Reflow | Co-Creating Circular Resource Flows in Cities

constRuctive mEtabolic processes For materiaL flOWs in urban and peri-urban environments across Europe

Deliverable 5.1

Detailed Pilot Planning & Evaluation Framework

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Abstract (for public dissemination only)	This document describes the overall Pilot Cities Framework (general and city-specific objectives, activities, deliverables, KPI, and roles of partners) as well as the foreseen management and monitoring methods. It will also include (i) internal communication tools, in order to coordinate the progress of tasks, align the development of each Pilot and share feedback, lessons learnt, outcomes, and (ii) a set of potential indicators to measure Pilots' effectiveness.
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Revision History

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Executive Summary

The vision of REFLOW is to develop transition paths towards circular and regenerative cities by re-localising production and re-configuring material flows. REFLOW uses Fab Labs and Makerspaces as catalysers of systemic change in urban and peri-urban environments. It does so through the implementation of Circular Economy (CE) projects in six Pilot cities throughout Europe. These Pilots aim to reduce material consumption, maximize multifunctional use of (public) spaces and develop regenerative practices, contributing to the overall project goal to enable, visualize and regulate free movement of resources, people, (technological) knowledge.

To coordinate the REFLOW Pilot projects, this document presents a '**Detailed Pilot Planning and Evaluation Framework**' (task 5.1). More in detail, the document describes conceptual and theoretical foundations (chapter 1), alongside the values and procedures that inform the coordination approach of the Pilots (chapter 2). Subsequently, the document describes the pilots' implementation by means of a digital platform: the **Pilot Cities Framework**(chapter 3), next to the specific action plans of each Pilot (chapter 4).

Overall planning and monitoring of the Pilots is articulated around **four challenge dimensions**, which provide a shared understanding of process within the consortium, while allowing for necessary flexibility in executing complex multi-year pilots in different contexts.

These four challenge dimensions are: *Material flow analysis*, mapping and analysing city production capacity, materials and material flows; *Governance, network and policy*, co-developing CE design in local multi-stakeholder ecosystems; *Technological development,* implementing materials, hardware and/or software that support new CE strategies; and *Citizen Engagement and Capacity Building*, creating awareness and behavioural change of citizens and organizational stakeholders in CE practice.

For planning and monitoring activities, these challenge dimensions are elaborated on via the **theoretical background**, in the form of three main theoretical concepts which in turn provide the ground for coordination procedures (ch. 2) and operationalisation in a digital platform (ch. 3).
- *Multi-level Purposive Approach*
  Sustainability Transitions are complex and multifaceted processes, which call for a 'multi-level approach' (van Geel 2011): here, extraneous 'Landscape' factors interact with structural 'Socio-Technical Regimes' and particular 'Niche innovations'. The latter can, driven by a 'purposive approach' leverage change in particular Regime-Landscape vectors.
- *Citizen Participation*
  Based on a 'quadruple helix' understanding of participating actors, emphasis is placed on societal engagement through citizen participation, where a balance should be struck between active partnership of citizens *within* the purposive goals of the REFLOW project.
- *Relative Change*
  Relative change breaks down the journey towards change, into smaller, contextualised steps, making it easier to understand what type of change is realistic within the scope of the project, and at what stage a subject helps design environments conducive of change.

Based on the four challenge dimensions and three theoretical foundations, the **coordination approach** emphasises the particular realities of each Pilot ecosystem, focusing on shared values and iterative learning cycles as primary success factors in coordinating Pilots and developing together a transparent testing environment with experts in the consortium.

The coordination emphasises *five values*: a holistic and iterative orientation on process; the enabling of trust, safe space and mutual respect; shared responsibilities, where mandates are devolved to local Pilot teams; clear procedures for communication, online systems and processes; and unity in diversity, emphasising local collaboration culture.

Together, they inform the *coordination strategy* that defines the requirements for Pilot coordination:

1. Creating alignment among Pilots through the challenge dimensions;
2. Providing guidance for the partners through a value-based process;
3. Designing and iterating the Pilot process by means of a digital platform;
4. Understanding and creating learning loops based on content collected through the process.

The coordination approach and strategy are implemented in a **Pilot Cities Framework (PCF)**, understood as an online *system for guiding and aligning, which fosters iterative project development, monitoring and knowledge exchange between the cities and partners.*

The PCF is operationalised as a digital platform, which intends to enable a more structured and focused dialogue between the Pilot city representatives and the partners representing each work package. It operationalises alignment, guidance and monitoring strategies for the coordination of the Pilots (WP5). It implements multiple aspects: the concepts, values and theories of REFLOW; the digital modular architecture; the articulation of functionalities, and how these reflect the process of Pilot cities under the proposed alignment. By implementing a common language and shared vision in a digital environment, it aims to support an exchange of perspectives, expertise and experiences.

As an evolving online system, it provides a constantly updated dashboard that is tailored to city Pilots and project experts respectively, with the goal of refining the logic of how the Pilot cities harvest and interpret information and share knowledge. As such, the PCF enables a shared perspective and larger pool of information that can feed the collective understanding, next to organising further learning and self assessment. The gathered information is organised, streamlined and mapped out to create a living and evolving picture of each city's context. This alignment, in both content and structure allows barriers and opportunities to be identified while becoming a circular and regenerative city.

As a starting point for coordination activities and continuing the PCF development, the **Pilot Cities Action Plans** define a first sketch of how the cities intend to implement their transitions towards becoming more circular and regenerative. These are summarised below, in alphabetical order, by Pilot city and are further described in chapter 4, the Pilot Cities Action Plans.

Amsterdam
The city of Amsterdam and the Amsterdam Metropolitan Region will adopt a new circular strategy in 2020, with the vision to be a thriving, regenerative, and inclusive city for all citizens while respecting planetary boundaries.

In the REFLOW-project, the Amsterdam Pilot focuses on textiles used by consumers and companies; the ways textiles are discarded and reused; and how textile waste can be brought back into the material flow. It will especially focus on the increase of home textiles that are recycled to be made circular, by supporting diverse collection methods with citizens, while providing feedstock for the recycling industries and creating supply for different markets.

Berlin

The Berlin Pilot is focussed on 'waste heat'.

For citizens, the issue of waste heat is almost invisible, the Berlin Pilot would like to address this issue. To this end, properties that are easily accessible to civil society, such as makerspaces and coworking places, are to be equipped with waste heat technology in a particularly tangible way. For example, sewers, pumping stations and sewage pressure pipes can be understood as low-temperature district heating networks.

The Berlin Pilot focuses on identifying where waste-heat potential lies in the metropolitan area. From that information, the Pilot aims at reducing time between stakeholders requesting advice about implementing waste-heat-technology and actually receiving such advice. The Pilot partners want citizens to understand the productive potential of water. This will be pivotal in getting better use of waste heat to become the standard, not the exception.

Cluj-Napoca

Cluj-Napoca is a mid-sized city that is growing economically and demographically, and thus has a high demand for housing. A new strategic plan (the National Energetic Strategy for 2030) sets objectives for the city including energy security, sustainable development and competitiveness.

Through the REFLOW Pilot, the objectives for Cluj-Napoca are: to prove how the measures taken to date by the City have impacted the energy efficiency of selected buildings; to involve the identified stakeholders in implementing and furthering the measures already taken; to disseminate the information gathered at household and business level; to encourage different actors in the ecosystem to propose new ideas regarding renewable energy sources to be integrated in the City's strategy for a circular economy. All these will be complemented by educating citizens on the circular economy, its benefits and possibilities.

Milan

Covered Food Markets were built from the 1940s through the 1960s as centers of commerce and connectors between rural and urban communities in Italy. Many of Milan's Municipal Covered Markets now suffer from high vacancy rates, decaying facilities and declining community interest within neighborhoods with viable commercial alternatives. Recognising that Markets present a unique opportunity to contribute to the transformation of neighborhoods and to promote sustainable change, the Municipality is looking to develop a strategy for Markets to anchor local culture, food traditions and healthy eating; to promote social integration to complement public sector initiatives; to build capacity among local stakeholders and community partners; and to create economic impact for vendors and local businesses.

Milan will deliver a Pilot focused on "Circular Markets" which aims at merging existing background and competences, grounded in the local ecosystem of actors working on agrifood and peri-urban agriculture. It incorporates the so-called "Fab-city perspective" as a new urban model of transformation and shaping cities, which shifts how they source and use materials from 'Products In Trash Out' (PITO) to 'Data In Data Out' (DIDO). This means that more production occurs inside the city, along with recycling materials and meeting local needs through local inventiveness, where material flows would mostly be found in the form of data flows (information, knowledge, design, code).

Paris

Paris hosts a huge number of events and temporary structures. This sector of activity, which is important in the capital, produces a large amount of waste of wood and packaging having been used

only for a short period of time. In this ecosystem of different agents (designers, event planners, site managers, waste management companies) there is a lack of specific agents taking care of and coordinating the flow and life cycle of materials involved.

The REFLOW Paris Pilot focuses on creating specific conditions for these agents in order to coordinate the use and reuse of materials involved in the event and temporary structure sectors. To achieve that, the Paris Pilot is developing four different actions: a tracking label, a set of tools for scanning resources, a waste management protocol and an incubation program.

Vejle
Vejle Municipality focuses on plastic, with "Vestbyen in Vejle" as the test area. The whole project builds upon a design thinking method, which connects to FabLabs and prototyping workshops. The Vejle Pilot will design new sustainable solutions to reduce the need for plastic and co-create circular strategies for plastic as a resource – together with local stakeholders from public sector, private sector and citizens. The social and civic responsibility of gathering waste and motivating to reuse is also a focus in the municipality.

The Pilot aims to provide realistic best practices through a people-centered approach by 1) mapping plastic streams in 7 micro test sites; 2) involving and connecting a wide range of local stakeholders; 3) developing new prototypes and consequently enable scaling and replication in other cities and 4) executing citizens' engagement and capacity building activities.

List of abbreviations and key words

Building blocks   The project work packages within REFLOW.

Challenge dimensions   The four challenge dimensions are defined as the content building blocks within REFLOW: 1. Material flow analysis; 2. Governance, network and policy; 3. Technological development and 4. Citizen Engagement and Capacity Building

Circular city   A circular city is a city where the circular economy principles are implemented and result in a resilient system that facilitates new kinds of social, environmental, technological, and economic activities. Examples of which can be the strengthening of competitiveness and the generation of employment.

Circular Economy (CE)   A Circular Economy is an alternative to a dominant linear industrial model of design, produce, purchase, consume and dispose. A circular model aims to redefine growth and a positive societal impact and for its development a systemic approach and a deep transformation of habits and behaviour are needed. It entails a transition from using finite energy resources, to using renewable ones (designing - the concept of - waste out of the system), while building economic, natural and social impact.
Although starting from different materials in REFLOW, the focus of the circular economy gradually extends beyond these issues related to material management and covers other aspects such as the social impact, technological aspects and the evolution of urban governance structures. Since Circular Economy is purposive, but isn't just about sustainability environmentally and economically, the social components are fundamental for this transition to happen. This happens in mindset and cultural rituals: from the way we design, produce, consume, purchase and dispose, all the way to how we see and value resources present or even abundant in the local environments.

Co-creation   Co-creation is a design driven approach to engage users in the design of a process, service or product. It supports the common understanding of new routes and futures through all layers of society. In REFLOW we engage stakeholders, end-users and professionals at all levels to create solutions to our cities challenges.

Design Thinking   Design thinking is a human-centred approach towards (complex) problems which are seen and (re)defined as design challenges. In order to tackle these challenges, a non-linear, iterative process seeks to understand users, challenges assumptions, redefines problems and creates solutions to prototype and test in its actual context. Design Thinking consists of five phases that are extracted from a creative design process and translated / captured in five simplified steps that can be run through simultaneously: Empathise, Define, Ideate, Prototype and Test. Design Thinking is both a mindset, a method and an approach and can be applied in a variety of fields.

Feedstock   Raw material or resource needed in order to supply or fuel an industrial process. Within REFLOW, feedstock refers to recycled resources that re-enter the production chain as "new" supplies for the manufacturing processes.

Iterative approach   An iterative approach reverse to repeating rounds of analysis and re-adapting of strategies and next steps in order to achieve the long-term goals. By each iteration the desired results will be brought closer to discoveries done during the executed research.

Within REFLOW, an iterative approach is crucial due to its uncharted territory in the field of Circular Economy and city transitions.

Key performance indicators or KPIs	KPIs refer to a set of quantifiable measurements used to gauge overall long-term performance. Within REFLOW, KPIs will be used not only to measure economic benefits (e.g., value creation and savings by reducing the purchase of primary raw materials), but also at environmental benefits (e.g., impact reduction), and at social benefits (e.g., job creation).
MFA or Material Flow Analysis	MFA has been defined as 'a systematic assessment of the flows and stocks of materials within a system defined in space and time' (Brunner and Rechberger, 2003). It is a method that quantifies flows and stocks of resources in a defined system. Within REFLOW, MFAs are designed by Metabolic, on the basis of data collected by various sources.
Niche	The niche is defined as the "locus for radical innovations" where dedicated actors nurture the development of technological novelties. Incubated from market and regulation influences, the niche fosters innovations that differ fundamentally from the prevailing regime and usually require landscape developments that open windows of opportunity in at the regime level.
Non-wovens	Non-wovens are fabric materials made of fibers that are bonded together by chemical, mechanical, heat or solvent treatments, thus fabric materials that are neither woven nor knitted.
PCAP or Pilot Cities Action Plan	Pilot Cities Action Plan, the first action plan drafted by the six Pilot Cities to map their journey towards becoming a circular and regenerative city.
PCF or Pilot Cities Framework	Pilot Cities Framework, the online system developed to structure and capture the internal REFLOW communication flows between the six Pilot cities and the project partners. It's main scope is to align, guide and monitor the developments of the Pilot cities within REFLOW.
Regenerative city	A city that moves beyond sustainability, and develops a restorative, mutually beneficial relationship with the natural and social systems that sustain it. In REFLOW, the road to generative urban development will be achieved through the attention to the social, environmental, technological and economic dimensions.
Regime	The regime represents the current structures and practices characterised by dominant rules, institutions and technologies that are self-reinforcing. The socio-technical regime is dynamically stable in the sense that innovation still transpires albeit incrementally and along a predictable trajectory.
Scenario(s)	Scenarios within REFLOW are sketches and descriptions of possible actions that a city could take on their path towards becoming a circular city. They always start by identifying a challenge or an opportunity and the involved stakeholders in order to design these actions.
Theory of Change	Theory of Change is a methodology commonly used in humanitarian, development, and social impact programmes, that helps to establish and articulate a logical sequence for how a desired change can be achieved. This is done by focusing, on one hand, on the challenge or need that should be addressed, and on the other hand on the desired

impact and the difference that should occur. Supported with knowledge of best practice and explicit assumptions, key activities are also articulated to illustrate what needs to occur to amend the current situation. (Anderson, 2006; Harris et al. 2014)

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1. Introduction

1.1 Scope and objectives

The ambition of REFLOW is to develop circular and regenerative cities through the re-localisation of production and the re-configuration of material flows at different scales. The project aims to provide viable practices that align market, government and citizen needs. These best practices are expected to create favourable conditions for the broad adaptation of circular principles, models and strategies that are in line with 2030 Sustainable Development Goals, and in particular Goal 12: 'Ensure sustainable consumption and production patterns, improving resource efficiency, reducing waste and building towards social and environmentally driven economic practice.'

REFLOW is a people-centered project, with at its core the development, testing and iteration of Circular Economy (CE) strategies in six Pilot cities across Europe (Amsterdam, Berlin, Cluj-Napoca, Milan, Paris and Vejle).

In each Pilot city, local interdisciplinary consortia focus on one specific resource stream: Amsterdam focuses on textiles; Paris on packaging and wood; Vejle on plastics; Berlin on water; Milan on agrifood; and Cluj-Napoca on energy efficiency.
The cities address their challenges through the four different dimensions (listed below). Other building blocks[1] within the REFLOW project are informed by, and feed into, these challenges. The **four challenge dimensions** are described as follows:

1. **Material flow analysis,** with the objective to map and analyse city production capacity, materials and material flows in Pilot cities, focusing on city-specific resource streams (related to the work done in REFLOW within the building block on Circular Engineering).

2. **Governance, network and policy**, with the objective to co-develop, test and receive feedback on CE design, taking into account the current and envisioned ecosystem of actors, governance, policy and business models (related to the work done in REFLOW within the building block on Governance and Urban Strategies on Circular Economy).

3. **Technological development**, with the objective to design, create and apply technological interventions (material research, hardware and/or software) that support new models and strategies, allow for more efficient management of streams and consequently enable scaling and replication in other cities, and feed the development of REFLOW OS (related to the work done in REFLOW within the building block on IT Infrastructure and Tools).

4. **Citizen Engagement and Capacity Building**, with the objective to build and grow a sustainable ecosystem through public engagement activities, creating awareness and working towards behavioural change of citizens and/or organizational stakeholders in CE practice (related to the work done in REFLOW within the building block on Capacity Building and Knowledge Transfer).

While each of the Pilots focuses on their own local topic, dynamics, cultures, and social, economic and technical challenges, the main goals for the coordination of the Pilots are to ensure that a coherent, replicable transition process can take place, while ensuring consistent output by the six

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[1] Within REFLOW we define the project's work packages as content building blocks of the project.

Pilot cities. The project wide knowledge, tools and learnings will initiate the transition process in the Pilot cities, as well as foster the engagement of other cities. The coordination of the Pilots is fundamental in the overall project coordination of the REFLOW project and the local communication strategies.

With its ambition to address the above multidimensional and multilevel challenges, the project needs a holistic, transparent and iterative strategy. Each city has a different profile in terms of organisational and local culture, social and economic relations and resources, and maturity in terms of technological innovation practice. A project wide strategy is essential for the development of solutions in complementary material flows, and to understand the dynamics within these cities. It requires a clear operational framework for information exchange, planning, ideation and monitoring of progress.

1.2 Reading guide

This operational Pilot framework and strategy is presented in this document **D5.1: Detailed Pilot Planning & Evaluation Framework.** The document describes the starting point for a methodology that will continuously be reviewed and updated according to the project's needs. Modifications will generally respond to increased understanding of the Pilot context locally, through dialogue with (Pilot) partners.
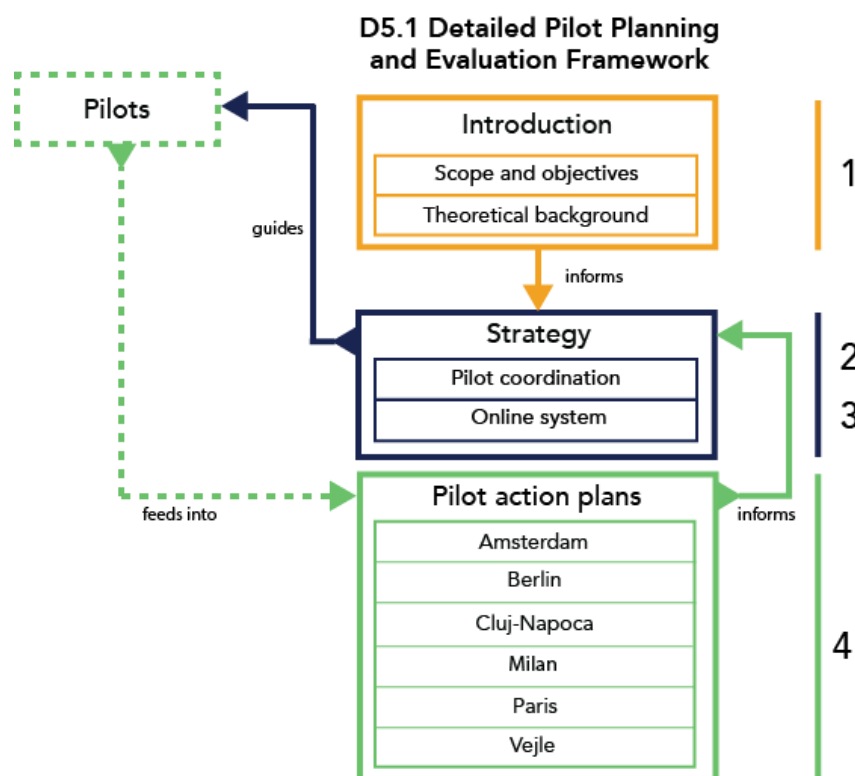
Figure 1 // Visual reading guide of this document by Waag

This document is organized in three main sections. The first section, visualised in yellow in figure 1 above, outlines the general scope of the task this deliverable reports on. This includes the outlines given by the REFLOW Description of Work, and the newly developed outlines, and is informed by research and experience of project partners. The second section (in blue) outlines the main elements of the strategy for the Pilots and the Pilot coordination, based on the above mentioned outlines, and

covers its supporting (online) measures. Section four (green) outlines the individual action plans for each Pilot.

Due to the explorative and iterative nature of the pilots, the Pilot Cities Action Plans are subject to developments and adjustments; therefore, updated versions of these plans will be included in upcoming deliverables of month 12 within REFLOW.

As a general note, it is important to point out that conversations in this domain often make use of words which may be conflated with academic terms. Terms used in this document such as storytelling, methods, approach and concepts do not intend to be understood as specifically referenced academic terms, but rather coming from a public research perspective[2]. If indeed terms are used that could be interpreted in various ways, a specific description within the context is given in a footnote. Additionally, a list of abbreviations and keywords is provided at the top of this document. This list is not complete, but will be considered a baseline for a glossary of words and terms used in this document. Throughout the project this glossary will be updated and improved, following the work in the various tasks, work packages and pilots.

1.3 Theoretical background

Considering the ambitions of REFLOW, it could be said that the project aims for change: there is a need to change the 'system' into a more sustainable, fair and inclusive one. As mentioned above, there are many challenges that need to be taken in consideration: some are operational, or bureaucratic, others are of political nature, and still others are based on human nature and social convention.

This awareness of challenges leads to research strategies that could support change. Therefore, theoretical support for REFLOW is found in studies from the fields of Circular Economy, Behavioural Studies, Design Thinking, and Participatory design, contributed by a number of expert project partners. Each of these studies will help approach the complex tasks at hand in REFLOW, and can very well complement each other. The Theory of Change[3] for REFLOW has already been identified as one of the leading theories to monitor the Pilot Cities Action Plans and formulate the key performance indicators (KPIs[4]) - and will be further outlined in the upcoming deliverable D1.2 Circular Cities Action Plans.

