- Enable outcome-oriented solutions and new levels of efficiency through technology and digitalisation;
- Improve resource utilisation and mitigate risk from regulatory, investor and societal pressure.

What is it useful for?

- Describing the rationale for why circular economy is relevant (Chapter 1)
- Identifying circular business models with the highest value potential per sub-sector (Chapters 2 & 6)
- Outlining required organisational and operational changes (Chapters 3 & 4)
- Providing a blueprint of a transformation journey for companies to achieve circular advantage (Chapter 5)

Description from Authors:

This playbook calls for action to
- Understand the advantages and untapped potential of the circular economy
- Assess your company's current state and identify the circular business models that can help you
- Understand which capabilities are needed to operate your selected model(s)
- Explore technologies that can enable your selected model(s) and assess your technology maturity
- Understand the key steps, common barriers and success factors.
- Design a transformation roadmap

Source:CIrcular Economy Playbook, http://www.kasvuakiertotaloudesta.fi/
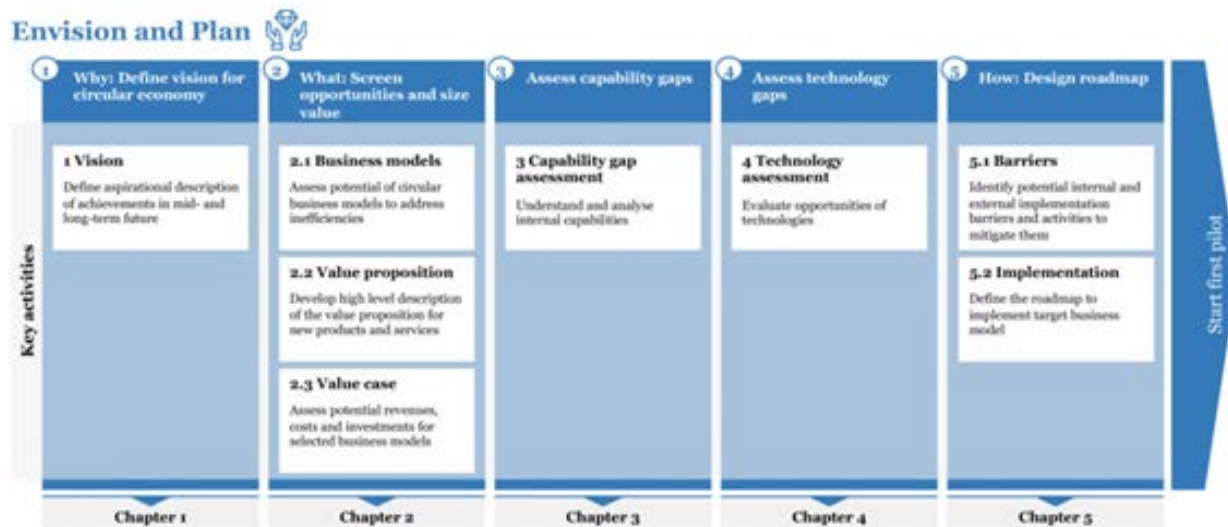
Useful Links

Download the Playbook with all the chapters and company examples from CIrcular Economy Playbook.
http://www.kasvuakiertotaloudesta.fi/.

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