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[2] *Note: Public research is research primarily funded with public money and is carried out by public research institutions. In our case, it also involves an active role for citizens (like in citizens science). It plays an extremely important role in innovation systems by ensuring the provision of new knowledge.*
Waag. (2019). Public Research Agenda 2019. Retrieved from: waag.org/nl/article/crossroads-public-research
[3] *Note: Methodology commonly used in humanitarian, development, and social impact programmes, that helps to establish and articulate a logical sequence for how a desired change can be achieved. This is done by focusing, on one hand, on the challenge or need that should be addressed, and on the other hand on the desired impact and the difference that should occur. Supported with knowledge of best practice and explicit assumptions, key activities are also articulated to illustrate what needs to occur to amend the current situation.*
Anderson, A. (2006). The Community Builder's Approach to Theory of Change. A Practical Guide to Theory Development. The Aspen Institute, Roundtable on Community Change.
DIY – Development Impact & You. (01 Dec 2016). Retrieved from diytoolkit.org/tools/theory-of-change
Harries, E., Hodgson, L., Noble, J. (2014). Creating Your Theory of Change. NPC's Practical Guide. NPC.

[4] *KPIs refer to a set of quantifiable measurements used to gauge overall long-term performance. Within REFLOW, KPIs will be used not only to measure economic benefits (e.g., value creation and savings by reducing the purchase of primary raw materials), but also at environmental benefits (e.g., impact reduction), and at social benefits (e.g., job creation).*

The project needs to operate at different levels to create an environment in which change is possible. The suppliers of the infrastructure and end users need to be involved, as well as change agents for the issue. It requires changes by governments, companies, and public and private organisations, and by ordinary people: citizens.

Following literature research combined with practical experiences of project partners, and results from Public Research, REFLOW bases its general strategy for the Pilots on three main concepts:
- Sustainability transitions;
- Citizen participation;
- Relative change.

Each of the concepts is explained in more detail below.

1.3.1 Concept one: Multi-level purposive approach of sustainability transitions

Moving from current linear processes towards circular cycles requires deep systemic change in production, transport and material treatment. A prominent researcher on the topic of such systemic change is Frank W. Geels. His concepts are well represented in the academic discourse on environmental innovation and societal transitions. According to Geels (2011), deep systemic change can be defined in terms of a socio-technical transition, entailing changes across technology, policy, market, consumer practices, cultural meaning and scientific knowledge. Geels (2011) also states that transitions aimed at improving sustainable development are referred to as sustainability transitions[5].

The sustainability transition that REFLOW aims for, is to move the current linear economy towards a more circular alternative. Circular economy relates to many different aspects of society: infrastructure, politics, people's emotions, etc. Thus, if REFLOW aims to contribute to a fundamental shift of the economy from 'linear' to 'circular', it must have a multi-level approach in society.

To understand these levels, REFLOW uses a conceptualisation of Geels. With his 'Multi Level Perspective' (MLP), Geels (2011) describes an interplay between three main societal levels. Figure 2 visualises the coherence of these levels.

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[5] *In the context of sustainability transitions, sustainability is defined according to the United Nations Brundtland Commission (1987) as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'.*
International Institute for Sustainable Development. (20 Jun 2019). Sustainable Development. Retrieved from https://www.iisd.org/topic/sustainable-development

1. Landscape developments put pressure on existing regime, which opens up, creating windows of opportunities for novelties.

2. New regimes influences landscape.

3. Socio- technical regime is 'dynamically stable'. On different dimensions there are ongoing processes.

4. New configuration breaks though taking advantage of 'windows of opportunity'. Adjustments occur in socio-technical regime.

5. External influences on niches (via expectations and networks).

6. Elements become aligned and stabalise in a dominant design. Internal momentum increases.

7. Small networks of actors support novelties on the basis of expectations and visions. Learning processes take place on multiple dimensions (co-construction). Efforts to link different elements in a seamless web.
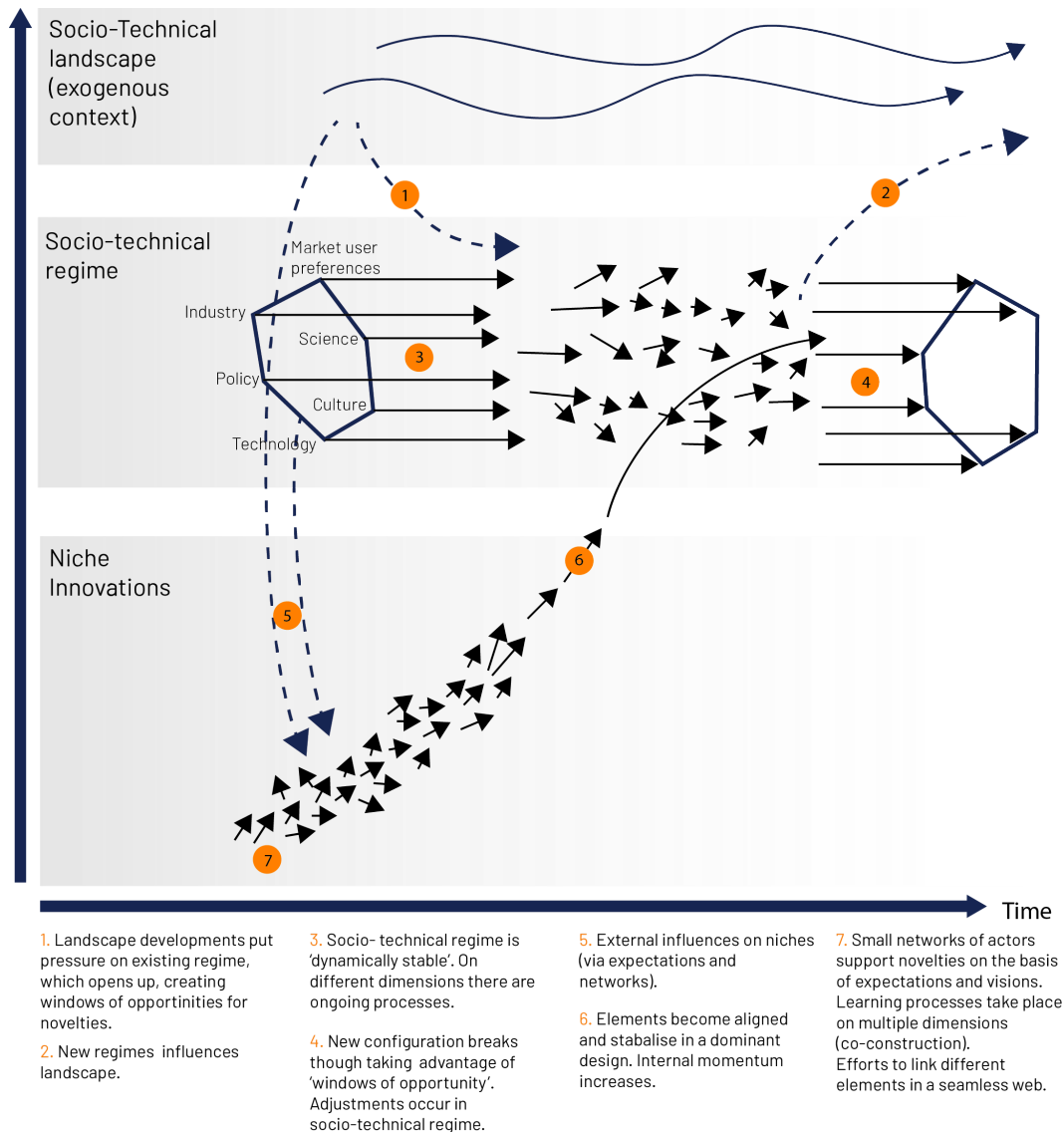
Figure 2 // Re-make of multi-level perspective on transitions by Geels (2011), by Waag

Geels distinguishes three levels: socio-technical landscape, regime and niche innovations which are explained below. These concepts are used to describe and understand how sustainability transitions can take place[6].

- The highest level which also has the broadest scope is called 'landscape developments'[7]. When the MLP is projected on industry and the waste material flows in cities, the landscape should be seen as the broader context, e.g. how the current infrastructure of material flows is mostly based on linear systems. Landscape developmentments can take decades to change and influence the other levels.

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[6] *Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8-9), 1257-1274.*
[7] *Note: The landscape forms an 'exogenous environment'; beyond the direct influence of niche and regime actors (such as: macro-economics, deep cultural patterns, macro-political developments). Changes at the landscape level usually take place slowly (decades).*
Geels, F.W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research Policy, 36, 399–417.

- The second level Geels identifies is the 'socio-technical regime'. This is formed by regime rules such as cognitive routines, capabilities and competences, lifestyles and user practices, (e.g. people's attitude towards waste). Regimes can be socio-cultural, political, scientific, technological, or about user / market preference. Regimes are the locus of established practices and associated rules that stabilize the existing system. Together, such regimes form the societal status quo.
- The third level within the multi-level perspective is the concept of technological niches. Niches are (non-)formal organisations that develop innovations that differ from current regimes, aiming to influence or even replace existing regimes.

Addressing all three levels is necessary to shift towards a circular economy, which emphasises the need for scoping interventions within these broad dynamics. To be effective, it is important to strengthen niche innovations - these are small enough to still be manageable, but may be substantial/disruptive enough to not only enter the status quo (or 'sociotechnicological regime'), but also to influence that regime. Therefore, REFLOW Pilots aim to be part of and form these 'disruptive niches' that can enter into and influence the current linear economy. At the same time, REFLOW partners do not *only* strengthen niche innovations, they also represent current established practices as part of the current regime. From that perspective, REFLOW partners are in an influential position to facilitate different niche innovations to be adopted within the current regime.

In order to better understand these transitions, REFLOW distinguishes between 'purposive' and 'emergent' transitions.[8] While emergent transitions are the result of arising opportunity (like the development of the internal combustion engine leading to the emergence of the car), purposive transitions are the result of the pursuit of specific goals that are set beforehand. The difference between emergent and purposive transition is visualised in figure 3.
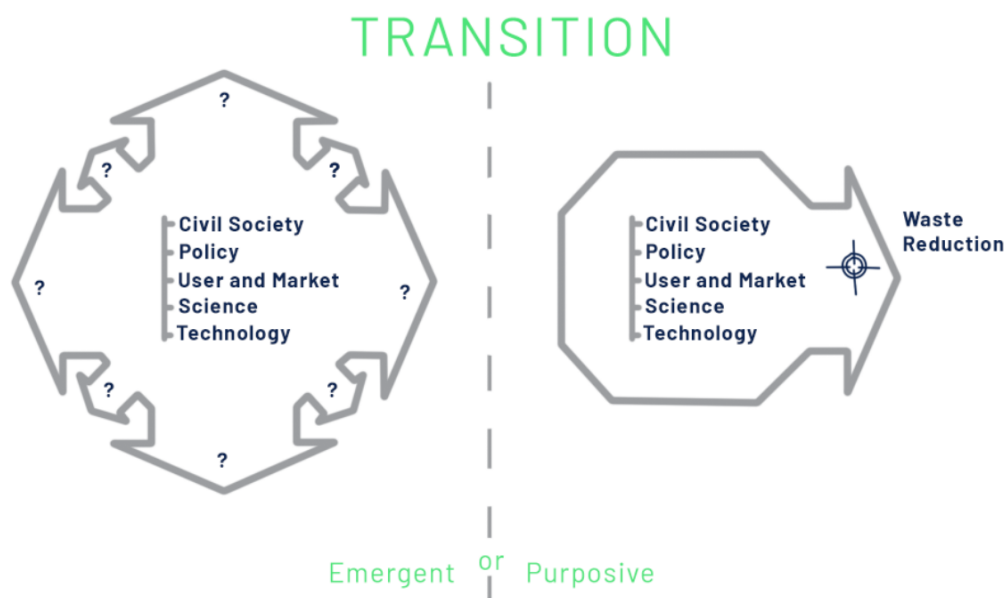
Figure 3 // Visualisation by Waag showing the difference between emergent and purposive transitions based on Geels (2011)

Because sustainability transitions address persistent environmental problems, they can be defined as purposive transitions (Geels 2011). Considering the goal-oriented aim of REFLOW one can say that the project aims for purposive transition as presented on the right side of figure 3.

Indeed, purposive transitions in practice do not follow the stylised representation in figure 3. The paths towards sustainability and circularity are always incredibly varied, departing from different starting points and different local contexts, defying diverse challenges. Yet, given a clear purpose, such varied movements can be brought together under the rubric of similar values and principles.

The concepts of the levels and types of transition introduced in the paragraphs above offer tools to reflect on and engage with Pilot cities in the task of coordination. In the next section, additional theoretical perspectives will be presented which aim to support our dialogue about citizen participation.

1.3.2 Concept two: Citizen participation

A starting point to help consider citizen participation is the work of Carayannis and Campbell[9] . They describe societal systems as consisting of four main pillars that are 'bidirectionally' interlinked in a Quadruple Helix. These four pillars and their complex interaction is presented in figure 4. In REFLOW these four pillars are represented in the partners of the project. REFLOW aims to create an interaction in which government, business, and academic research work together with society to change the current regime in specific domains. An important question for REFLOW is how the project can optimally enable and represent the fourth pillar in the helix: society.
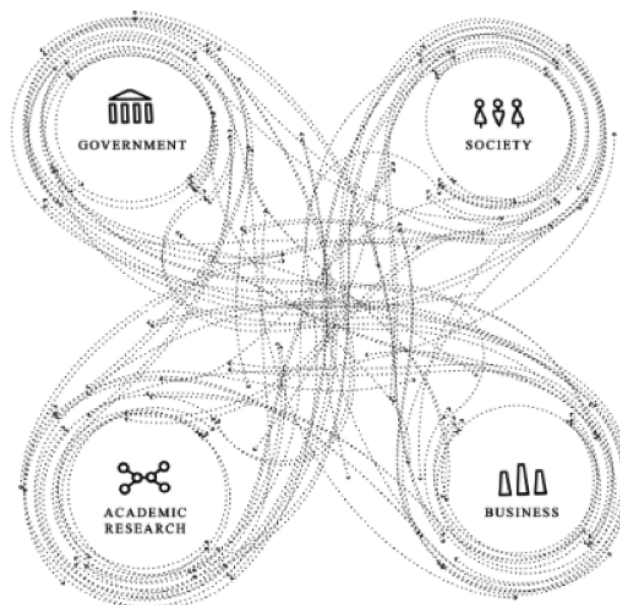

Figure 4 // The Quadruple Helix Model originally developed by Carayannis and Campbell (2009), adapted by Fraunhofer (2016).

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[9] *Carayannis, E. G., & Campbell, D. F. (2009). 'Mode 3'and'Quadruple Helix': toward a 21st century fractal innovation ecosystem. International journal of technology management, 46(3-4), 201-234.*

A way to approach the practical integration of society in the Quadruple Helix is by implementing the Users as Designers methodology[10]. In this participatory methodology (grounded in Design Thinking and co-creation), citizens / end-users and other stakeholders are seen as active co-creators throughout the process, and are involved in various stages of the development of change. This includes the earliest stage of formulating the basic needs and requirements that eventually lead to improvements of an existing system.

REFLOW will draw supportive measures for co-creation and design thinking from the Co-creation Navigator (ccn.waag.org), which is based on the Users as Designers methodology. This platform was developed within previous EU projects like BigPicnic[11], Cities4People[12] and MUV[13], and builds on experiences working with local communities in a wide range of European (municipal) contexts. As the CCN is hosted by project partner WAAG, results and best practices from REFLOW could in turn feed into the platform.

When this methodology is used in the context of policy development or system changes on a city-level, a municipality is often the 'problem owner' and the one overseeing and connecting regulation, long-term planning, local and national policies, while citizens become co-creators in the process of addressing problems and co-designing (requirements for) solutions.

To better understand how citizens can actually be involved, the ladder of citizen participation of Arnstein[14] (figure 5) can be consulted. This ladder represents the level of autonomy of citizens in the design process starting at the bottom with "manipulation" to the highest step of the ladder being "citizen control" in which citizens are dominant in decision-making.
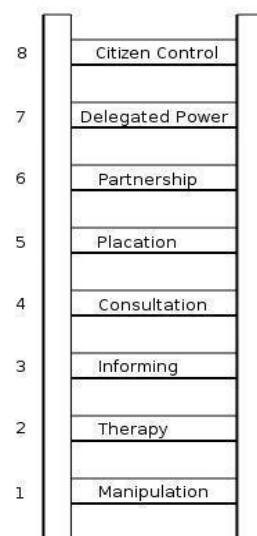

Figure 5 // The ladder of citizen participation (Arnstein, 1969)

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[10] *van Dijk, D., Kresin, F., Reitenbach, M., Rennen, E., Wildevuur, S. (2011). User as Designers. A hands-on approach to Creative Research. Retrieved from: https://waag.org/nl/project/users-designers*
[11] *Big Picnic Project Partners (25 jan 2017). Homepage. Retrieved from https://www.bigpicnic.net/*
[12] *Cities for People Project Partners (2017). Homepage. Retrieved from https://cities4people.eu/*
[13] *MUV Project Partners. (13 feb 2020). Homepage. Retrieved from https://www.muv2020.eu/*
[14] *Arnstein, S. R. (1969). A ladder of citizen participation. Journal of the American Institute of planners, 35(4), 216-224.*

In level 5 and 6 of citizen participation (placation and partnership), citizens are actively involved and are invited at the design table to foster involvement, but they do not have full control when it comes to decision making. REFLOW will aim for these levels of citizen participation, since the transition that needs to be made is purposive, and therefore less of a subject of debate. This means that the decisions need to move the current system in the direction of that purpose. In REFLOW the challenge will be to find the right balance in giving purposeful direction while maintaining a relationship of dialogue with citizens and other stakeholders.

1.3.3 Concept three: Relative change

REFLOW sees the potential and need for the citizens not only in a participatory role, but also as principal actors in shaping cultural change. A city's relation to material production, consumption and end-of-life cycles is deeply embedded in the way citizens understand, use, consume and relate to materials and products.

In an hyper-consumptive society, like the one we live in today, change is triggered by an array of stakeholders that are present, responsible and active in a city. Citizens are often not aware of this city ecosystem and its complex dynamics. As mentioned in the introduction, REFLOW aims to address challenges in 6 different resource flows in 6 Pilot cities, and will unpack these challenges on four different challenge dimensions: Material flow analysis, Governance, network and policy, Technological development and Citizen Engagement and Capacity Building.

REFLOW aims for purposive change and acts as a driving directional force, where the status quo of the existing city context and fabric of actors are stimulated to move towards a circular and regenerative city, which is more sustainable, fair and inclusive. Each of the challenge dimensions offers a relevant array of opportunities and obstacles to overcome.

Understanding these challenges highlights the need for a coordination strategy that supports the practices and tools that facilitate purposeful change as a shared process, rather than a strategy outlining a single solution that forces development, ignoring context and multi-level interactions in real time. Therefore, the starting position of each involved actor should be considered, gauging how much 'the needle can be moved' to align with the purpose of the project.

This introduces the importance of the concept of Relative change: by breaking down a journey towards purposive change into smaller, contextualised steps, it becomes easier to understand what type of change is realistic within the scope of the project, and on what levels support is needed.

When looking at the societal and human aspect of this transformative, circular purpose, it becomes clear that behavioural change is at the core of the challenge. Change in behaviour is only possible when the environment in which a society operates, is enabling: when circumstances allow for habits and rituals to be altered towards the required change. This observation is supported by the work of behavioural researchers like Les Robinson[15], B.J. Fogg[16] and Dan Ariely[17] .

In REFLOW this will mainly manifest itself by adapting the environments in which citizens operate, aimed at improving their capacity to participate. Knowledge of what cities, citizens and local stakeholders need in order to change, and what is preventing them from changing, is essential to stimulate the creation of enabling environments. (Within REFLOW, the defining challenges and

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[15] *Robinson, L. (2011). How the Science of Behavioural Change can Help with Sustainability. Retrieved from: http://www.theguardian.com/sustainable-business/behaviour-change-sustainability-tips*
[16] *Fogg, B. J. (12 aug 2015). What Causes Behavior Change. Retrieved from: http://www.behaviormodel.org*
[17] *Ariely, D., Hrera , J., Berman.K. (2014). Hacking Human Nature for Good. Irrational Labs*

opportunities for citizens to change are a collaborative effort between the Pilot cities and the rest of the consortium.)

The breakdown of these steps towards behavioural change is based on a model that was developed at Waag for FP7 Project Decarbonet[18]: the wheel of relative change[19]. The wheel is a model built on the work of the above mentioned experts in behavioural studies.

In this model, the state-of-mind of the targeted audience is made visible, and with that, requirements of an environment to facilitate a move to the next step becomes more concrete.
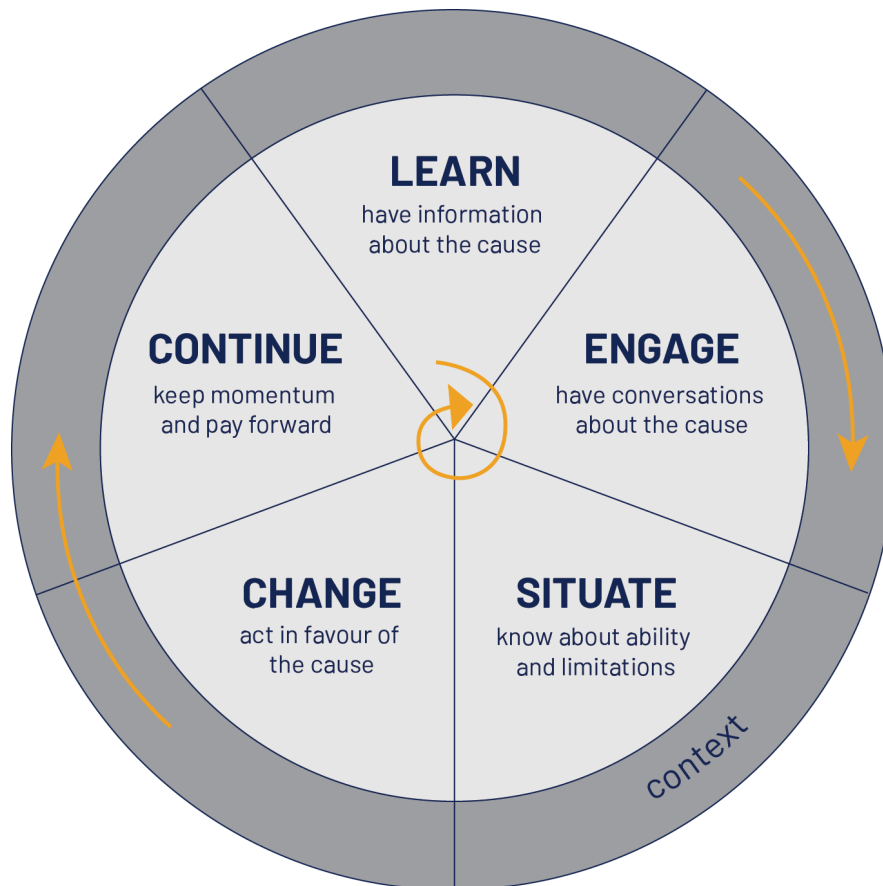

Figure 6 // Wheel of Relative change (previously called 'User Journey' in 'decarbonisation methodology' - Decarbonet[18])

The inner-circle shows the level of susceptibility of an audience to change their behaviour in favour of the cause presented, and the outer-circle represents the enabling environment that could facilitate the change.

The model is primarily meant for mapping; for gaining insights on a subject's position; and possible comparison between a '**before-and-after**' in behaviour. It also provides insight into how many stages a person needs to go through before he or she would actually change and consequently maintain

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[18] *Decarbonet Project Partners (2 Okt 2014). Homepage. Retrieved from https://www.decarbonet.eu/*
[19] *Note: At the time of development the model was not yet named as such. It was referenced as 'user journey to change behaviour' Wippoo, M., Alani, H., Piccoli, L. (1 apr 2014). Decarbonisation Methodology. Retrieved from: http://sites.weblyzard.com/playground/wp-content/uploads/sites/23/2014/10/D1.1.1-v2.pdf*

that behaviour on a specific topic. It is, however, not a tool for change in itself, but more specifically **a tool for self assessment** in the process towards change.

The stages for behavioural change are defined as **learn, engage, situate, change** and **continue**.

The first stage, '**learn**', describes an audience that knows about a cause and could develop a general interest. This type of person is able to learn in a very minimal way by registering information. This is passive involvement with the cause.

When a subject takes a more active position towards the cause, we talk about stage two, **engagement**. This subject understands that something can be done to support change and the cause more specifically, and is willing to communicate about the topic.

When a subject is able to **situate** the cause (stage three), they are able to consider their own context, and know what their abilities or limitations are to make a change. They know what particular changes are achievable in their situation. This subject will start looking for opportunities that could fit their circumstances.

So, once a subject is fully prepared - has all the knowledge and prerequisites to act – behaviour can be **changed**; this subject will start acting in favour of the cause. Crucially, the subject should not only change their behaviour once. Maintaining and **continuing** behaviour, making it a routine, is the most challenging part. The environment needs to be in such a state that falling back to old behaviour is not possible, is difficult or it would not bring any benefits.

Understanding at what stage a subject is helps to determine which environment(s) need to be (re)designed to get to that change of behaviour to occur. A subject that is unaware of a topic will not respond to a call to change immediately, but could be inspired to learn more. Once a subject is in the middle of change, the subject will not be the most susceptible to new information on other topics, but is likely open to suggestions for continuation of the change. It is all about timing, and taking the iterative and replicable steps towards change at the best time. Once it is determined what the subject needs to make a change in behaviour, it is in the hands of the local city partnership to facilitate an environment where change is possible and inspiring, ideally with the help of the general public.

2. Pilot coordination approach

This chapter elaborates on how the pilot coordination strategy is informed by the methodology, but is grounded in the reality of the Pilot perspectives and a set of values and principles that form the coordination approach.
Section 2.1 "Towards City Pilots" introduces the coordination task of the Pilots, describing how the Pilots face different challenges, but connect to each other, by aligning within the structure introduced by the building blocks of REFLOW.
Section 2.2, "Coordination values and processes", introduces a vision and approach on a coordination style, which is executed through a facilitating attitude that guides and aligns the Pilot cities. At the same time, it collects the inputs for the development of replicable CE strategies and transition processes, rather than directing them and imposing ready made solutions on their decision making processes. Within transition processes and the re-design of locally suitable CE strategies, different expertises, cultures and possible solutions need to be taken into account. These can be summarised as a bottom-up input and top-down alignment in structuring the process.

The strategy aims to bridge the abstract methodological background with the reality of the local challenges and the coordination values and processes. The strategy is then translated into an operational framework, the online system Pilot Cities Framework. The online system is developed in order to support replicability of the identified CE strategies (by the Pilot cities) and transition processes, by capturing this interaction and process in a digital environment.

2.1 Towards City Pilots

REFLOW aims to develop new models and practices that feed fully circular and regenerative cities. It is the project's ambition to deliver outputs that will *not only* push forward CE practices in six Pilot cities, but will also be replicable between these cities and beyond. These CE practices aim to have high potential of adoption in cities such as Circular Cities[20] , C40[21] and Fab City Global Initiative[22]. The fact that one intervention or approach has proven to be successful in a specific local context does not mean it is a recipe for success elsewhere. It is equally important to understand the context, and why certain practices have failed or turned out differently than expected.

On top of local variables, each Pilot is characterised by a focus on specific resources, covering plastics, agri-food, fair materials and wood, water, energy and textiles. Each pilot will also consider four different dimensions of the city's circular strategy. The Pilots will work towards:

1. **Material Flows**: Understanding the detailed qualitative and quantitative understanding of resources and their flows through the city;
2. **Governance, network and policy**: Understanding the dynamics around these resources, in relation to the local context, to the ecosystem of stakeholders, the policies and regulations.
3. **Technological development**: Understanding how technology could support a sustainable and viable implementation of these circular economy practises, around specific resource flows and the connected stakeholders.

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[20] *Ellen Macarthur Foundation. (29 Aug 2017). Cities in Circular Economy: An Initial Exploration. Retrieved from https://www.ellenmacarthurfoundation.org/publications/cities-in-the-circular-economy-an-initial-exploration*
[21] *Decarbonet Project Partners (2 Okt 2014). Homepage. Retrieved from http://www.c40.org*
[22] *Fab City Global Initiative (2019). Homepage. Retrieved from http://www.fab.city*

4. **Citizen Engagement and Capacity Building**: Understanding of citizens' position and agency in the circular economy system as a starting point for building engagement and capacity.

In relation to the four challenge dimensions mentioned above, each Pilot city will develop its unique vision and a local strategy on the challenge as a whole. Throughout the project, each city's vision will be further shaped and strategies will be further developed and tested, supported by project-wide tools and translated into operational strategies for transforming material flows, governance, policy and stakeholder ecosystems, technology and citizens' knowledge and behaviour.

This approach is supported by the methodological basis in the three theoretical principles described above: Sustainability Transitions, Citizen Participation theories and Waag's methodology of Relative Change. An outline for this methodology can be found in the following section, 2.2 'Coordination values and processes'.

2.2 Pilot coordination values and processes

The primary role of the WP5 coordinator is to facilitate the progressive creation of a coherent multifaceted image, and mapping the existing context of each Pilot city. To support the cities in the development of their plans and monitor their progress, it is essential to support continuous dialogue, critical reflection and collaborative learning at all levels (in cities, between cities and between cities and supporting project partners).

In the coordination strategy and its operationalisation, the following key values and principles are embodied, and are further elaborated below:

1. Process-oriented: holistic and iterative
2. Respect: The enabling of trust, a safe space and mutual respect
3. Shared responsibilities: local Pilot execution lies with local Pilot teams
4. Clear procedures: defined communication channels, online systems and rhythm to operationalise 1-3
5. Unity in diversity: Local collaboration culture

1. Process orientation. The holistic approach on CE transformation in cities unpacks and embraces the complexity and uncertainty inherent to large urban transformation through the five above mentioned values and principles. This calls for a dynamic, intuitive, iterative way of working. It requires us to go back and forth between ecologic, social and technological opportunities and challenges. A way of working that allows us to not only focus on the end result, but is inspired by and reflective of each other's theories and practices. To share work in progress, successes and failures. To open up to alternative views, ideas or solutions. It is of essence that this interplay happens inside local city teams, between cities and between the expert partners involved across the other content building blocks within REFLOW. The common values that form the baseline are inherited from Fab City Global Initiative and articulated in the Fab City Manifesto[23]. They include but are not limited to: inclusivity, transparency, openness, glocalism, local productivity and prioritizing people and cultures over technology. They are enriched with multiple perspectives of what a CE city strategy means, including its accountability, to give further shape to the direction needed.

2. Respect: The enabling of trust, a safe space and mutual respect. The enabling of trust, safe space and mutual respect form an important baseline of sharing work in progress and facilitate constructive dialogue between partners, Pilots and WPs. As described in the REFLOW Project

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[23] *Fab City Global Initiative. (2019). Manifesto. Retrieved from https://fab.city/uploads/Manifesto.pdf*

Management Handbook (D8.1), with safe space in the context of project organisation and communication we mean to allow the virtual and physical space for individuals to speak their mind, be critical in a constructive manner, put on the table their worries and take them seriously and constructively. To not judge, but listen to understand different visions and approaches, thus be respectful to learn from each other and pave the way towards becoming a circular and regenerative city.

3. Shared responsibilities: local Pilot execution lies with local Pilot teams. As building block coordinator, Waag liaises in each local Pilot with a local coordinator duo consisting of both the municipal partner and a creative or technological partner. This local coordinating duo in turn liaises with the local Pilot teams. This approach bestows mandate where it is most effective, ensures multi angle dialogue at all levels and relieves the WP5 coordinator from coordinating the 28 partners on content level. This process also promotes the creation of deeper synergies between the partners of the local city consortium, acknowledging each others perspectives, expertises and fostering the creation of a collaborative working environment. City partners becoming more aware of their collective potential are able to formulate optimised strategies for their cities, while refining their roles within the local partnership.

4. Clear procedures: defined communication channels and rhythm. Chosen communication channels are a mix of online and offline meetings as presented below, some lead by WP5, others lead by the project coordinator.

Type	Who (bold is lead)	Rhythm	Purpose
Pilot Coordinators call	**WP5 coordinator**, Project coordinator, all Pilot coordinator duos	Monthly	Alignment between Pilots, sharing tools and approaches, share between coordinators what is hindering progress on pilot level, sharing WP level updates
Coordinator one-on-ones	**WP5 coordinator**, project coordinator, one Pilot city coordinators duo	Every four-five months	In depth understanding of challenges, support, feedback, monitoring pilot progress
WP lead calls	All WP leads, **project coordinator**	Bi-weekly	Alignment between WPs, what is hindering progress on WP level
Physical meetings	In any constellation of partners relevant to the task at hand.	At any time needed, or combined with other instances when project partners meet.	Ideation, consolidation, problems that come up on WP or Pilot level.
Framework	WP5 coordinator	24/7 access to share,	Operational

	facilitates, partners are each responsible for their own contributions and development.	and build insight, wherever we are.	translation of the coordination approach: progress tracking of pilot development

5**. Unity in diversity: Local collaboration cultur**e
We have to take into account the different local collaboration cultures, which are a key factor in our ability to develop transformative CE strategies. Different key stakeholders with an important variety of expertise, networks and experiences are brought together in the local Pilots, creating new synergies between partners that collaborate for the first time, or strengthen the existing collaborations. It is important to not assume local partners are able to work together effectively simply because they are in the same city, share the same cultural background or supposedly know each other. It is in this that we recognise that each local partner will have different stakes, different roles in the city, different hierarchical positions, different ways of working, different levels of familiarity with one another and most importantly each will have a different vocabulary and set of skills.

A project like REFLOW allows and supports these local institutions to overcome hurdles, develop a common language, work together as equals striving for the same goal: cities that implement circular economy principles and practices, and result in a resilient system that facilitates the emergence of new social, environmental, technological, and economic activities.

2.3 Pilot coordination strategy

The concepts of Relative change, participatory approach and the multi-level perspective as described in chapter 1.3, are the starting point for the coordination strategy and the online framework. Together they support alignment, guidance and monitoring of the Pilots and a process through which the cities and their stakeholders can pursue this process of Relative change, in an iterative manner.

2.3.1 Sustainability transitions
The concept of sustainability transitions defined in 1.3.1 helps understand how purposive innovations are shaped, what are the needed elements for these transitions to happen and how we can unpack the challenges these innovations represent.
Sustainability transitions are an interesting concept for projects like REFLOW, in which complexity is multi layered. In this chapter, the complexity has been highlighted and dissected to bring into light the various layers separately, but when these are recombined, we can observe the multi level perspective nature of the REFLOW Pilot coordination and Pilot execution.

When reconstructed, the multi layered view of the purposive transition proposed by REFLOW:

- is explored across the four the challenge dimensions (and the knowledge and expertise coming from REFLOW's building blocks and project partners):
  - Material Flow Analysis, Governance, Network and Policy, Technological Development and Citizen Engagement and Capacity Building
- illustrates the necessity of transdisciplinary co-production and co-creation processes to take place between the different experts of the challenge dimensions and the Pilots, to craft a collective holistic strategy
- needs to be understood and crafted as an iterative process on multiple levels:

- ○ the redesign of the interaction and of the process itself,
- ○ the actual progress made by the Pilot cities.
- ● needs monitoring of the progress made, on three levels:
  - ● impact of the process on participants
  - ● impact of the products of the process;
  - ● use of the products of the process.

The concept of Multi-Level Perspectives helps unfolding these challenges of coordinating, aligning, guiding, and monitoring of the Pilots, and helps better understand what the complexity exists of and lay the groundwork for monitoring.

The coordination values and processes (chapter 2.2), combined with the understanding of these dynamics at a Pilot city level (chapter 2.1), is seen through this multi layered view, and restructured into the logics of an online system: the Pilot Cities Framework, described in chapter 3.

The coordination is therefore designed into a four part strategy:

1) alignment under the challenge dimensions (2.1 Towards City Pilots),
2) guidance for the stakeholders into the process through the values (2.2 Coordination values and processes);
3) the design and iterative shaping of the process (through the design of 3. The Pilot Cities Framework),
4) the understanding of the content collected through the process (the content delivered by the cities in the online Pilot Cities Framework and their Pilot Cities Action PHans).

The coordination strategy, and the capturing of the process under the first three layers, form the basis from which we can further understand and monitor how the fourth layer is developed: what the implications, the impact and the obstacles for these proposed purposive transitions might be. The iterative process of monitoring and giving feedback happens through rounds of interaction, and is developed from the perspectives of the four challenge dimensions: Material flow analysis, Governance, network and policy, Technological development and Citizen Engagement and Capacity Building.

On a local Pilot level, Sustainability transitions can assist in understanding that actions in purposive change, are stronger when connected and aligned to other sets of actions and initiatives already existing in a Pilot city outside REFLOW. When Pilots connect their actions with other initiatives, they stand a chance in breaking the linearity of the existing socio, economical and environmental system of a city.

2.3.2 Citizen participation
Building on top of understanding the multi-layered complexities and the aim for sustainable processes and CE strategies as described above, guidance for the local coordination is needed. In order to work towards successful transitions, activities need to be rooted in their local context and supported by local stakeholders, deeply requiring citizens participation to actuate change at every level.
In the context of citizen involvement with government or policy, 'participation' is the most widely used term. In non-governmental contexts, like in activism on specific issues, 'engagement' is a more commonly used term. They are related terms, but not exactly the same. The advance of using the term 'participation' is that there is a lot of theory behind it (like the participation ladder of Arnstein) that can give a more precise demarcation of the type of involvement that is needed/provided.

For all the Pilots, engaging citizens in the transition towards circular economy is fundamental, to understand the complexity of the challenge faced by their city, they need to be able to understand the dynamics and perspectives of all the stakeholders involved.

In a traditional linear economy, consisting of a model shaped in: design, manufacture, purchase, consume and dispose, citizens are involved in the last three phases. In an alternative circular economy model, where we: design for recyclability; manufacture with recyclable resources; purchase and consume consciously; and, dispose for collection and recycling, citizens play a key role. Their participation is required for this transition to happen, and the value arising from their participation has to be acknowledged. One of REFLOW's tasks will be to understand how we can enable circulation of this renewed value in resources for all the stakeholders involved.

2.3.3 Relative change

The concept of Relative change (ch. 1.3.3) is implemented both in the coordination approach in guiding the Pilot cities and its operational translation (the Pilot Cities Framework online system, defined in chapter 3 of this document).

Within the online Framework, this concept of Relative change guides the progress and monitoring of the Pilot cities development: by gathering information and refining this information through multiple cycles, Pilot cities produce a progressive scan of their local city context.

Using this scan as a starting point, the Framework captures the interaction process between Pilots and experts. This process is iterative, follows steps close to the phases in Design Thinking, and will use the concept of Relative change to understand the progress achieved between the starting point of a Pilot city and the end of it, within the timeframe of REFLOW.

This concept of Relative change supports the structuring of the coordination task of the Pilots. Although cities have different starting points and different transition phases, they all pursue overarching goals, (research) objectives, values and principles and all work towards replicable processes and CE strategies.

The understanding that each Pilot city has a different starting point and will undergo a change that is relative to their starting point is fundamental for the monitoring of the Pilots' progress. This monitoring needs to take place starting from the perspective and knowledge provided by the four challenge dimensions[24] of REFLOW and its relative building blocks.

Relative change, on a local Pilot level, also assists in the understanding of the value proposed in the scenarios (described in chapter 3) and of the action plans (chapter 4): by defining the steps needed to actuate this change, the challenges and opportunities are clear and made more tangible for all the REFLOW building blocks, through the online system – i.e. the Pilot Cities Framework.

Yet on another level within the local Pilots execution, the concept of Relative change also supports the understanding and monitoring of the steps in behavioral change needed locally: by the actors involved in each of the Pilots. Relative change can support understanding in where these actors are situated in the wheel of Relative change and which steps they could take into actuating this change.

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[24] *Note: Material flow analysis, Governance, network and policy, Technological development and Citizen Engagement and Capacity Building*

3. The Pilot Cities Framework

The Pilot Cities Framework was created as a *system for guiding and aligning, fostering iterative project development, monitoring the progress and boosting knowledge exchange between the cities and partners.* It sets in place a strategy that aims to guide a city in further becoming aware of the opportunities that arise along with the interactions. Its form and structure translate these concepts and aims into a vision for long term use to facilitate support in the replicability of the outcomes, possibly even after the project's life time.

This chapter elaborates on how the 'Pilot Cities Framework', the *online system*, operationalises guidance and monitoring approaches within WP5. It implements multiple perspectives: the concepts, values and theories of REFLOW; its digital architecture; by articulating its functionalities and how these reflect the process of city under the proposed alignment.

The goal of the 'PCF' (Pilot Cities Framework) is to provide a living and flexible system for iterative exchange of structured information, creating the basis for possible replicable outcomes, and map out the path towards circularity for each of the six Pilot cities with a strong empirical basis. The 'PCF' is, in other words, a tool. In successive iterations, such tool will work in order to capture and crystallize what we learn and discover, showing the interplay between Pilot cities, WPs, and the Pilot coordination objectives. The 'Pilot Cities Framework' is enabled by and rooted in the awareness of interdependencies, differences and similarities not only between Pilot cities, but also between WPs; over the lifespan of the project and possibly beyond.

3.1 An operational translation of the coordinating approach of WP5

The concepts, theories and values that have guided the coordination are made operational through the online system "Pilot Cities Framework". This guides the six pilot cities into deep understanding of how REFLOW can support their path towards becoming a circular city. The Pilot Cities Framework has the main aim of aligning, guiding and monitoring the progress of the cities. It also sets a clear strategy for supporting Pilot cities in co-creative processes and understanding the expertise and various perspectives coming from the project partners. Its form and structure translates these concepts and aims into developing a platform for long term use that can support replicable outcomes, even after the project lifetime.

The Pilot Cities Framework is an evolving online system, developed to define a logic of how the cities can collect and understand information and build upon each other's knowledge. This should create a collective perspective and larger pool of information that can feed collective understanding, next to organising further learning and self assessment.
The gathered information is organised, streamlined and mapped to create a living picture of each city's context. This alignment, in both content and structure, not only provides a constantly updated dashboard to all partners, but also allows opportunities and difficulties to be identified while becoming a circular and regenerative city.

The PCF therefore intends to enable a more structured and focused dialogue between the city representatives and the partners representing each work package. By implementing a common language and shared vision in a digital environment, it aims to support an exchange of perspectives, expertise and experiences.

Information supplied (primarily) by work package partners is analysed and then structured in the Pilot Cities Framework. This occurs by re-mapping the intentions behind the inquiries, and further scoping the main aim of the information requested and provided. This co-creative process cultivates a baseline of deeper understanding which allows Relative change for each roadmap to be highlighted and diversity to be maintained.

The Pilot Cities Framework is built based on the design principle of a customizable modular system, that is further detailed in chapter 3.6. This grants the necessary flexibility for a project which is explorative and purposive in nature; where impact towards sustainability is supported by a large group of experts (represented by the partners of the REFLOW project) who can in turn guide collective progress towards circularity.

On the local Pilots perspective, the online Pilot Cities Framework also aims to harbor and showcase the wide and diverse cumulative knowledge of all the local city partners. By highlighting the importance of a strong local network that collectively strives to become a circular city, the online PCF supports the visibility of connections to other cities' local initiatives, projects and activities. It supports a sustainable transition in the entire city that builds upon existing knowledge and activities, rather than creating new isolated actions.

The framework operationalises this concept by letting the cities choose the amount and typology of information that they provide for each step and by encouraging the cities to showcase the focus of their Pilot and re-design of the resource flow. This aspect also supports diverse opportunities for both the monitoring of the developments and for capturing the relevant pointers for the redesign of the local ecosystems.

3.2 Structure of the Pilot City Framework

The Pilot Cities Framework is structured through the Multi Level Perspective (MLP) concept as described in section 1.3, reflecting the different needs coming from both the work packages and the six cities.
Building on the concept of Relative change, the PCF is focused on supporting, in a digital form, the progress of the six cities in their journey towards discovery, awareness, ideation and implementation of transition to more circular and regenerative resource streams.

It is designed to also function as a growing and expanding archive for knowledge exchange. The structure allows each Pilot city to access a personal space where information about each resource stream is gathered. Simultaneously, each Pilot city is able to review the information from the other Pilots, creating a shared knowledge bank of data to learn from, that will keep evolving. This system convenes successes as much as unsolved challenges to be addressed in the future.

This structure can support further change analysis in the future, designing and hosting a growing number of tools and features, that jointly assess the Relative change performed by each city.

In the future, we envision a city being able to log into the PCF to possibly draft a new trajectory for themselves, tackling the analysis, ideation and redesign of a new stream, or for a new city to start their journey towards circularity.

As of today, the *Pilot Cities Framework* is structured in the format of an interactive content management system, following the extracted logics coming from the concepts of *a Relative Change methodology and Citizen participation* and uses those as underlying guidelines for development.

It re-configures the overarching setup of the REFLOW project as a whole, addressing the identified relations between two main components (work packages and city local partnerships) into a digital environment in which these components interact.

From the perspective of the local city partnerships, it offers a dashboard, that in turn gives insights in the local investigation, the process performed by each of the cities, fostering curiosity and learning from each other. From the work packages perspective, it enables the reconfiguration of the modular formats, page and sections into a topic-relevant structure, while giving insights in the challenges and opportunities faced by the Pilot cities.

It is therefore structured with a double entry point:

1. From the Pilot cities perspective, it hosts:
● General home page - to select and access each Pilot city-specific environment, through this entry point cities can explore each other's approach, understand how another city is undergoing a similar process towards change and enabling cross-pollination
● City-specific environment - structured in macro sections, pages and specific sections, relative to each specific city to be used as a dashboard for each Pilot.

2. For the work packages interaction it hosts:
● Questions Editor and Customisation panel - structured in:
    ○ Generation of new formats, questions and requirements for inquiry
    ○ Re-organisation, adjustment and prioritization of the newly added formats and questions

Following the detailing of the above described structure, the Pilot Cities Framework is further developed into its operational translation in the following paragraphs.

3.3 The home page of the framework

The home page entry point is structurally needed for the digital content management system to function, allowing users to access each Pilot city-specific environment. It also supports the collaborative approach and explorative nature in learning from each other.

By easily being able to access information, process and challenges that another city is working through to become circular, it allows for cross-pollination.

As long as all the Pilot cities continue to use the system, it ensures transparency and the possibility of helping and guiding future cities into better understanding which challenges these six Pilot cities faced, which opportunities and strategy became relevant and when.

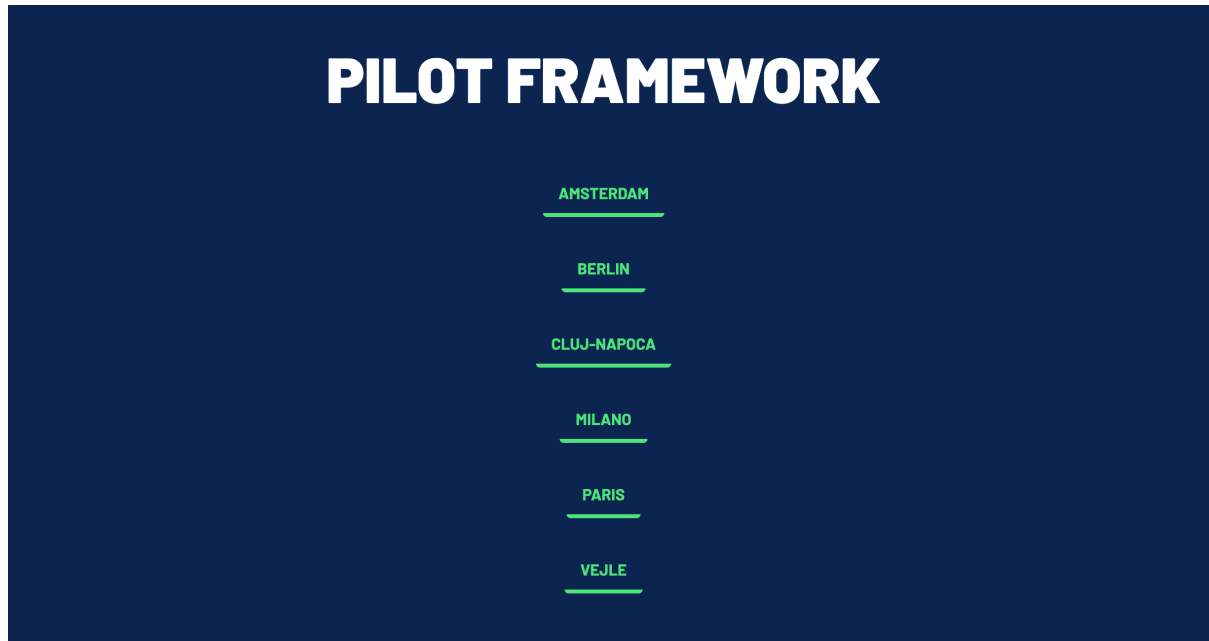Access to the cities is provided through this entry point : https://cities.reflowproject.eu

Figure 7 // Overview of the city Pilot entry point in the City Pilot Framework

From here, users are able to deep-dive into the the city-specific environments, structured further into macro pages, pages and sections.

3.4 Articulation of the structure - Macro sections, pages and sections of the framework

In this chapter, a broad overview of how the structure is articulated is presented, while more detailed information regarding each element is detailed in chapter 3.5 of this document.
The macro sections are wider overarching phases of the development. Each of these macro sections unfolds into several pages, each addressing different challenge dimensions. Sections articulate the pages into finer details.
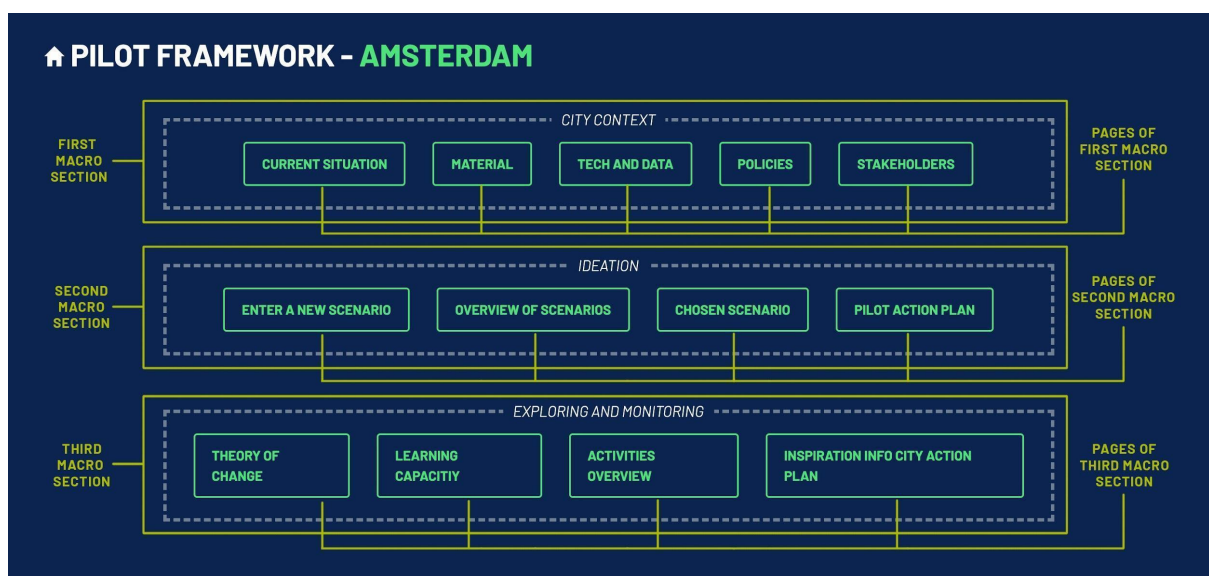
Figure 8 // Overview of the city specific pilot framework page

The three main macro sections are each focusing on a specific phase of development for the cities. These phases consist of: understanding the city context, from which the cities are guided into a second phase, to start collectively ideating from the information and knowledge gathered. This phase allows for better acknowledgement of the opportunities for intervention that have most potential for each of the cities. The third phase and macro section, is devoted to define more in depth the exact plan of action for each city, by creating the space for a focused dialogue between the WPs and the city representatives.

Each macro-section aims to reflect on the steps taken into coordinating the Pilots and the information flows around them. Both the format and features of the macro section enable and ensure the entire consortium to continue the development and design of the process, by adding new macro sections when the need arises.
The pages hosted within the macro sections, are composed by a set of inquiries formulated by all the work packages towards the Pilot city partners, where information can be filled in and recorded.
The recording of information is stored in a database where changes are tracked over time in order to gain deeper understanding of the process undergone by each city over time.

The information is organised through the challenges associated with the respective streams of the four challenge dimensions. A "macro section" defines a first umbrella that fosters the mapping and grouping of the information exchange, this is then organised in multiple "pages" hosting themselves more detailed "focused sections".

> The *city context* is the first macro section, consisting of five pages, each hosting different focus-sections. These are detailed further in chapter 3.5 of this document, and that were generated in collaboration with the other content building blocks within REFLOW.

> The second macro-section focuses on *ideation,* it consists of four pages and steps towards idea and scenario definition.

> The third macro-section, *exploring and monitoring the city action plan,* is the starting point for further definition and focus of the plans. This macro-section was again generated based on the needs and requests from the various experts from the building blocks within REFLOW.

The PCF is a system that develops iteratively, by exploring the needs and requests of the project as it develops and ensuring the possibility to continue its development maintaining a holistic approach. Its modularity features enables the entire consortium to contribute in an iterative manner to its development and adjustment. The operationalization of this is further articulated below in the work packages entry point to the Pilot Cities Framework.

3.5 The macro sections of the framework

3.5.1 City context (Align)
The first section focuses on aligning the cities by gathering information on the context of each of the cities at the project's outset.
No city is the same, each city is unique and holds potential to design and develop a different route towards circularity. Consequently, the strategy for aligning the cities is to streamline, preserve and highlight the similarities and different starting points between the six Pilot cities. No matter how diverse the focus area for each of the cities is, each PIlot city might want to focus on a different combination of challenge dimensions (Material flow analysis, Governance, network and policy, Technological development and Citizen Engagement and Capacity Building). The initial contextualisation is important to understand the individual baseline, and to better understand the Relative change and steps that each city will undertake.
This multifaceted picture of starting points also works towards supporting and guiding possible future cities to take steps towards becoming a regenerative and circular city. By fostering the possibility of replicability and traceability of our collective efforts and actions, we can learn from these and in the future identify which steps can become a future starting point.

This macro section not only helps capture an initial picture of each Pilot city from each of the four challenge dimension perspectives, but also assures that all present information is registered and gathered in one specific easily accessible location.
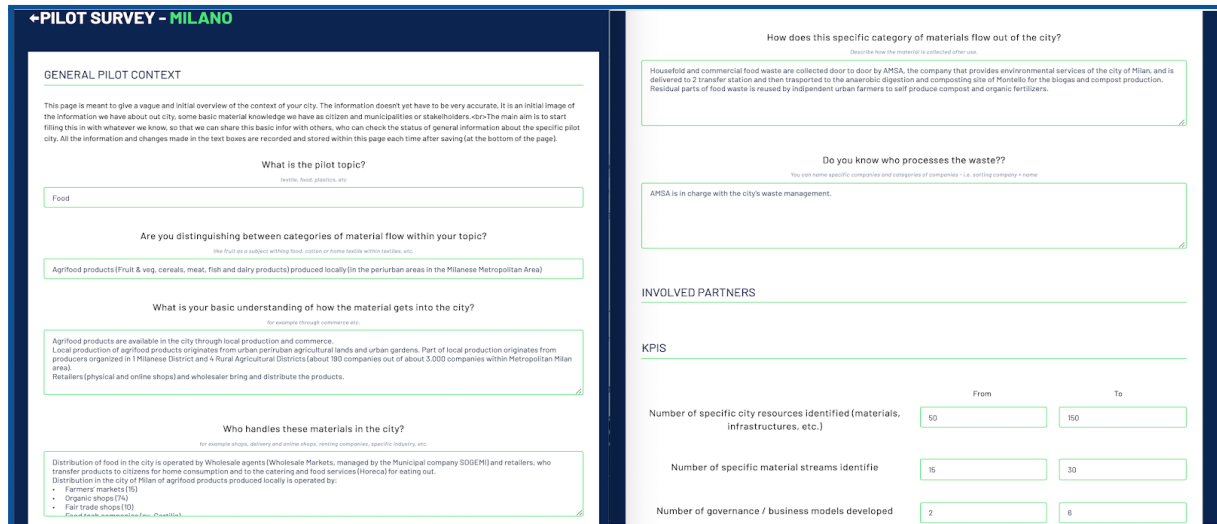The nature of this macro section is defined by the **needs** we collectively defined, coming from both the cities and the WPs. This supports the city to align with its own city partners while better understanding the expertise coming from the WPs, and vice-versa. Its nature and goal is therefore to harbor the space for this knowledge exchange to happen in a guided and structured way.

Figure 9 // City Context pages overview

Each page of this first macro section aims to highlight different aspects that, combined together, create the first city scan regarding the composition, technological infrastructure, digital information collection, material flow & presence in the city, as well as all the actors and policies already present in each city. The information is collected by the partners of each of the cities in collaboration with the other REFLOW project partners.
On the other hand, each "focused section" has the aim of detailing out information, in a question-answer format that facilitates and guides the construction of a story line approach.
The questions and knowledge sections are formulated in cooperation with the WP leads through a series of different collaboration sessions and co-creation workshops. The co-creative and questioning approach of the sessions worked towards fostering a clearer and common understanding of what the different parties needed or had to offer to each of the cities.

Figure 10 // Overview of one example section for the page "Current Situation"

- **Current situation** - *offers insights about the basic understanding and information regarding the chosen material stream, the partners involved and their roles and technical competences, as well as the predefined KPIs. It gives all parties involved a sense of the composition, dynamics and potential of each city team.*

- **Data and tech** - *aims to sketch out the various levels of digitalisation, available data and possibilities in gathering data about circular developments and activities, technologies and production means of various nature.*

- **Materials** - *hosts the first Material Flow Analysis scans realised by Metabolic, based on the available public data, that help the cities to investigate which neighbourhood or more specific flow could have interesting aspects to focus on. In the future it could foster also material regulation policies to create a crosslink with the policy section.*

- **Policy** - *hosts references and a scan analysis of the first policy papers about circular economy analysed by P2P Lab.*

- **Stakeholders** - *hosts a list of the most relevant stakeholders that should be involved in each Pilot in their ideal situation.*

This macro-section has shown to be very important for the process, further underpinning that each city has a different starting point offers the cities the potential to learn from each other, mapping out previous and future steps that could be taken, reflecting once again highlighted in *the concept of Relative Change* described in this document in the Theoretical background 1.3.3.
As well, one of the goals is to use the PCF as a potential tool to craft the ideal next steps of the progress towards circularity. The direction to take in order to create future steps is made visible by highlighting today's Pilot cities challenges and therefore work together towards filling in the lack of information that generate the challenge.That is why the PCF, by gathering information, offers the opportunity to simultaneously determine which data are missing (simply, every time a question is not answered) and draw a clear path towards future strategies. At the same time it also highlights the focus and already existing potential present in each city.

This goal is concretized into a digital structure of fill-in forms that allows to add as many entries as a Pilot city wishes. Consequently, it organically starts to highlight which are the most prominent

aspects already developed and valued by each city. Further analysing this in the future will be fundamental for better assessing each of the city action plans and their next steps.

3.5.2 Ideation (Guide)

The second section focuses on ideation, making visible the steps taken by the cities, starting from the initial ideas, all the way to the first formulation of the action plans.
The process aims to work in a way that supports an explorative and multifaceted approach, but also guides in documenting the process into finding focus and clarity of scope of action for each city.

The pages build upon each other, mainly accompanying and framing the steps of the process of each city. By starting to collect the ideas and challenges from the entire local city consortium, the framework promotes cohesiveness, dialogue and knowledge exchange at a local level, needed to achieve change as a local group and movement. Each partner active in the local consortium is able to generate new scenarios[25] by adding them in the PCF system, starting from their strengths, coming from either the perspective of challenges, possibilities or involved actors. This process promotes cohesiveness, dialogue and knowledge exchange by inviting all local partners to contribute (not just the Pilot Coordinator) and then organise local Pilot partner meetings in order to revise and structure further the information together.

From a very wide and comprehensive collection of ideas generated by the local city partners as a collective effort, the entire local consortium can become more aware of the possible synergies. Having a wider angle to observe potential change making actions and ideas, can foster new opportunities to be developed. From this amplified collective perspective, cities can take more informed decisions, that maximise the use of local synergies.

The Pilots develop the scenarios with their local partners, exchange ideas and perspectives, by recording them in the PCF system and then discussing them in local Pilot sessions. This process also supports the growth of trust between the local pilot partners, clarifying even further where the strengths of each of them lays.

The selecting and merging scenarios urges the cities to find their main focus, which, in combination with the dialogue between WPs and Pilot cities, support the first definition of a Pilot City Action Plan.

This divergent-convergent phases aim to promote listening and understanding, while helping the cities to also be realistic and grounded when defining the specific local focus and plan of action.

Figure 11 // Ideation pages overview

These pages and stages within ideation, follow loosely the steps of design thinking[26], where step by step, in a constant cycle of creating and testing (in the form of questioning and reflecting), the pilot works towards a scenario they want to focus on.

Figure 12 // The 'enter new scenario page' from the ideation macro section

- **Enter a new scenario -** harbors the process of sketching out and collecting the first ideas for each Pilot city. A guided narrative approach identifies possible scenarios and actions, by starting from opportunities, existing obstacles to overcome, and possible actors involved. Defining these is the first step towards digital co-creation, where all city partners are involved and propose their ideas.

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[26] *Note: Design thinking is a human-centred approach towards (complex) problems which are seen and (re)defined as design challenges. In order to tackle these challenges, a non-linear, iterative process seeks to understand users, challenges assumptions, redefines problems and creates solutions to prototype and test in its actual context. Design Thinking consists of five phases that are extracted from a creative design process and translated / captured in five simplified steps that can be run through simultaneously: Empathise, Define, Ideate, Prototype and Test. Design Thinking is both a mindset, a method and an approach and can be applied in a variety of fields.*

- **Overview of scenarios -** offers the complete overview of all the scenarios inventorised by all the city partners. It makes visible and supports the interaction between different perspectives of each scenario, generated by each partner in each Pilot city. This is made operational by offering the possibility to modify, fork and thus create parallel storylines for each one of them.

    The concrete functionalities are:

    Forking[27] - this action allows to experiment with changes, creating parallel changes without affecting the original scenario, but using someone else's scenario as a starting point for a new scenario.

    Editing - to further define, adjust, finalise or concretize a specific scenario or bring two separate scenarios together.

    Deleting - to avoid duplication and misunderstandings.

    Star - to select preferred scenarios.

Figure 13 // The 'overview of scenario's page from the ideation macro section

- **Chosen Scenarios**
    - **The starred scenarios -** (in development) this function collects only relevant scenarios that were chosen by the PIlot cities for further investigation and formulation of their plans.

- **Pilot Action Plan -** hosts the first sketch of the city action plan. The content of this section sets the first defined goals, objectives, overall strategy and a list of activities that the Pilot city has identified as fundamental to undertake. The aim is to document the starting point for the final definition of the city action plan to be in deliverable 1.2.

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[27] Note: Forking is the act of technically creating a copy of a digital repository.

3.5.3 Exploring and monitoring the city action plan (Monitoring)

This macro section can assist in ensuring the operalisation and feasibility of the proposed project-scenarios, by fostering knowledge exchange, supportive input and actions by the other WPs into accomplishing and realising the proposed plans.

This macro section acts as a second layer of screening and articulation that also allows for the tracking of progress, especially in the page explaining the **Theory of Change**[28]. This specific section aims to screen repetitively the expected outcomes and focused/relevant insights that help the cities into formulating their **Key Performance Indicators** under both the social, environmental and economical lenses provided by the experts on the topics of material research, business and society. This section also aims to identify the obstacles encountered in the development of each city action plan and analyses how each pilot overcomes them.
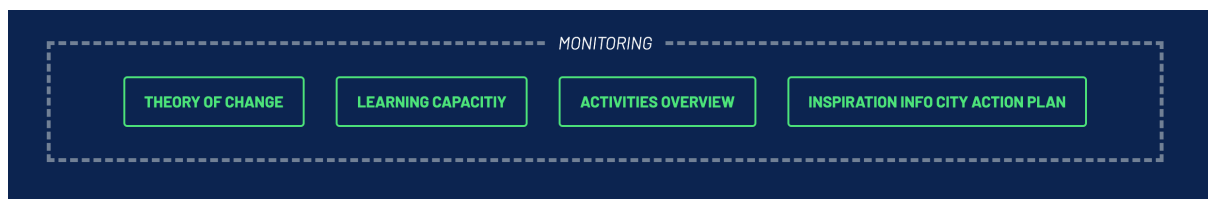
Figure 14 // Monitoring pages overview

- **Theory of change -** This section hosts a complete and overarching, but not detailed, overview of the PCAPs where the steps are strictly linked to each other. It aims to understand wider dynamics which will help to further **understand the progress of each city** based on its challenges, objectives and their possible outcomes. This process will happen several times during the lifetime of the project in order to help WP1 and WP3 monitor and evaluate the needs, challenges, outputs and concrete activities at each stage of the roadmap towards circularity.

  Following a more in depth explanation the steps of the Theory of Change:

  Challenge - gathers information on which problems and challenges each Pilot is addressing and facing.

  Stakeholder - gathers information on who are the stakeholders involved in the process: partners as much as audience.

  Scenarios - gathers information on what the entry point of each pilot is to be able to reach the audience.

  Activities - gathers information on which activities are planned for each scenario in order to reach the audience.

  Outputs - gathers information that will later turn into KPIs, as this part is intended to measure the effect of the activities previously listed.

  Outcomes - each scenario will possibly generate outcomes. This part gathers information on the expected results. By definition outcome measure consequences of a situation, in this case related with possible scenarios, that differs from Output which measure an amount (in this case KPI) generated by the Activities.

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[28] *Note: See chapter 1.3 for definition.*

Impact - this part reviews and gathers information on the long term goal each Pilot is expecting to match.
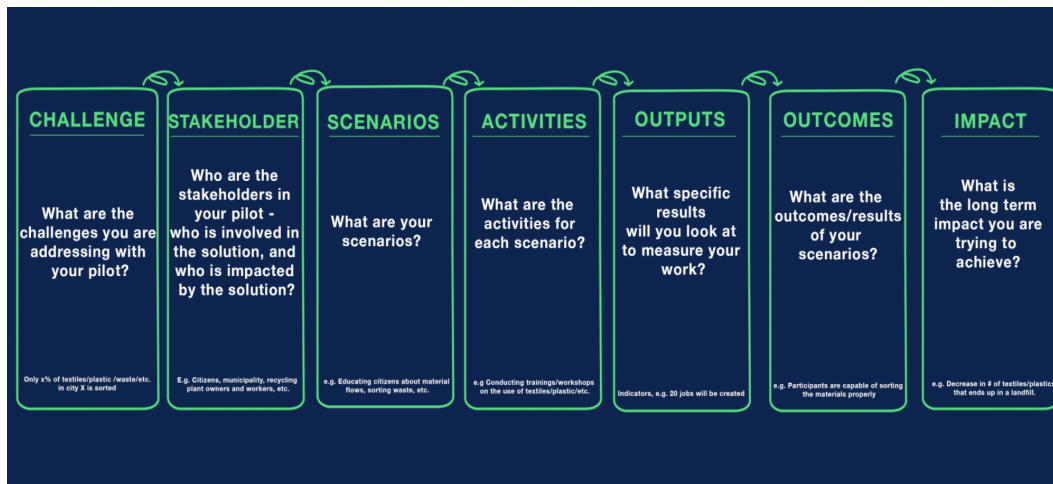
Figure 15 // Overview of one example page of the Theory of Change

- **Learning capacity -** this section explores the educational resources that are supporting the objectives of each Pilot, identifies the level of possible stakeholders that might support Pilots reaching their goals as well as defines the type of competences and knowledge each target group (audience) should develop. It is prototyped on the base of the information exchange with the experts within the REFLOW project.

- **Activities overview -** This section will be showing an overview of the activities and their outputs of each Pilot. The Activity overview section is linked with the Theory of Change section (the information filled in Theory of Change section regarding activities and their outputs are automatically copied in the Activities overview section) and is functioning as an archive, while possibly offering further insights in the support of the dissemination actions in collaboration with other experts within the REFLOW project.

- **Inspiration -** this section harbors relevant projects and activities that could be interesting for each pilot. It is a space to share new appealing and attractive initiatives that could inspire the generation of new ideas for each of the Pilot cities.

The 'Exploring and Monitoring' macro-section is fundamental for monitoring the process of the Pilots, and it creates a base for analysing each Pilot case and merge possible results and challenges to find what Pilots possibly have in common throughout their development, for example challenges, activities or achievements. One of the key aspects lies in the generation of a complete overview throughout the whole process, within the *Theory of Change* page that will be supportive for a constant monitoring of the activities each Pilot is executing.

3.6 The modular architecture

The entire framework is modular, consisting of building blocks that are semi-flexible in structure, but adjustable in content.

Each module represents a typology of information flow either shared or requested by any of the consortium partners. Work package partners can add, modify or finetune their own requests iteratively, by accessing the customisation panel. This customisation panel enables the partners to craft their own process, leading the cities into a dialogue and storytelling approach that will collectively sum to snapshots of the process undergone by the project in relation to the cities.

3.6.1 The modules

The modules allow for the addition of questions in different formats and lengths, displayed as plain text, or organised columns to better organise the information and categorise it, or uploading images and links to external forms and sources.
Each of these modules can be combined to create unique pages, that address the needs of the specific dialogue, while tracking its progress.
This modular aspect reflects also the open, collaborative and experimental research nature of the project, while trying to support the aspect of replicability and future development of the framework system.

The modules are in constant progress, as the consortium partners request new formats and give shape to their methodologies throughout the project life, new modules will be added. Creating therefore an updated repository of choices for further shaping the framework system.

At this moment we have given shape to the first set of eight modules:

Question Simple text - enables to add a short answer in text

Question Block text - enables to add a longer and more detailed answer in text

Question Column - enables to add multiple short answers on the same topic by adjusting columns number depending on the number of information required (For the same question you may for example add Name, Description, Type, Target, and more). For this question type there is the possibility to keep adding information by using an 'add button'

Question KPIs - enables to insert value of measured KPIs (from-to) in a columns overview. For this question type there is the possibility to keep adding information by using an 'add button'

Question Upload - enables to upload an image or a file to answer to a question with a visual drawing or picture

Question Link - enables to share a link from a webpage

Question Display image - enables to create a question formulated as checkbox, the user will therefore be guided through preselected options

Question checkbox - enables to insert a displayed image by adding a link from a webpage or from a previously uploaded file on the framework

3.7 Interoperability for the actors

Being shaped as a modular content management system, the Pilot Cities Framework allows all partners of the consortium to adjust their needs, questions and process iteratively.
As the cities evolve, a further definition of the strategy by the work packages is fundamental, evolving like a dialogue that builds upon each response and insight.
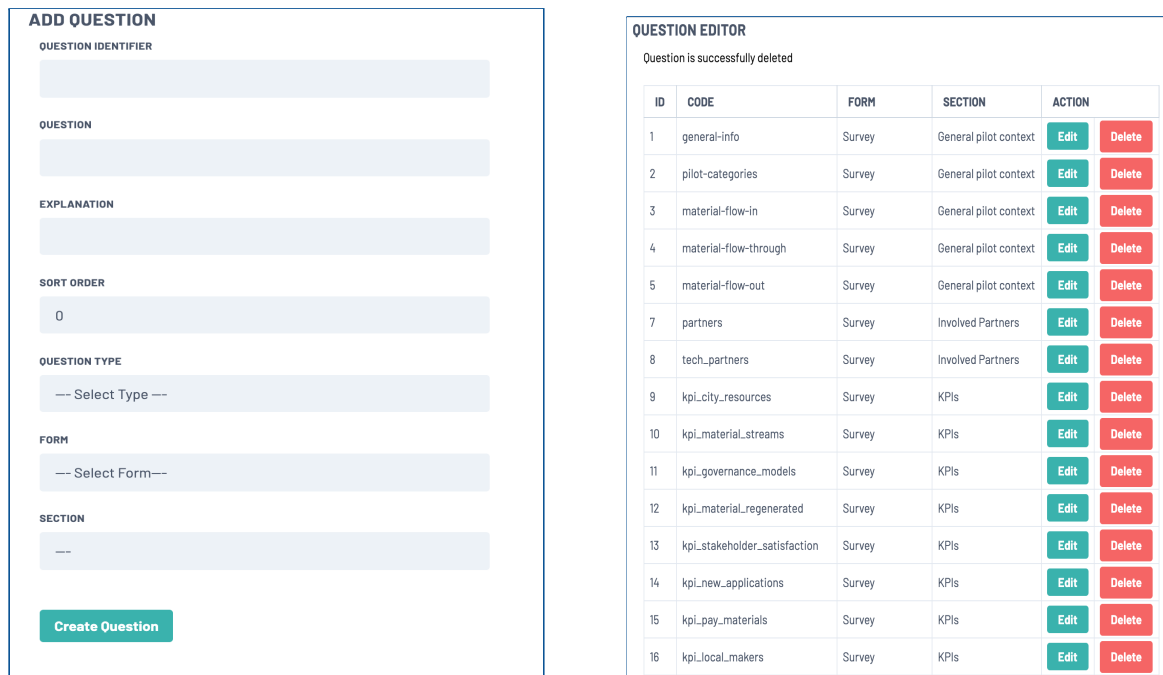
It is realised in two separate pages, the customisation panel for the formulation and addition of new questions, and the questions editor, functioning like a database for the re-organisation of the questions.

The customisation panel can now be found here:
https://cities.reflowproject.eu/questions/create

While the Questions Editor is to be found here:
https://cities.reflowproject.eu/questions

Figure 16 // Overview of the customisation panel and the question editor

3.7.1 The Customisation Panel

The Customisation Panel offers the possibility to the work packages to add, modify and further refine their inquiries towards the city at any given moment.
The access to this functionality will be given to all work packages starting mid February. As of today, the inquiries and formats have been filtered by WP5 to ensure the creation of a cohesive starting point for the entire consortium, while the Pilots cities have been fully interacting with the formats generated until February 2020.

The Customisation Panel (on the left of fig16), depicts a screenshot of the front-end form through which the partners will be able to add their questions. It is structured into seven entry fields

collecting information about the question itself and other relevant aspects, such as insights in its goal, suggestions to better frame the answer, position within the overall page and section.
How the Customisation Panel is articulated in fields and what these aim to do, can be found in the list below:

Question - enables to create a new question in a simple text format.

Question identifier - enables to add a tag (one word) for tracking the question in order to group questions by similar topics.

Explanation - enables to create an example of how to answer the question previously formulated gives insights in the goal and framing of the question itself.

Sort order - enables to give to the questions the right order to ensure the logic to stay intact within the list of questions in each page.

Question type - enables to select the right module (see above: Question Link, Question Checkbox, or other) to fit the logic and needs of the question formulated. Question types will be added as they get developed to reflect the needs of capturing information by the other partners.

Form - enables to choose in which page of the framework the question will appear.

Section - enables to choose in which section of the preselected page the question will appear

3.7.2 The Questions Editor

The Questions Editor offers the possibility for a complete overview of all the formulated questions, listed in a chronological order. In this overview each question is categorised and listed by:

ID - which provides each question with a specific identification number.

Code - enables the user in assigning a tag to the question, through the Question identifier, which allows for a quick understanding of the specific question.

Form - showcases which Page of the Pilot Cities Framework the question belongs to.

Section - showcases which Section from the related page the question belongs to.

Action - enables the user to edit an existing question or to delete it

3.8 Framework development and next steps

The Pilot Cities Framework development will continue across the lifespan of the project, developing new features, forms and macro sections in an iterative way, together with the project partners.
The current state of the PCF is open and accessible to everybody inside and outside the consortium. However, the consortium and WP leads will be asked to take a collective decision regarding the level of openness of the framework while the project is running, especially looking at how to deal with possibly sensitive information. In case the consortium will decide for a password protected environment, WP5 will start the development of this feature alongside further testing and implementing changes requested by the partners.
In the near future, WP5 also sees the chance to further elaborate the number of pages in the macro section, especially in the *Exploring and Monitoring of the City Action Plans.* As the partners will gain

insight in the Pilot City Action Plans, new perspectives and questions will arise. WP5 hopes to be able to host these within the current structure of the PCF. A structure for suggesting new features to the platform will be set up in the near future, to enable a quicker identification and categorization of the needs voiced by the Pilot cities or work packages.

3.9 Resources

For those interested in the more technical description of what the framework is and how it has been set up, a technical annex about the framework can be found in Appendix 1.

All of the website pages mentioned in the document above are listed below:

Cities entry point	https://cities.reflowproject.eu
Amsterdam	https://cities.reflowproject.eu/locations/amsterdam
Berlin	https://cities.reflowproject.eu/locations/berlin
Cluj Napoca	https://cities.reflowproject.eu/locations/cluj-napoca
Milano	https://cities.reflowproject.eu/locations/milano
Paris	https://cities.reflowproject.eu/locations/paris
Vejle	https://cities.reflowproject.eu/locations/vejle
Questions Editor	https://cities.reflowproject.eu/questions
Customisation panel	https://cities.reflowproject.eu/questions/create

4. Pilot Cities Action Plans

4.1 Introduction

The Pilot City Action Plans (PCAPs) are a collective effort and contribution of all six Pilot cities and their local partners. Each Pilot city has provided a first overview of their initial sketch of their action plan. Through these plans, the cities provide a general introduction about the local context, further specify their challenges and objectives, define the supporting strategy, and identify activities that will ensure a relevant development of the plan. At the same time the cities address stakeholder interactions and local synergies.

These PCAPs create common ground for a new exploratory phase, through which the entire consortium can gain a deeper understanding about the plans from their expert perspectives. The plans are a first draft and open to be questioned by the REFLOW project partners. The PCAPs will continue to be refined and iterated based upon shared knowledge and input from consortium partners.

This overview of the city action plans can also offer an overarching reading that enables further analysis in multiplicity, diversity and similarities. By understanding how the process and progress of the cities is very diverse but similar in actions, we can again see a directional movement towards circularity.
The six Pilot cities are addressing different streams of resources and starting from different local contexts, but there is again a common vision for their choice of actions and strategies for development.
The proposed Relative change concept (1.3.3) and unity in diversity value (2.2) support the process, by taking into consideration both the starting point and the progress achieved by each Pilot city. Lessons learned from the six different starting points can be further extrapolated in the future. This allows us to further understand how the spiral development of Pilot cities can build upon each other's steps. Some of the cities start from a set of digitalised information about their resources; others will aim to further digitalise their resource flows in order to achieve this change. Other cities have already in place a set of policies towards circular economy, while others will be working towards promoting development in exactly this direction. In short, the trajectory for each pilot is different; starting and ending points differ, and the rate of change will vary for each Pilot.

The graphic below is a schematic overview that can help cities to better understand how Relative change towards a purposive transition such as circular economy, can have different starting points and different levels of progress. No matter where each of the Pilot cities starts in this transition, each of them will develop a strategy and take steps in the direction of circular economy. The image also shows that there is an emphasis on progress, supporting also possible formative and summative monitoring of this progress in the timeframe of REFLOW.
As an overview depicting the process of all six Pilot cities, what is lost, is the visualisation of the individual iterative cycles that each of the Pilot cities undergoes within REFLOW.
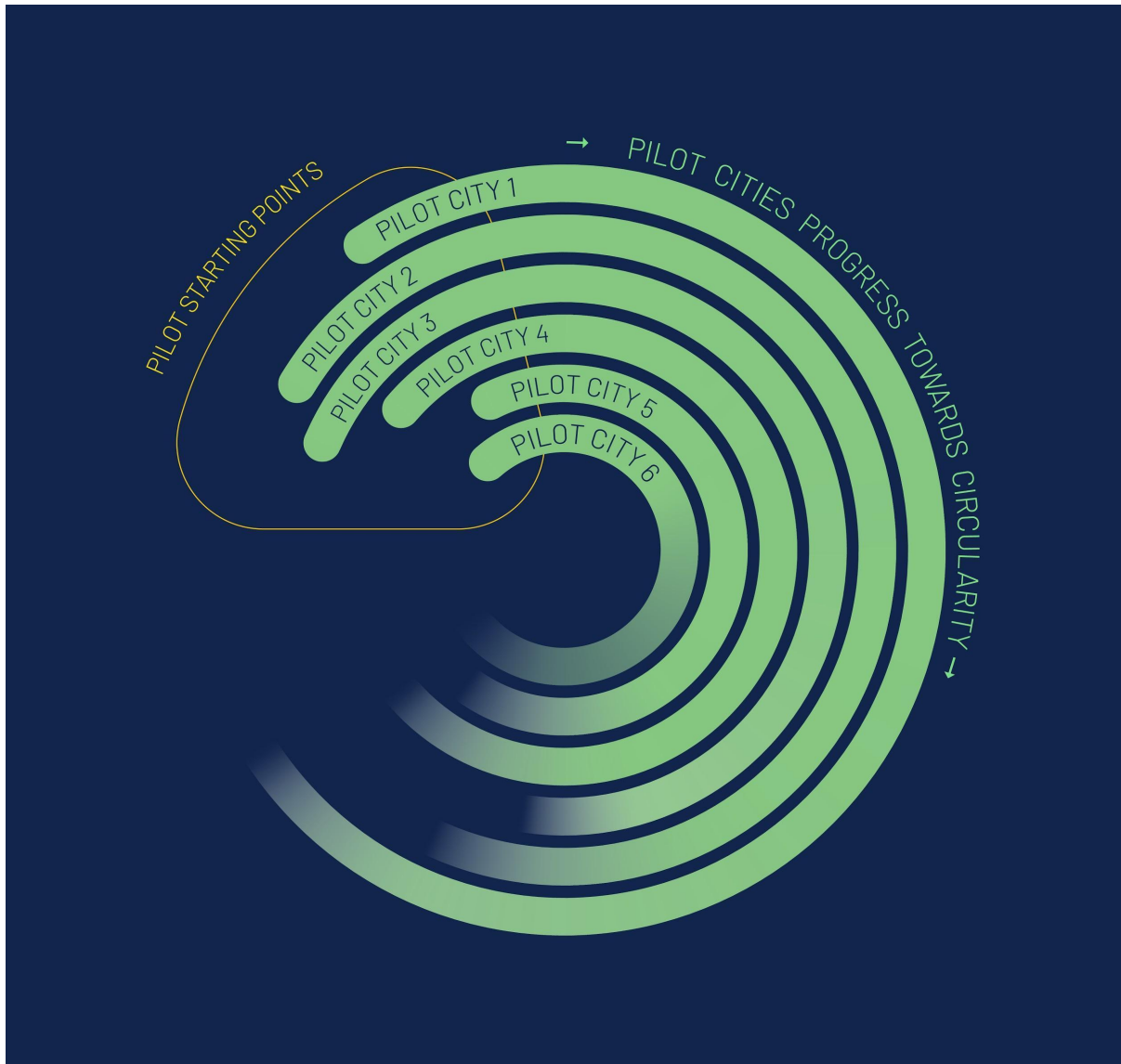
Figure 17 // Schematic overview of the diversity of Pilot city trajectories within a cyclic concept of progress.

The Pilot city descriptions in this chapter can be seen as a starting point from which city Pilot teams take action. From this point onwards, they further pursue their short- and long-term goals and ambitions. Each Pilot city partner needs to recognise itself in the description and have a clear role to fulfill, related to their core strengths and organisational representatives.

The Pilot City Action Plans are structured in:

- A **general introduction** in which an analysis of the current situation is provided in terms of government, legislation, ecosystem and material flows.
- A **list of objectives** in which both short term and long term objectives for the Pilot are identified.
- A specification of **Pilot strategy and activities** in which the Pilots provide a first description of 2-4 complementary short and long interventions, that feed into each other and cohesively

form the Pilot strategy. Pilot cities are requested to address governance, network & policy, technological development, capacity building and social impact.

● A short list of the first 4-8 environmental, social and economic **KPIs** is drafted by each city in collaboration with REFLOW project partners, which will be used to monitor the progress in recurring sessions across the life span of the project. The shortlisted KPIs are calibrated to the local context of each Pilot city to represent more accurately the local activity and direction, as well as refine the monitoring. The KPI's are part of each Pilot city's task of generating a first version of their Theory of Change, which focuses on further clarifying the activities and outcomes of their scenario(s). The first outcomes of this iterative exercise are included in D5.1 as part of the Pilot Cities Action Plans, but will be further developed and fully defined in the upcoming deliverables 1.1 and 3.1 in month 12 of REFLOW. This goal is reached in collaboration between Copenhagen Business School, Metabolic and Waag, feeding into the way the Pilot Cities Action Plan template is structured. At this point, the extent to which the additional KPI's have been formulated is an aspect that differs amongst Pilot cities.

● A more complete and formatted **timeline** and explanation are provided to better understand what the future actions and activities of each of the Pilots will be. It is formulated by Pilots themselves, based on their choice of scenario and activities. By further detailing the main goals for each of the Pilot cities, other consortium partners gain insight into next steps which the Pilot cities aim to take.

● The **local partnership overview** further details both the roles of local consortium and of the external parties, projects or initiatives that are already present in the city and offer an opportunity to support local synergies.

4.2 Amsterdam Pilot Action Plan

4.2.1 General introduction

Introduction: Current context in terms of government and legislation

The city of Amsterdam and Amsterdam metropolitan region will adopt a new circular strategy in 2020[29], with the following vision: to be a thriving, regenerative and inclusive city for all citizens, while respecting the planetary boundaries. Its vision and strategy are based upon the Doughnut Economy model[30] and its realisation requires deep systemic transformation, far beyond the cities borders and sphere of influence. Amsterdam is recognised for its 'Amsterdam Approach' by which it contributes to collaborative innovation. This connects bottom-up initiatives by neighbourhoods, start-ups and civil society with established institutions across government, business and academia.

The city recognises that there is a journey to move from vision to reality, and continues to adopt the 'learning by doing' approach as implemented over the last decades. The city signed the national Circular Economy Pact and its audacious goals[31], to have a circular economy by 2050. The points of focus for the city and its regional partners are the building sector, the food sector and consumer goods ; within consumer goods, textile products are the main focus. In 2020 the city of Amsterdam is renewing its textile collection procedures, focusing on better strategies of executing the collection.

On European and Dutch national level, policies for circular textiles are being established, and are expected to be published in 2020. Extending producer responsibility is part of these policies, as is a new target for the amount of recycled materials in textiles and the way the textile chain is monitored. The aim will be to make it more transparent for both consumers and businesses. In addition to policy making, the Dutch government has supported the initiative Dutch Circular Textile Valley[32], boosting initiatives around circular textiles in four regions, including the Amsterdam region. Focus on the Amsterdam region is on the consumer side, on new, circular business models and the role of design for more circularity.

The current status quo - when it comes to textiles – is far from circular. The ecological and human/social footprint is large and untenable. Textiles flow into the region, quality of textiles decreases (fast fashion) and although demand for recycled materials is growing, general commercial uptake is still far away. Cities have the responsibility for the collection, sorting and treatment of textiles, but cannot improve this chain alone; it requires organisation and cooperation throughout, on both local and national, European and global level. REFLOW will facilitate local and regional understanding, network and capacity building and awareness amongst the greater public.

Improving material flows

In the REFLOW-project, the city of Amsterdam focusses on textiles used by consumers and companies, the ways textiles are discarded and reused and how textile waste could be brought back into the material flow. It will especially focus on the increase of home textiles that are recycled (made circular), by supporting diverse methods for collection with citizens, while providing feedstock

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[29] *Circle Economy, Amsterdam Municipality. (19 Jun 2019). Building Blocks Amsterdam Circular 2019. Retrieved from https://amsterdamsmartcity.com/posts/building-blocks-towards-a-new-strategy-circular-am-o3oun1mh.*
[30] *Raworth, K.(2017). Doughnut economics: seven ways to think like a 21st century economist. Vermont: White River Junction.*
[31] *Rijksoverheid (08 Feb 2019) Nederland circulair in 2050 Retrieved from https://www.rijksoverheid.nl/onderwerpen/circulaire-economie/nederland-circulair-in-2050.*
[32] *Dutch Circular Textile Valley (06 Jan 2020) Homepage. Retrieved from https://www.dutchcirculartextile.org.*

[33] for the recycling industries and creating supply for different markets. The current volume of the textile streams is mapped below by Metabolic within their REFLOW tasks.
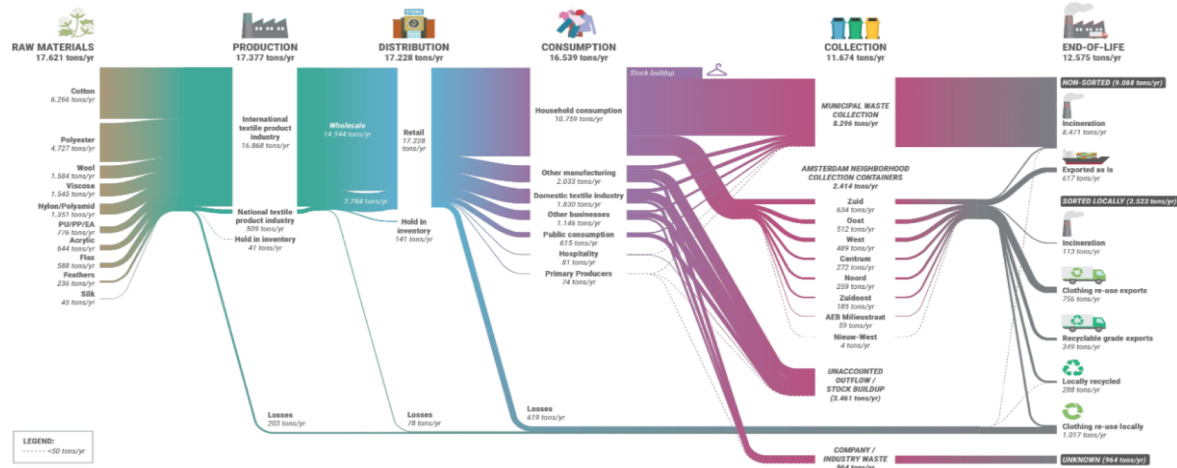
Figure 18 // Material Flow Analysis[34] for Amsterdam (AMSTERDAM MFA[35]), by Metabolic

Circular Textile Material Flow

For the Amsterdam Pilot, a **circular textile material flow** made by Gemeente Amsterdam in collaboration with BMA Techne (figure 18). It is used as the starting point for the definition of the objectives. While looking at this wheel, it becomes clear that in order to move from the current, almost non circular situation to achieve a circular one, a variety of problems need to be solved. The phases highlighted in the wheel are described below, and a number of them are taken as the focus point for the Amsterdam Pilot. How these chosen phases and their related challenges are translated into the objectives and activities for the Amsterdam PCAP, is further detailed below. Rising problems in this transition will carefully be examined and taken into account in the design of the next steps for Amsterdam's journey towards becoming a regenerative and circular city..

Figure 19 // Circular textiles material flow wheel.

The main steps within the wheel (figure 19) are detailed below, drafting a first overview of the process undergone by textiles resources within the Amsterdam region. The understanding of these steps, and the challenges and opportunities within each of them, is the starting point from which the Amsterdam PCAPs was developed.

1. *Collection*

The collecting of discarded textiles is the first and most important step towards creating circular material flows within a city. Currently only 3,5 kg/person/year[36] of post-consumer waste is collected. That compares a total number of 13,5 kg/person/year of textile post-consumer waste generated in Amsterdam. Collection of textile happens through around 360 textile waste containers in the public space around the city, by thrift-shops and by a number of textile retail points.

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[36] *AfvalMonitor (2020) Online Data Portal Swing Viewer. Retrieved from:*
https://afvalmonitor.databank.nl/Jive/Jive?cat_open=Gemeentelijk%20niveau/Ingezamelde%20hoeveelheden%20en%20scheidingspercentages%20huishoudelijk%20afva

2. *Sorting and Shredding*

Separately collected textiles are sorted in specialized textile sorting centers[37]. The sorting centers acquire the materials from the collecting companies, and then start sorting the material. This usually happens at different levels, ranging from re-usable products to fiber sorting for recycling. Reusable products are further sorted and re-sold both locally and worldwide, while textiles for recycling are sold on to recycling companies. These companies are shredding the products and bringing them back to textile fibers, which find application in non-wovens[38] for heat and noise insulation. Products that fall in between these two categories: non reusable and not directly ready for recycling), are stripped of all the non-textiles accessories.This task is currently still a manual process.

The industrial shredding step focuses on resizing the fibers. Depending on the future use and size, thetechnique vary to ensure quality and feasibility. Especially for chemical recycling and recycling by melting and extrusion, size reduction is a critical step.

3. *Recycling*

The main routes for textile recycling are mechanical recycling, recycling by melting and extrusion and chemical recycling.

Mechanical recycling is the most common technique, currently used to create technical non-woven, it can be ideally used to obtain fibers which can be re-used in spinning processes to produce high quality yarns.

Recycling by melting and extrusion is only possible for meltable synthetic materials like polyester and polyamide. Recycling by melting and extrusion is often also performed on a large scale by transforming polyester into textile fibers.

Chemical recycling delivers fibers which have properties comparable to virgin fibers. It is carried out on an industrial scale for polyester, polyamide-6 and is under development for cotton. This process, combined with mechanical recycling, has the best potential for a circular economy.

4. *Yarn, fabric and product development - design*

The output of all three recycling methods are fibers. These fibers are spun on existing lines into high quality yarns, which are used to produce woven or knitted fabrics. The quality of the recycled fibers determines the quality of the yarn. Therefore, by improving the quality and variety of offered recycled yarns, higher quality textiles can be achieved, encouraging the use of recycled materials.

4.2.2 Objectives

The Amsterdam REFLOW challenge is to change the textile material stream from linear to circular in the Amsterdam region. It wants to achieve that by focusing on the increase of collected textiles to be brought back into the loop (step 1 in the wheel); to provide feedstock for the recycling industry (step 2); and supply newly produced products out of recycled resources for other stakeholders (and thus create business opportunities).

To achieve this, the Amsterdam Pilot is constructed as a campaign that exists of two complementary scenarios that feed into each other.

1. The **short-term impact / citizen scenario** focuses on citizen engagement in the collection of home textiles and clothing in the most efficient way for recycling and therefore saving textile

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[37] *Note: In the Amsterdam region, the most relevant textile sorting center is Wieland Textiles B.V., https://www.wieland.nl*

[38] *Note: Non-wovens are fabric materials made of fibers that are bonded together by chemical, mechanical, heat or solvent treatments, thus fabric materials that are neither woven nor knitted.*

waste from being discarded. A varied program that creates awareness and fosters behavioural change and action, will be designed and executed. In the set-up of the programme (as described in the first draft of the ToC), the theoretical background (see chapter 1.3. of this document) is taken as a starting point and translated into different activities that match the different entry points as described in the concept of Relative change (learn, engage, situate, change, continue). These different entry points will be taken into account to match different neighborhoods, its character and flows, the interest of different people and their level of knowledge concerning textile collection.

2. The increase of collected clothing and textiles that creates feedstock are the starting point that the **long-term impact / industrial scenario** will build upon. This long term-scenario aims at creating an exchange system (platform) involving industry (from sorting companies to mechanical recycling, all the way to crafting regenerated materials) and entrepreneurs (designers, product designers / developers and local shops), and connect these different businesses by demand and supply. This (expanding) chain will support business development, circularity, local industry and visibility in order to showcase this tracking & tracing of material to citizens again. This platform that will showcase the full circle will also incentify the development of better sorting machines, better methods of yarn spinning out of recycled fibres, et cetera, while provoking transparency and cultivating citizen involvement. To summarise: using an enabling platform, this circular chain will have social, economical and environmental benefits. This platform will: 1) **track and trace**, 2) **prove how a material is following a circular flow and cycles** and 3) **investigate and incentive business opportunities along the chain, promoting and mapping the businesses involved in the recycling of materials**. For the long-term scenario the Relative change concept is taken as a starting point (see chapter 1.3.3 of this document).

4.2.3 Pilot strategy and activities

The activities develop into a two fold complementary set of actions that together form a campaign, merging the two different scenarios described above.

Short Term impact / Citizen Scenario	Long Term impact / Industrial Scenario
Addressing citizen/stakeholder engagement and education	**Addressing citizen/stakeholder engagement and education**
1. Design and execute public events, talks and workshops a.o. in public libraries (maakplaatsen), fablabs and public platforms, to engage citizens of all ages and facilitate behavioral change through different learning points.	**7**. Promote the use of recycled resources, decrease the use of only virgin fibres.
2. Further intensify collaborative actions with the local network and initiatives to bring information and awareness to the different neighborhoods.	
3. Brainstorm sessions with citizens / students on how to collect more effectively (with interventions	

like a rag collector) in different neighborhoods.	
4. Promote circular textile in educational programs on sustainability for fashion schools and universities.	
5. Hands-on workshops with creatives and citizens on manipulating / upcycling material which could facilitate behavioral change and feed ideation of circular textiles.	

Addressing governance, network and policy	**Addressing governance, network and policy**
6. Promote and organise collections through retailers, libraries and other public indoor spaces (through contracts and policies developed by municipality)	**8**. Workshop focused on collecting information for an online platform for exchange (small entrepreneurs, manufacturers, sorting companies).
	9. Creation of advice documents for policies to push the implementation of recycled textiles.
	10. Rethinking the common governance model for the textiles chain by strengthening public awareness through thought-provoking articles for national debate and/or debate amongst the hubs.
	11. Work towards the creation of policies that push for the implementation of tracking labels / smart bins in the Amsterdam region.
	12. Work towards the creation of policies that push for the implementation of recycled materials in textiles (Europe- wide) and the use of tracking labels to develop a culture of transparency throughout the chain and carry out a network analysis, to distinguish the niche of the Amsterdam region in the circular textiles landscape.
	13. Facilitate the connection and the exchange in the marketplace between entrepreneurs and the sorting companies.

Addressing technological development	**Addressing technological development**
	14. Workshop focused on the identification of the market needs.
	15. Development of a platform that does: track & trace; proves how a material is following a circular flow and cycles and investigates and incentives business opportunities along the chain, promoting

	and mapping the businesses involved in the recycling of materials.
	16. Create live tracking garments/home textiles in the city – tags/bins.
	17. Testing of the platform.

3.2.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, Pilot cities are in the process of refining these as part of other tasks. This section is therefore a work in progress where additional information will be added as soon as clarity about additional KPI's is reported by pilots.

Grant Agreement KPI's

KPIs	Target value
Number of textile specific city resources identified (materials, infrastructures, etc.)	100
Number of specific textile streams identified	10
Number of governance / business models developed	5
% textile regenerated (current 20% of complete stream)	40%
% Overall stakeholder satisfaction with new models	80%
Number of new applications for textile waste developed	10
% Willingness to pay for regenerated products and materials	80%
Number of local makers and business reached through showcases	2000
Number of citizens engaged through educational programmes	500

The following list is a preliminary list of short- and long-term social, ecological, economic and environmental objectives identified by the Amsterdam pilot. These objectives will be transformed into quantitative KPIs after aligning with Metabolic (Material Flow Analysis and the KPI longlist) and through the ongoing activity with CBS on the Theory of Change and SRoI.

Additional KPIs

Short Term Scenario		
Activity	**KPI**	**Impact Lenses**
1	Citizen of all ages will learn information about the cause and will be more aware of the meaning of circular economy and the value of textile waste in Amsterdam region.	socio-ecological and enviromental
2	Citizen and local institutions will learn information about the cause and will be more aware of the meaning of circular economy and the value of textile waste in Amsterdam region, therefore the collection of home textile waste will improve	socio-ecological and enviromental
3	Citizen of all ages will learn information about the cause and will be more aware of the meaning of circular economy and the value of textile waste in Amsterdam region, therefore the collection of home textile waste will improve	socio-ecological and enviromental
4	Engage with fashion schools and university to change the way students and future designers improve the way of using textile and discover the value of textile waste	socio-ecological and enviromental
5	Citizen of all ages will learn information about the cause and will be more aware of the meaning of circular economy and the value of textile waste in Amsterdam region, therefore the collection of home textile waste will improve	socio-ecological and enviromental
Long Term Scenario		
Activity	**KPI**	**Impact Lenses**
6	Decrease the amount of virgin fibres used in the production for textile, creates new feedstock for industries, raise awareness, promote a new exchange system	economical, social and environmental
7	Create more value for the use of textile waste on top of raising more awareness. Manufacturer will decrease the amount of virgin fibres used int he production for textile and everybody will be more involved in the recycling process. Creates new feedstock for industries, raise awareness, promote a new exchange system.	economical, and (therefore) environmental
8	Decrease the amount of virgin fibres used in the production for textile, creates new feedstock for industries, raise awareness, promote a new exchange system	economical, social and environmental
9	Decrease the amount of virgin fibres used in the production for textile, creates new feedstock for industries, raise awareness, promote a new exchange system	economical, social and environmental
10	Create more value for the use of textile waste on top of raising more awareness. Manufacturer will decrease the amount of virgin fibres used int he production for textile and everybody will be more involved in the recycling process. Creates new feedstock for industries, raise awareness, promote a new exchange system.	economical, social and environmental
11	On a long term this action will decrease the amount of virgin fibres used int he production for textile, involve small entrepreneurs, manufacturers, sorting companies on a business level by creating new value (cost) for textile waste, it will influence the industry into becoming more transparent and circular.	economical, social and environmental
12	Create more value for the use of textile waste on top of raising more awareness. Manufacturer will decrease the amount of virgin fibres used int he production for textile and everybody will be more involved in the recycling process. Creates new feedstock for industries, raise awareness, promote a new exchange system.	economical, and (therefore) environmental
13	Manufacturer and entrepreneurs will decrease the amount of virgin fibres used int he production for textile as they will and understanding the value of textile waste.	economical, and (therefore) environmental
14	Create more value for the use of textile waste on top of raising more awareness. Manufacturer will decrease the amount of virgin fibres and citizens (everybody) will be more involved in the recycling process.	economical, and (therefore) environmental
15	We achieve an economical, and (therefore) environmental impact	economical, and (therefore) environmental
16	On a long term this action will decrease the amount of virgin fibres used int he production for textile, involve small entrepreneurs, manufacturers, sorting companies on a business level by creating new value (cost) for textile waste, it will influence the industry into becoming more transparent and circular.	economical, social and environmental

4.2.5 Planning

Planning Reflow/AMS		2019				2020				2021				2022			
Amsterdam Pilot Project related activities per short term scenario	Lead:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Addressing citizen / stakeholder engagement and education																	
Activity 1																	
Activity 2																	
Activity 3																	
Activity 4																	
Activity 5																	
Addressing governance, network and policy																	
Activity 6																	
Addressing technological development																	

Planning Reflow/AMS		2019				2020				2021				2022			
Amsterdam Pilot Project related activities per long term scenario	Lead:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Addressing citizen / stakeholder engagement and education																	
Activity 7																	
Addressing governance, network and policy																	
Activity 8																	
Activity 9																	
Activity 10																	
Activity 11																	
Activity 12																	
Activity 13																	
Addressing technological development																	
Activity 14																	
Activity 15																	
Activity 16																	
Activity 17																	

Chart 1 // Overview of actions over time

This planning, divided by short and long term scenario is envisioning the start and ending point of each activity previously described. This will later be fine tuned by adding additional activities and milestones, and by merging it with other WP planning connected to the Amsterdam Pilot. Both in this planning and in KPI's table of the activities described in the previous page, the numbers of the activities are referring to the '4.2.3 Pilot strategy and activities' in which each activity is numbered and further explained.

4.2.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the short and long term plans and activities a success. A list of possible stakeholders was compiled and categorised by BMAtechne with the input from all local partners and can be found here.[39] (stakeholders include City District -Stadsdeel, Secondary retail, Repaircafe, Zone2Source, Bookstore Art Community, Gerrit Rietveld Academy, small retail brands & concept stores, Circle Economy, Modemuze, Yard Sales, United Wardrobe, Vinder, Lena Fashion Library, Ijhallen Sunday Market, Westergas Market, Bas Kosters, Jessica van Halteren , Duran lantink, Ronald van der Kemp, Fashion for Good, FairWear foundation, M-ODE platform, True price platform, Local Good store / de hallen, Elderly care "dagbesteding", Buurthuizen). The amount of stakeholders is too extensive to cover

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[39] *Note: The stakeholders list is provisionally hosted on SharePoint and can be found here https://studentcbs.sharepoint.com/:u:/r/sites/REFLOW/Shared%20Documents/WP5%20-%20Pilots/WP5%20-%20Amsterdam/horizontal%20version%20stakeholder%20selection%20sustainable%20development%20Amsterdam%20Reflow%20vs%207%20%20feb%20%202020%20(2).html?csf=1&e=jOIb3Z*
Later on it will be available on https://cities.reflowproject.eu/stakeholders/amsterdam/edit

within this deliverable but subcategories have been specified in the overview below (figure 20) to give a general idea on the broadness of stakeholders identified.

For the short term scenario the Amsterdam pilot will mainly involve citizens, entrepreneurs, education and the local government. For the long term scenario the pilot will mainly involve parties that give access to the process of collecting, sorting, and refabricating. In Amsterdam, the three main parties that partners aim to align with are WIeland[40], Frankenhuis[41] and Sympany [42].

Figure 20 // Overview identifying local and national stakeholder categories (Data by BMA Techne)

[40] *Wieland. (2020). Homepage. Retrieved from https://www.wieland.nl/*
[41] *FrankenhuisBV. (2020). Homepage. Retrieved from https://www.frankenhuisbv.nl*
[42] *Sympany. (2020). Homepage. Retrieved from https://www.sympany.nl*

4.3 Berlin Pilot Action Plan

4.3.1 General introduction

Water plays a key role in the metabolic cycle of metropolitan regions. Among other purposes, it is used for heating. This function plays a particularly important role in the built environment, which has been chosen as the main field of application in the Berlin Pilot for REFLOW. Waste heat is produced by a machine, or other process that uses energy, as a byproduct of doing work. All such processes release heat as a fundamental result of the laws of thermodynamics. This heat is often wasted. This waste heat also has lower utility than any kind of original energy source. From a sustainability perspective, waste heat is heat that should not be wasted. Instead, we should explore how it can and should be re-channelled into the urban metabolic system.

Government & legislation. The European Commission proposed a Europe 2020 flagship initiative ("The European Green Deal") in order to provide policy plans in climate change, transport and energy. The overall goal is to make the EU a competitive low carbon economy by 2050. Within the framework of the Europe 2020 Strategy, member states committed themselves to reduce greenhouse gas emission by 20%, increase the use of renewables in the EU-s energy mix to 20%, and achieve the 20% energy efficiency goal by 2020. In February 2011, the EU Council reconfirmed the objective of reducing greenhouse gas emission by 80-95% by 2050 compared to 1990 level. This action was set up in order to keep climate change below 2°C [3]. To achieve the European Union's goal and because of the other beneficial reasons, it is recommended that the industrial actors recover waste heat to generate electrical or mechanical power. Waste heat recovery is a direct way to achieve the first two key objectives (20% reduction of the GHG emission compared to the 1990's level and 20% energy efficiency increase) of The European Green Deal.[43]

Resource flows. Generally, most of the discharged waste heat during industrial processes is qualified as low-grade heat (under 200 °C) which is immensely difficult to utilize. The qualification of this resource is based on its temperature. High grade heat: temperature is higher than 650 °C, medium grade heat: temperature ranges between 200°C and 650 °C, low grade heat: temperature is lower than 200°C. According to a recent study, most of the waste heat (66%) is low-grade.[34] So far, around 2.2 megawatts are operated in Berlin. Based on the not yet publicly disclosed data on municipal waste-heat potentials available to the BWB, the Berlin Pilot consortium roughly estimates the theoretical waste-heat potential at up to 360 megawatts city-wide.

Local ecosystem. The stakeholder ecosystems around waste heat in Europe are usually dominated by one or a few public utility companies such as Berliner Wasserbetriebe (BWB) and companies that generate or consume waste heat. For civil society, the issue of waste heat is almost invisible. We would like to change this through the Berlin Pilot. To this end, properties that are easily accessible to civil society are to be equipped with waste heat technology in a particularly tangible way. The latter means that demonstrators are to be installed which illustrate how productive activities in these objects can be promoted by waste-heat recycling. Currently, the Berlin Pilot is considering transparent water pipe sections that indicate heat through discoloration, but also urban farming installations.

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[43] *Interreg Central. (28 June 2017). Low-grade waste heat utilization in the European Union. Retrieved from https://www.interreg-central.eu/Content.Node/CE-HEAT/Low-grade-waste-heat-utilization-in-the-European-Union.html*

Local gatekeeper. BWB already operates an extensive wastewater infrastructure with a sewer network of around 9,700 km, 160 pumping stations and a further 1100 km of wastewater pressure lines. Wastewater has a seasonally dependent temperature level of 12-20°C and thus a higher mean temperature level than its surroundings during the heating period. Sewers, pumping stations and sewage pressure pipes can therefore be understood as low-temperature district heating networks. At a flow rate of one litre waste water per second and one Kelvin cooling, approx. 4.2 kW heat output can be extracted from the waste water.

4.3.2 Objectives

Berlin aims to reuse water in many ways but in the form of waste-heat in particular. The Pilot aims to involve anyone producing heat that can be transferred in the form of water, but also everyone who has a use for this application. The Berlin Pilot will focus on identifying where waste-heat potential lies in the metropolitan area. From that information, the Pilot aims at reducing time between stakeholders requesting advice about implementation waste-heat-technology and them actually receiving such advice. The Pilot partners want people to understand the productive potential of water. This will be pivotal in getting better use of waste-heat to become the standard, not the exception. This concerns in particular two partners of the Berlin consortium: firstly, Agile Heap e.V./Fab Lab Berlin, whose self-defined mission is to make new technologies understandable and accessible to as many people as possible. On the other hand, the BWB, which as a municipal enterprise has a vital interest in making its impact and methods accessible to as many citizens of the city as possible.

For the Berlin Pilot, the objectives regarding the project have been split in long-term and short-term aspects. Both are further described below. Following the short and long-term objectives, a table is presented in which the aims of the Pilot are structured along a set of activity keywords that are central to the Pilot.

Long term objectives. The long-term goal of the Berlin consortium is to make Berlin the European pioneering metropolis for the data-driven use of waste heat with particular emphasis on productive enterprises and places of relevance for the civil society. Thus, physical locations are to be created where waste heat technologies can be coupled with other sustainable energy sources in a meaningful and transparent manner. Such spaces shall be called reference objects in reference districts, which can serve civil society, but also private sector and political decision-makers as "showrooms" of a CE-conscious use of water in an urban *and* productive society. Ideally, such Pilot activities should use the energy used to produce physical consumer goods that would otherwise be imported into the metropolitan region.

Short term objectives. To get there, two things are missing: data-based information about the potentials in these fields as well as concrete offers and ideas to put this resource to a better use. At present, waste heat potentials at the BWBs are relatively laboriously examined in individual inquiries for specific locations, which hampers the nationwide implementation. Civil society is not sufficiently informed about the potential of waste heat and there is a lack of easily accessible Pilot projects. Hence, to begin with, the Berlin Pilot consortium will follow the short term objective to create a thorough data basis for identifying matches between waste heat generating and consuming properties.

Activity keywords aims and intentions

The Berlin Pilot activity keywords and subsequent objectives are:

MAP	ACTORS RESOURCES BUSINESSES	Berlin aims to map the different existing networks of local stakeholders (producers, distributors and consumers of waste heat and other complementary sources of energy relevant to productive activities). This mapping shall be transparent to the public.
DATA	CAPTURING INTEROPERABILITY SENSE-MAKING	Berlin aims to capture data related to waste heat and complementary energy sources both regarding producers and consumers all across the Berlin metropolitan area in order to: ● map the existing metabolic relationships and estimate the future metabolic potentials with regard to waste heat and other water-based resources that are relevant for productive activities within the city ● map the mismatch between the needs that can be solved and the opportunities that can be generated through the connection and the enabling of all waste-heat-relevant stakeholders
BUSINESS DESIGN	WASTE-HEAT-RELATED BUSINESS CALCULATION WASTE HEAT INTERVENTION SERVICES CE-BASED PRODUCTION HUBS AS COMMON/ COMMUNAL SERVICES	Berlin intends to gain knowledge at business level in three areas: ● precise calculations regarding waste-heat (both for producers and consumers) ● conception and test implementation of services that a REFLOW spin-off could provide ● energy-economic optimisation of production hubs as Private-Public Partnerships (PPPs)
GOVERNANCE	CO-GOVERNANCE	Berlin aims to: ● Establish a supportive and inclusive type of governance around the new resource flow(s). The aim is to position not only commercial organisations and governmental institutions in roles regarding governance. Instead the aim is to formally position the general public and institutions through which they represent themselves in governance of the resource flows. ● A priority objective within this strand is to reduce bureaucratic barriers for users of waste heat and to ensure that civil society initiatives can benefit when larger sites emit waste heat that would otherwise be wasted.

Table 1 // Keywords and objectives relating to the Berlin Pilot

4.3.3 Pilot strategy and activities

In the paragraphs below, multiple complementary short and long interventions are described that together form the Pilot strategy. This is done along three central topics, 'addressing governance, network & policy', 'technological development', and 'capacity building'.

Addressing governance, network and policy

At policy level, the Berlin Pilot Consortium can tie in with the Berlin Energy and Climate Protection Programme 2030 (BEK 2030). This is the official policy guideline of the city of Berlin, which can be connected to CE. It is the central instrument of Berlin's climate protection policy. It was developed on the basis of scientific recommendations with broad public participation and was adopted by the Berlin House of Representatives in January 2018. It pursues an integrated approach and contains around 100 measures in the fields of climate protection and adaptation to the consequences of climate change, each for an initial implementation period up to 2021. For climate protection, the measures in the fields of energy, transport, buildings and urban development, business, private households and consumption are intended to achieve a reduction in carbon dioxide emissions in the city. Central to this is the saving and efficient use of electricity, heat and fuels as well as the increased production and use of renewable energies. The BEK 2030 contains explicit appreciation of waste heat as a potential leverage for a more sustainable, ideally circular energetic setup of the city of Berlin. The digital monitoring and information system diBEK[44] as well as annual monitoring reports of the senate[45] inform about the progress in the implementation of BEK 2030. Accordingly, the Berlin Pilot consortium aims at relating its efforts to the BEK 2030 andensure that it gets highlighted in the annual monitoring reports in 2021 and 2022. This does not only concern the development of a waste heat map as a web application and corresponding interventions at neighbourhood level. It also concerns in particular the coupling with complementary energy sources in objects that are easily accessible as reference sites for the urban society.

The **governance strategy** ties in with this. First and foremost, the Pilot distinguishes between three levels of governance, whose representatives will be involved in the approach.

- Senatskanzlei/Senate Chancellery: Based on the Letter of Support issued by the Senate Chancellery, the Pilot will maintain a close dialogue with related decision makers such as Secretary of State, Mr. Nägele. This is important to ensure that the subordinate Senate Departments (Economy, Energy, Businesses = SENWEB and Environment, Transport, Climate Protection = SENUVK) support our efforts equally.

- Senate Department for the Environment, Transport and Climate Protection (SENUVK): Senate Department has decision-making authority when it comes to climate-related measures. They also co-authored the above-mentioned BEK 2030, and close cooperation should help to clearly demonstrate the climate potential of our measures clear in the city.

- Senate Department for Economics, Energy and Public Enterprises (SENWEB): This Senate Department is responsible for all economically relevant processes in the city, which also include the energy industry. Since it is a declared goal of the Berlin Pilot to carry out economically functioning energetic interventions in the built environment, close cooperation with SENWEB is essential. It should be used above all to learn about larger site projects at an

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early stage. Furthermore, the cooperation with SENWEB is important in order to receive, if necessary, support for spin-offs that could result from our Pilot work.

- **District administrations**: Among the Senate administrations that operate citywide, the district administrations control activities in individual districts. This is the - from top - third level of governance that the Pilot is addressing. Here the Pilot is concerned about working with up to three districts and several clearly defined neighbourhoods within, thereby ensuring our interventions are focused and effective. District administrations are often particularly close in their exchanges with actors behind new location projects in their catchment areas.

- **Neighbourhood decision makers**: Finally, the fourth level of governance with which the Berlin Consortium interacts is individual stakeholders on the neighbourhood level. Even in the individual districts there are districts with their own dynamics. It is the aim of the Berlin Pilot consortium to work closely with the actors of these special neighbourhoods. An example is the Urban Tech Republic project (Tegel). Here, an ultra-modern reference quarter is being created on the periphery of the city. The urban operating company is regarded as particularly dynamic. These are precisely the kind of neighbourhoods meant by this level of governance.

The **overall network** to be included is made up of other groups of actors. Workshops are planned with:
- heat-emitting small or medium-sized manufacturing companies in urban areas
- small or medium-sized manufacturing companies from urban areas that consume heat, especially from the sectors of makerspaces/workshops and urban farming
- residents of the neighbourhoods.

Addressing technological development

Addressing technological development starts with gathering/harvesting, transforming and coupling critical data about water-related potentials for the built environment and productive activities within. In this work step, close cooperation between Berliner Wasserbetriebe, Metabolic and MCS Data Labs will help to create a coherent real-time data image that allows relevant conclusions to be drawn about intervention options. In order to achieve a broad implementation, information on local potential data on waste heat is required on an urban level. Up to now, even in international comparison, there is rather little data on how existing waste heat plants perform, even though this is the best basis for estimating potentials. This could include a GIS-based and simulation-supported analysis of where and in what quantities heat could be provided in the status quo on the wastewater system side. With the currently available models, a first representation of the distribution of the overall urban potentials can be obtained on the basis of a snapshot of the current status of operations. Location-related restrictions due to operational necessities to ensure the proper drainage of the city are not yet taken into account. For the future valid and updated representation of the heat potentials the development of a dynamic, automated model is necessary, which represents a resilient planning basis according to the current situation. It includes harvesting/transforming such data and reducing heterogeneity. This further development and coupling of the existing data thus represents an elementary component for the necessary guarantee of a reliable settlement drainage and the planning security of waste water heat plants. The determined data on wastewater heat potentials thus not only offer the possibility of a spatial, GIS-based resolution according to the current situation, but can also be represented dynamically as daily and annual cycles. This results in various possibilities for coupling with other generation systems for municipal heat planning. It must also be stressed that these data - respectively those parts which according to public law could be shared with the public - could be included in the REFLOW open data dashboard.
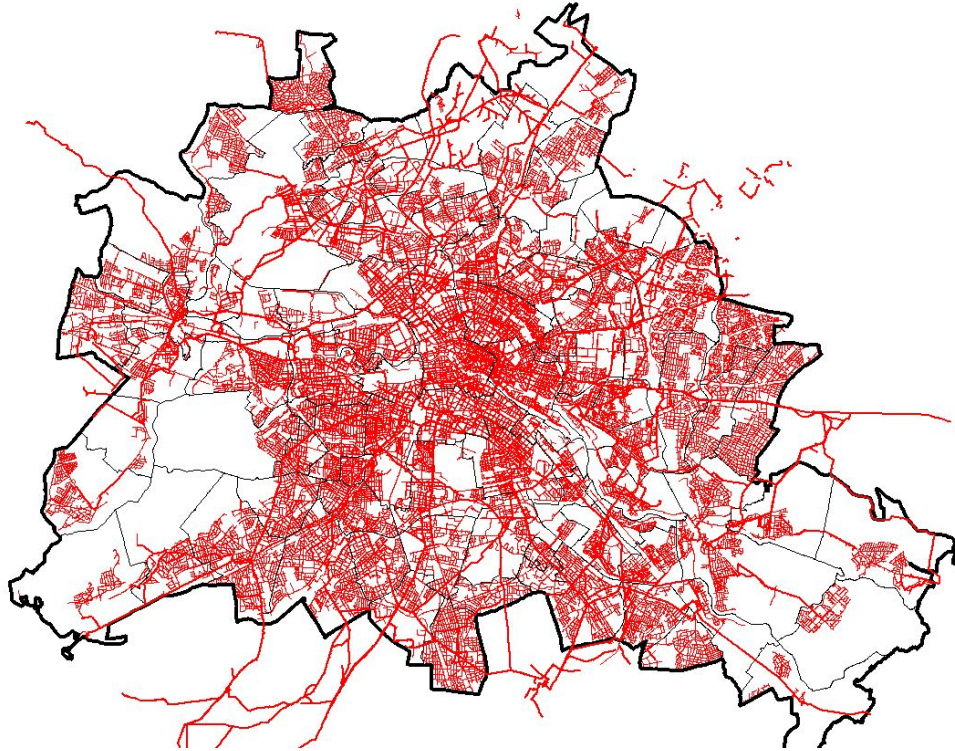
Figure 21 // Overview of main water infrastructure in the urban environment of Berlin - during the pilot project, the consortium will develop a much more elaborated and dynamic map that shows waste-heat potentials in Berlin - through this, an otherwise abstract field of application becomes transparent.

The second level of technological development concerns the use of this data basis: designing metabolic water-conscious production hub concepts, tailored to Berlin needs, yet easily transferable. Through the previous step, knowledge will be gained about which specific objects are predestined to benefit particularly from water as a recycling factor. Currently, setups are to be designed that help to put this into practice. These setups will consider water as an energy supplier, but also as a resource for urban farming applications. As a local Pilot partner Agile Heap e.V. will focus in particular on involving the districts and their players as buyers of envisioned products. The support of the city will be particularly relevant in this context. For example, public and semi-public institutions could be involved as initial purchasers of both waste heat and urban farming applications which make use of waste-heat. Generally speaking, the water-conscious production hubs will draw from the following blueprint:

Energy management masterplan

Thermal design of buildings

Power-to-X

A constantly improving real-time data platform informing about waste heat potentials

Selected pilot objects will be developed towards more efficient & sustainable multi-purpose properties. Customizable production plug-ins such as Urban Farming installations help to make civil society and private actors in the real estate sector aware of the potential of such space use

Coupling with solar energy

Property cooling via green roof

Green roof applications

*Figure 22 // Waste-heat related interventions will be embedded into a larger Berlin blueprint for water-conscious production hubs, as schematically indicated above***

Addressing capacity building / citizen / stakeholder engagement and education
Capacity building, respectively citizen engagement and education, in the Berlin Pilot revolves around the transfer of insights into physical interventions in the built environment which can trigger replications. This is all about the development of regenerative energy concepts for specific physical spaces. The Pilot consortium is convinced that the fields of CE-oriented use of water, urban production and neighbourhood development/citizen engagement cannot be separated. By concentrating on local conditions, scenarios for the use of waste water heat in combination with other energy sources can be developed on the basis of actual implementation constellations. In order to demonstrate how effective water recycling management measures can be in the built environment, production relevant to CE practices - in the sense of the Fab City[46] initiative idea - should be supported by the energy generated wherever possible. Flat roofs, but also flat open spaces are suitable for interventions that include processed rainwater. Seeing the massive potential for both - utilizing waste heat and installing urban and rooftop farming applications - in the Berlin area, engaging citizens is not a secondary, but a central aspect of the activity. This includes proactively addressing users of suitable objects in reference quarters, conducting information events in reference objects and the dissemination of starter kits and construction workshops for waste heat-supported and, more generally, water-related productive activities such as urban farming installations.

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*The Berlin Pilot envisions connecting insights gained through the platform with complementary energy sources and energy utilization routes. These include, for example, solar energy, power-to-grid, and green-roof applications. The idea was to use real example projects from the FCA to show that an optimal combination of energy tools can be facilitated through the platform. Since the software platform is currently being completed (referring to the far-left centre of figure 22) we can now focus on the other aspects. The idea is to use the other components in the figure both as data sources and interventions of third parties to be connected to wastewater heating interventions.

Figure 23 // Visualizing the full productive potential of water in an interactive way will help making the rather abstract theme tangible for users[47]

4.3.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, Pilot cities are in the process of refining these as part of other tasks in other work packages as well. This paragraph is therefore a work in progress where additional information will be added as soon as clarity about additional KPI's is reported by Pilots.

The original KPI's for Berlin in the grant agreement were initially formulated with another material flow in mind. Using these same KPI's for the new topic will not fit because the material topic in Berlin has changed from real estate to waste heat in the first place, as well as the productive potential that lies in water and complementary energy sources as secondary areas of application. Berlin will use the original KPIs as an inspiration to redefine new KPI's. KPIs will be developed in collaboration with WP1 and WP3. Resulting in:

KPIs' from the GA (Redefined)

KPIs	Target value

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[47] Note: ©SIemens // www.siemens.com/press

Total volume of waste heat harvested (comparative assessment for previous and future years) measured in megawatt	2,2 (2019) 4,4 (2020) 8,8 (2021) 22,2 (2022)
Number of properties with waste heat potentials identified	50
Number of businesses interacted with through waste heat adoption measures	12
% waste heat of overall heating	10%
Number of productive activities facilitated through waste heat supply	10
Number of citizens and production-oriented business reached through showcases	320
Number of citizens engaged through educational programmes	220

Additional KPIs to be developed:
The final KPI list will be completed after sharing the KPI long list by Metabolic and the ongoing activity with CBS on the ToC.

4.3.5 Planning

This paragraph will detail how the proposed objectives will translate to an overview of actions over time. After identifying and detailing all actions envisioned at this point, a general GANTT chart is presented. In some cases, additional partners are suggested to be involved as well. These will be further introduced in paragraphs 4.3.6

Action 1: Addressing stakeholders, mapping and research grounding	
Timeline	[M7-M12]
Role of the partners	Leader: AH Participants: BWB, FOKUS MCS, FARMLYPLACE, CITYLAB, CRCLR NEUKOELLN
Description	**Action 1 consists of three sub-tasks:** *A1.1 Identifying all types of relevant stakeholders and approaching groups representing them* The activity encompasses all municipal and civil stakeholders mentioned above. *A1.2 Mapping* Desk and field research (qualitative interviews) with relevant stakeholders. The desk analysis aims to analyze the processes that come with adopting waste heat solutions. The field research aims to observe all the stakeholders involved with a focus on practices, configuration of places, range of activities and stimulating the emergence of needs in terms of CE. *A1.3 Research grounding* The action identifies the possible scenarios of projects - system - process - product - service solutions that have particular characteristics of innovation linked to REFLOW's approach to CE. These scenarios will be used as a starting point for developing the subsequent co-design activities. Main goals: 1. to draft a catalogue of the emerging solutions which are perceived as relevant by the stakeholders relating to waste-heat

	2. to draft a report which analyses and describes emergent needs/areas of opportunity connected to the adoption of waste-heat solutions and complementary solutions (rainwater, photovoltaik, wind) 3. to identify a provisional set of design-driven scenarios aimed at drafting a feasibility plan of project activities.
Results	R.A1.1: All relevant stakeholders are addressed. R.A1.2: A report on desk and on-field research is created. R.A1.3: A catalogue of all possible waste-heat measures and needs and opportunities is created.

Action 2:	
Multi-stakeholder workshops series @ CityLab Berlin - *focus on data in web action.*	
Timeline	First cycle: [M13-M14] – Second cycle: [M23-M24]
Role of the partners	Leader: BWB, AH Participants: MCS, FOKUS, CITYLAB
Description	**Action 2 encompasses a series of co-creation workshops which brings together relevant stakeholdersfrom the consortiumand external stakeholders for *data* related work.** The multi-stakeholder workshops will come as 2 cycles of 2 co-creation workshops per year. This activity will involve all the Berlin project partners and other relevant stakeholders. The action will be based on results coming from the research grounding activities and from the collected needs and opportunities. The workshops will focus on data-related work. Specifically, this series will cover the following topics: ● GIS data processing (cycle 1) ● Data modelling with InfoWorks (cycle 1) ● Data simulation with InfoWorks (cycle 1) ● Digital planning area BWB internal (cycle 2) ● Monitoring and performance measurement (cycle 2) ● Digital panning open to the public (cycle 2)
Results	R.A2: 2 cycles of multi-stakeholder workshops, consisting of 2 workshops which bring about valuable insights regarding the above mentioned topics. Insights are considered valuable if they provide the necessary information for the following action package.

Action 3:	
Multi-stakeholder workshops series @ CityLab Berlin - *focus on waste-heat-related implementation*	
Timeline	First cycle: [M15-M16] – Second cycle: [M25-M26]
Role of the partners	Leader: AH, BWB Participants: MCS, FOKUS, FARMLYPLACE, CITYLAB, CRCLR NEUKOELLN
Description	**Action 3 encompasses a series of co-creation workshops which bring together relevant stakeholders from the consortium and external stakeholders for *implementation* related work.** The multi-stakeholder workshops will come as 2 cycles of 2 co-creation workshops per year. This activity will involve all the Berlin project partners and relevant other stakeholders. The action will be based on results coming from the research grounding activities and from the collected needs and opportunities. The workshops will focus on implementation-related aspects, as opposed to the Action 2. Specifically, this series will cover the following topics: ● Tech selection (cycle 1)

	● Tech sourcing (cycle 1) ● Tech implementation (cycle 2)
Results	R.A3: 2 cycles of multi-stakeholder workshops, consisting in 2 workshops which bring about valuable insights regarding the above mentioned topics. Insights are considered valuable if they provide the necessary information basis for the following work package.

Action 4:	
Execution of interventions in the real built environment	
Timeline	First cycle: [M14-M24] – Second cycle: [M26-M36]
Role of the partners	Leader: AH Participants: BWB, MCS, FOKUS, FARMLYPLACE, CITYLAB, CRCLR NEUKOELLN
Description	**Action 4 includes actual implementations of the previously developed findings and solutions.** In this last action package, the Berlin consortium is implementing the previously prepared measures. Based on the collected data and technological knowledge, real physical objects with waste heat and complementary energy sources will be developed into urban production hubs, which are also CE-compliant from an energy point of view. Specifically, this includes: ● Selecting urban production hubs (cycle 1) ● Equipping urban production hubs with demonstrator installations and waste-heat technology (cycle 2)
Results	R.A4: 6 waste-heat-related interventions in the Berlin built environment have been executed.

Chart // Overview of actions over time

4.3.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the different interventions a success. The core consortium of the Berlin pilot project consists of **Berliner Wasserbetriebe (BWB)** as the municipal company and **Agile Heap e.V. (local Pilot coordination)**, **Fraunhofer FOKUS** (ICT framework) and **MCS Data Labs** (sensor framework and measurement technology) as the municipal application partners. However, other local partners also provide a great added value for the Pilot project. They are not only involved through their written and verbal input in discussions and brainstorms, but also benefit directly from the implementations. Here the Pilot distinguishes further local partners from three groups of actors: (1) public stakeholders, (2) civil stakeholders, (3) waste-heat consumers/production hub partners.

- Public stakeholders
  - SENWEB - arranges contacts to waste-heat generating and consuming companies
  - SENUVK - helps identifying progressive property developing projects where our solutions can be implemented
  - Berliner Energie Agentur - helps to integrate our waste-heat offerings with complementary energy-supply offerings
  - CityLab Berlin - helps creating visibility for our offerings, particularly based on interactive demonstrators
  - 1.000 Grüne Dächer Programm - helps to identify properties with a progressive energetic setup where our solutions can be implemented, too
  - Infralab - helps to convince all other municipal utilities and waste management companies to learn about and adopt our offerings
- Civil stakeholders
  - Open Source Ecology Germany - helps to develop demonstrating open source hardware that helps to harvest waste-heat
  - Circular Berlin - helps to promote our offerings as a component of the city-wide CE ecosystem
- Production hub partners
  - CRCLR Neukölln - is the Berlin Pilot's first production hub, displaying production infrastructure powered by waste-heat and carefully coupled sources of energy within a radically CE-centered property
  - Farmlyplace - is a production hub partner who offers profitable and citizen-centered urban farming applications powered by our offerings as well as complementary offerings
  - TXL Urban Tech Republic - is likely to become the Berlin Pilot's largest application partner (external to the REFLOW project partners), operating the large area around the soon-to-be-former airport Tegel

4.4 Cluj-Napoca Pilot Action Plan

4.4.1 General introduction

Cluj-Napoca is a constantly growing city and thus is experiencing an ever-growing need for energy. In REFLOW, Cluj-Napoca will be focusing on energy, its consumption evolution and the impact of investments made in energy efficiency.
Cluj-Napoca is one of the few middle-sized cities in Romania, which grow strongly both economically and demographically, currently needing to match expectations for a highly liveable environment with a growing density and legacy of high-rise neighbourhoods.

This generates a constant inner flow of population, and a demand for housing. The World Bank have recently presented a study that revealed that housing needs for the next ten years is over 100.000 homes, while the building pace in the last years was around 7000 homes/year in Cluj. These new apartments and houses expand the outskirts of the city. The municipality is considering authorizing at least 250 hectares of new neighbourhoods for real estate development.
Challenges towards growth management in Cluj-Napoca have been addressed recently within an Integrated Strategic Plan[48], drafted for the whole Metropolitan Area of Cluj-Napoca (consisting of the city and the surrounding 18 communes), which organised the framework for development until 2030. The strategic plan introduced a paradigm change in comparison with previous planning attitudes, working inclusively and convincing local actors to start from the identification of real territorial needs and only afterwards looking at funding opportunities. Both local and regional strategies are following the guidelines of the National Energetic Strategy for 2030, which sets the main strategic objectives as: energy security, sustainable development and competitiveness. Legislation regarding energy is out of reach for local authorities because legislation regarding energy is managed at the central government. One of the ways to intervene in that direction is by implementing investment projects aimed at increasing energy efficiency and/or mitigating climate change with the help of EU funding. The municipality has indeed accessed some funding for increasing energy efficiency, promoting low carbon public transportation and other ways of having a positive impact of energy use, such as disseminating the need to be energy efficient to the local community.

4.4.2 Objectives

The main goal for Cluj-Napoca is to unequivocally prove that it makes economic sense to invest in energy efficiency.* Not only does it lower the carbon footprint, but it also creates important cuts in energy consumption expenditure. This means that through this project, the objectives are: to prove how the measures taken to date by the City have impacted the energy efficiency of selected buildings (property of Cluj-Napoca municipality); to involve the identified stakeholders in implementing and furthering the measures already taken; to disseminate the information gathered at citizens and business level; and to encourage different actors in the ecosystem to propose new ideas regarding renewable energy sources to be integrated in the City's strategy for a circular economy. All these will be complemented by educating citizens on the circular economy perspective, its benefits and involvement possibilities.
Of course, in order to have those important cuts in energy consumption and its outputs, it is also crucial that the municipality pays attention to opportunities to finance those investments from EU funding, at least until the technology is mature enough to be economically viable. As William B. Arthur noted in 1989 in his paper called *Competing technologies*, "new technologies are not being

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[48] Note: Currently being developed with the help of the world bank.

used because they are more efficient than the conventional ones, but they become efficient because they are being used and perfected[49]"; so, financing these investments in new technologies that increase energy efficiency through non-refundable EU mechanism is a priority for Cluj-Napoca.
By achieving this main goal, an entire series of smaller achievements can be met: improving quality of life, saving resources (both from an economical point of view but also ecological), improving the collaboration between the City Hall and the stakeholders of the project, confirmation of Cluj-Napoca`s status of Lighthouse City in Romania and, of course, increasing the involvement of the local community (citizens, civil society, institutions) and raising awareness among them.
One of the positive outputs of the project, if these objectives are met, is that it will be proof of an opportunity of replication for other cities in Romania and in the EU.

*The main goal of the pilot goes beyond proving the economic sense to invest in energy efficiency but seeks to make the case and build support for circular economy practices in the energy sector. To carry out these goals, the pilot team works through several objectives and scenarios aligned along three levels. These include 1) innovative experiments in the energy efficiency and regeneration sector, (2) awareness raising activities and (3) incorporating circular economy practices and energy efficiency in policy agendas. As such, the means through which these objectives are achieved correspond with the activities the pilot is undertaking at each level.

1. Within the first level
    1. The pilot city is carrying out small-scale interventions through installing retrofit kits in municipally owned buildings as a way to showcase an intervention that is more accessible to interested actors who seek to make an energy transition but may not have access to necessary resources to implement a large-scale intervention.
    2. Furthermore, the pilot engages in the validation of circular business models for local businesses surrounding energy efficiency and optimisation for those that are interested in entering the smart/efficient energy market.
2. Within the awareness raising level
    1. The pilot carries out activities within educational institutions including the integration of CE curricula at the local universities and hosting workshops with students on the topics of CE, sustainability, and energy.
    2. The Cluj pilot has also developed the concept of the Energy Tree (see Figure 5) as an innovative means to raise public awareness on circular economy and the importance of using green energy, moving past just energy efficiency itself, and towards building an awareness around the diversity of regenerative energy sources.

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[49] *Arthur, W.B. (1989). Competing Technologies, Increasing Returns, and Lock-In by Historical Events. The Economic Journal, Vol. 99, No. 394, pp. 116-131.*
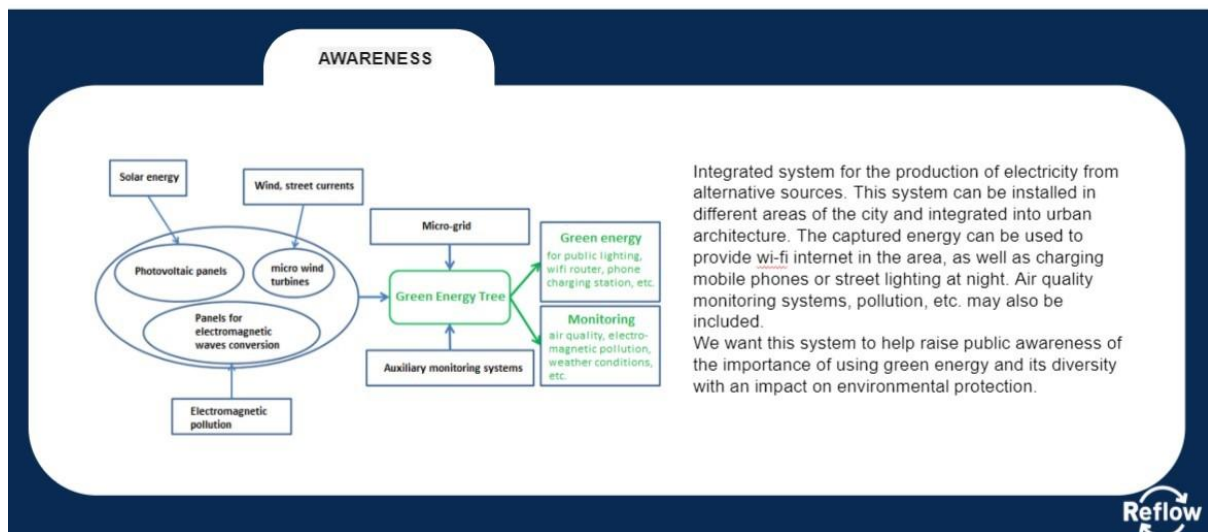
Figure 5: The Concept of the Energy Tree (Source: Cluj-Napoca Pilot Presentation, REFLOW Review Meeting)

3. Within the third level
    1. The pilot has carried out activities associated with the collection and analysis of existing relevant local, regional and national policies as well as defined the needs and proposals to integrate principles and city-relevant actions points into local and regional policies. As such, the pilot addresses this objective through developing policy solutions that integrate CE into policy such as the Cluj-Napoca Integrated Urban Development Strategy.

4.4.3 Pilot strategy and activities

In the paragraphs below multiple complementary short and long interventions are described that together form the Pilot strategy. This is done along three central topics, 'addressing governance, network & policy', 'technological development', and 'capacity building'.

Addressing governance, network and policy

Energy, legislation and policy is beyond the municipality`s reach, because it is a nationwide legal framework. But Cluj-Napoca is prepared to make the most of the opportunities that arise from support schemes being implemented at the European or national level.

Building and maintaining a strong network with other European cities and institutions can bring the municipality closer to new ideas and technologies in the field of energy.

Energy security is one of the key pillars of local governance, according to the Development Strategy of Cluj-Napoca, and it certainly will be prioritized in the next strategic period of 2021-2030.

Addressing technological development

The municipality has a strong collaboration with the universities, business clusters (especially IT business clusters), and Cluj-Napoca is actively aspiring to be a smart city.

Efforts are being made to have a totally green public transportation fleet, to have a strong internet connectivity throughout the city, a digital experience for the citizen when it comes to dealing with the City Hall, but also the challenges of Industry 4.0, AI, Blockchain and other emerging new technologies.

Cluj Innovation Park, a public investment of the City Hall, is aiming to be a top regional business hub, with start-ups and established tech companies present there.

Addressing capacity building / citizen / stakeholder engagement and education

In order to get some engagement from stakeholders, we plan to organise annual or bi-annual meetings, to keep them posted about the progress of the project, first of all will take place at the end of January 2020.

Also, to raise awareness on energy efficiency and to promote consumer education at the citizen`s level, we will take REFLOW to our CIIC (Center for Civic Imagination and Innovation) that consists of public meetings and debates with the general public, moderated by specialists in different topics of interest like urban development, infrastructure, green spaces etc.

4.4.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, Pilot cities are in the process of refining these as part of other tasks in other workpackages as well. This paragraph is therefore a work in progress where additional information will be added as soon as clarity about additional KPI's is reported by Pilots.

KPIs' from the GA

KPIs	Target value
Number of housing and electricity specific city resources identified (materials, infrastructures, etc.)	150
Number of governance / business models developed	5
% housing and electricity regenerated	35%*
Overall stakeholder satisfaction with new models	85%
Number of new applications for housing and electricity developed	6
Willingness to pay for regenerated products and materials	80%
Number of local makers and business reached through showcases	1000
Number of citizens engaged through educational programmes	500

*Regarding the KPI on the percentage of housing and electricity regenerated, originally, the target was 35% but it has been changed to: percentage of energy consumption reduced after installation of retrofit kits (target: 15%). The pilot calibrated this KPI because the regenerated electricity is not possible to estimate for individual consumers due to the set-up of information flows from the energy providers/distributors, what the pilot can estimate is the percentage of energy reduced in the retrofitted buildings and this is what the pilot estimates to be 15%+ in the short-term (project) and more on the longer term.

Additional KPIs to be developed:

Cluj Napoca has made a start in formulating additional KPI's relating to their goal of influencing public policy proposal mitigating energy efficiency and renewable energy use:

Goal	Concepts for KPIs
Increasing awareness of what is possible	Awareness workshop(s) and/or debate(s)
Identifying possible fitting solutions	New energy source(s) identified inside the city
	Proposal(s) for NZ energy buildings
Allowing citizens to become an informed and active party in the pilot	Knowledge transfer(s) to the citizens
Learning from others and exchanging information / best practices.	Good practices borrowed from members of the consortium
	Energy analysis(es), the first step to the energy sustainability of the city

The final KPI list will be further completed after sharing the KPI long list by Metabolic and the ongoing activity with CBS on the ToC.

4.4.5 Planning

This paragraph will detail how the proposed objectives will translate to an overview of actions over time. After identifying and detailing actions envisioned at this point, a general GANTT chart is presented.

Cluj-Napoca Pilot will provide an analysis of energy consumption in municipality owned buildings and public lighting system of actual lamps in public space, with a focus on those who have benefited from investments in energy efficiency in order to observe impact (M16-M20).
Stakeholders will be involved throughout these steps, with regular meetings.
These analyses will be disseminated to the public through meetings and debates within the Centre for Civic Imagination and Innovation (M20-24 and M30-34 of the project) in order to raise awareness in the local community and to involve citizens in the co-creation of future local governance tools regarding energy.
In order to argue the positive effects of being a rational and aware consumer of energy, cooperation with the IT companies currently developing apps in this direction will be in order. This cooperation will be provided by Transilvania IT Cluster (M20-M24).

Planning Reflow/CLU		2019				2020				2021				2022			
Cluj Napoca Pilot Project activities	Lead:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Analysis of energy consumption in municipality owned buildings and public lighting hubs																	
Sub-activity 1								■	■	■							
Sub-activity 2								■	■								
Dissemination to the public through meetings and debates within the Centre for Civic Imagination and Innovation																	
Session series 1										■	■						
Session series 2														■	■		
Cooperation will be provided by Transilvania IT Cluster																	
Sub-activity 1										■	■						
Sub-activity 2										■	■						

Chart 2 // Overview of actions over time

4.4.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the different interventions a success. The Consortium in Cluj-Napoca includes the Municipality of Cluj-Napoca, Aries Transilvania and the National Institute for Research and Development of Isotopic and Molecular Technologies (ITIM). However, the stakeholders involved in the project reach other branches of the ecosystem. The actors involved in collaboration will be coordinated by the **Municipality of Cluj-Napoca** and their ideas will be part of the policy co-created at local level.

Aries Transilvania maps the existing energy suppliers. The organisation will also disseminate the existing information and bring together the stakeholders that can contribute to finding new ideas and test them within the Pilot city.

Transilvania IT Cluster stimulates and supports the IT companies in the Cluster to develop and test apps and software that contribute to monitoring and reduction of energy consumption at organizational and citizen level.

ITIM proposes solutions in the field of regenerative energy sources. These can be integrated in the long-term development plan of the municipality, as resources for present energy consumers, as well as for the future neighbourhoods that will be developed in the metropolitan area of Cluj-Napoca.

The Energy Cluster stimulates and supports the companies, part of the Cluster, to propose and develop new energy flows and sources for the heating and lighting systems in the metropolitan area.

CIIC (Centre for citizens' innovation and creativity) is involved two-fold: in supporting the **citizens** to propose ideas regarding the priorities in consumption reduction and to educate them in the middle and long-term how to use the tools developed during the project.

Other stakeholders in the ecosystem include organisations that have concluded studies regarding the energy consumption in Cluj-Napoca, developed tools for reducing energy consumption or contributed to a national strategy for stimulating the use of alternative sources of energy. This way, the aim is to create synergies between the findings in different projects implemented or in the process of implementation, projects that are funded through different programs at national and EU level.

Companies that can use the solutions proposed during the project will be involved. Construction companies and local developers will be invited to know and integrate the proposed solutions in their activities.

4.5 Milan Pilot Action Plan

4.5.1 General introduction

Given the increasing interest in food boosted by Expo 2015, the Universal Exhibition hosted in Milan with the title "Feeding the Planet. Energy for Life", the Municipality of Milan has promoted in recent years a coordinated set of policies and initiatives aimed at supporting and stimulating innovative activities in rural and urban agriculture, food processing and distribution, food education and culture. These initiatives range from periodic exhibition events (Seeds and Chips, Tuttofood…), to research and innovation projects (on processes and products, technology, social issues and entrepreneurship) involving bodies and institutions, universities, public and private agrifood companies, citizens and associations towards a progressive transition toward a more sustainable and circular urban food system.

As a milestone of this process, the "**Milan Food Policy**" supports city government to make the city more sustainable starting from food-related issues. It focuses on actions that unfold in the short, medium and long term and promotes anything already available that can contribute to the implementation of food policies. It crosses ordinary and special policies that the Municipality promotes in its fields of competence, and was defined by the active involvement of citizens and all those operating in the city as part of the food system, in order to capitalise on the different resources (ideas, skills, investment, planning, etc.) able to trigger a multiplier effect.

At the same time, the Municipality of Milan has characterised its action as strongly supporting open/social innovation projects developed by Fab Labs, makerspaces, and other citizen/community labs which act in the metropolitan area (Milan is one of the European cities most densely populated of Fab Labs and makerspaces). These communities are grouping themselves around hybrid social and experimental spaces, distributed in the city. Milan counts more than one hundred co-working spaces, ten Fab Labs and makerspaces, incubators and business accelerators, cultural and creative hubs. It is an emerging ecosystem that involves Universities, more and more committed to opening up their heritage of structures and skills to the city, businesses, professionals and citizens. In Milan, this innovation ecosystem is not only structuring but is also being structured to design, prototype and test initiatives, products and services on an urban scale in different sectors: agri-food, manufacturing, digital technologies, energy and healthcare.

To support this trend, the Municipality of Milan has launched the strategic program "**Manifattura Milano**", aimed at facilitating the establishment of a new urban manufacturing community, to support the development of an open ecosystem of places and services for the materialization of goods, and to stimulate the integration of technological, social and design-driven innovation. Manifattura Milano thus becomes an action with which the Municipality puts itself at the service of a transformative process, transforming itself into an inclusive and enabling policy for-making platform.

Finally, Milan embraces the system of the municipal covered markets as a place for experimentation. These markets are symbolic places of production-distribution in cities. These markets are also the location of a market culture. This culture is also targeted when aiming to promote a transformation that integrates open innovation and circular economy.

The Covered Food Markets were built from the 1940s through the 1960s as centers of commerce and connectors between rural and urban communities. Many of the stalls and stands in Milan's Municipal Covered Markets now suffer from high vacancy due to these places not being in demand and

therefore not rented by salesmen. This leads to decaying facilities, and declining community interest in neighborhoods with viable commercial alternatives. Recognising that Markets present a unique opportunity to contribute to the transformation of neighborhoods, the Municipality is looking to develop a strategy for Markets to anchor local culture, food traditions and healthy eating, to promote social integration culture, to complement public sector initiatives, to build capacity among local stakeholders and community partners, to create economic impact for vendors and local businesses.

The 23 municipal markets are also located in peripheral areas of the city in order to bridge the territorial gap in the commercial offer of these services. In 2017 the City Council approved the Guidelines for renovation of covered municipal markets.

The task intends to support this policy through the integration of the markets within the social and urban fabric and the involvement of citizens and enterprises in order to promote a new culture of food, health and the environment. The municipal markets will be places for citizen engagement, creation of user groups, awareness campaigns and public thematic events. The task will also contribute to the creation of the Food Milan Council, a body that has the task of promoting the participation of various actors in the food system (producers, traders, experts, associations, etc.) in the choices related to food policies.

Following this path of development, Milan will deliver a Pilot focused on "Circular Markets" which aims at merging existing background and competences grounded in the local ecosystem of actors working on agrifood and peri-urban agriculture with the so-called "Fab-city perspective", as a new urban model of transforming and shaping cities that shifts how they source and use materials from 'Products In Trash Out' (PITO) to 'Data In Data Out' (DIDO). This means that more production occurs inside the city, along with recycling materials and meeting local needs through local inventiveness, where material flows would mostly be found in the form of data flows (information, knowledge, design, code).

The Municipality of Milan has set a series of clear targets, to facilitate and speed up the transition to the circular economy:

❏ 20% Reduction in greenhouse gas emissions by 2020
❏ 70% Recycling rate by 2030 – "Towards Zero Waste
❏ 25% Reduction of traffic in areas of moderate speed by 2030
❏ 142% Increase in population served by local public transport (over the next 10 years)
❏ 15% Cut amount of waste produced by each citizen by 2030 (Towards Zero Waste)
❏ Increase presence, usage and types of Car Sharing
❏ 70% Reduction soil consumption by 2030
❏ Plan of action for: planting of 3 Million trees by 2030 (urban forestry program)

To achieve these objectives, the role played by the Public Administration in Milan is fundamental in the adoption of plans, in programming activities, in the commitments to regulate the business market, in creating new opportunities and sharing practices. REFLOW is one of the Pilot projects which aims at contributing to these objectives.

4.5.2 Objectives

In a long term view, the general objective is to develop a circular agri-food Pilot project connecting agricultural activities in peri-urban areas to municipal covered markets developing different circular and tech solutions for sustainable food logistics and transportation activities, smart food transformation, distribution and conservation processes. Testing this approach with selected Pilot

markets, the goal will be to extend the positive results to other municipal markets, in a logic of scalability.

In a short term view, REFLOW will contribute to:

- [Local Economy goal] spread circular practices in the agro-food field among the traders of the covered municipal markets, activating "market laboratories" managed by the three fab labs (Polifactory – OpenDot – WeMake);
- [Policy goal] enhance the municipal covered markets as community hubs for the neighborhoods in which they are territorially located;
- [Citizens awareness goal] involve citizens on circular agri-food chain issues and on the fight against food waste;
- [PPP] involve the business world to participate in public and private partnership processes to enhance public spaces as drivers for local economy in peripheral areas of Milan.

The Milan pilot specific goals in relation with activities are:

MAP	ACTORS RESOURCES BUSINESSES	Milan aims to map the different existing networks of local producers, transformers, distributors and consumers to identify areas of fostering and facilitating a local economy by the use of systems and product-service solutions based on open technologies and open business models.
DATA	CAPTURING INTEROPERABILITY SENSE-MAKING	Milan aims to capture data of existing *indie* (independent, sustainable, energy savvy, socially inclusive, *economy-of-scope* based) agrifood production, transformation, distribution and consumption activities all across Milan metropolitan area in order to: - map the existing relationship and estimate the metabolisms (energy, waste…) of the most relevant indie food players which could be involved in an experiment on urban food circularity; - map the mismatch between the needs that can be solved and the opportunities that can be generated through the connection and the enabling of all the indie actors (in the different parts of the *from-field-to-mouth* food system)

BUSINESS DESIGN	FAB MARKET ON-DEMAND PSS CORPORATE HACKING CORPORATE PYRAMID	The creation of a lab on circularity (Enzyme Lab) aims to generate two results: ● co-design open source solutions and experiments that can support *urban coalitions* (indie agrifood producers, transformators, distributors and citizen) to solve food problems and/or generating social and economic integrated agrifood activities; ● set up a demo of an open data platform on circular agrifood system that can be used by all the actors and citizen involved to implementing PSS solutions.
LOGISTIC	ENERGY AND EMISSIONS SAVVY LOGISTIC PROCESSES HELP THE DEVELOPMENT OF SUSTAINABLE URBAN MOBILITY (PRODUCT AND MATERIALS LOGISTICS)	The project will try to ● analyse the impact of logistic processes in the production of a virtuous system of urban consumption enhancing how circularity between producers, transformers and consumers of local products could become financially and socially sustainable ● analyse and optimize the logistic support system and use it as source of data to understand and improve city metabolism
GOVERNANCE	BOTTOM-UP CIRCULAR FOOD POLICY CO-GOVERNANCE OF FOOD POLICIES	Milan aims to: ● upgrade the existing urban food policy stimulating new forms of open innovation related to circular food. ● facilitate and enable co-design projects developing circular urban agrifood chains ● create a "controlled environment" to test projects and experiment shortening of smartening bureaucratic processes related to agrifood (production, access, …)

Table 2 // Keywords and objectives relating to the Milan Pilot

4.5.3 Pilot strategy and activities

In the paragraphs below, multiple complementary short and long interventions are described that together form the Pilot strategy. This is done along three central topics, 'addressing governance, network & policy', 'technological development' and 'capacity building'

The Pilot strategy is based on the integration of open innovation processes to circular economy practices. The Municipality of Milan intends to enhance the great social and commercial heritage of the distribution structures, born in the 50s, and adapt them to emergent consumption patterns and lifestyles, through co-design labs with local public and private stakeholders, managed by Fab Labs and with the goal to develop prototype experiments in the local agri-food supply chain. Municipal markets have been defined as "places to co-produce circular solutions" engaging citizens and companies.

The Milan Pilot will start mapping and analysing the streams of agri-food products on selected covered municipal markets. The selection of the covered markets will be made through an engagement process which also aims to know the needs of market managers and identify first areas of experimentation for the subsequent laboratories and workshops.
The analysis will contribute to co-creating a catalogue of possible circular solutions for Milan municipal markets, from which extract topics and projects will be developed in the "market laboratories".
Co-design workshops and prototyping experiments will be the core of the activities of the Pilot and will be organised physically within the markets on spaces defined "markets laboratories".

In the market, at the stall of the fruit and vegetable vendor, a "check-in and -out gate" with RFID for fruit & vegetables will be set up. Goods arriving from the Foody Hub will be tagged with pre-printed RFID tags. Through mobile readers, it will be possible to read the information contained in the boxes, and an intelligent scale equipped with a camera will allow the automatic update of the quantities of sold and unsold products. The prototypes tested in this scenario such as RFID labels, readers, smart scales and boxes will be able to be shared with the tests of scenario 2 (Foody Zero Waste), which takes place at the logistics platform of the Foody Hub where wholesalers give unsold goods to the NGO, RECUP, to redistribute them at city level.

Addressing governance, network and policy

REFLOW will involve an extended network of stakeholders to be engaged with variable geometry based on the strategic areas of development of the workshops. Different categories of stakeholders will be involved:
- Private companies as start-ups in agri-food chain or peri-urban farmers of Milan;
- Social enterprises as independent local producers, NGOs and neighbourhood associations;
- Institutions and public companies managing general fruit&veg market of Milan or Agricultural institutions.

Therefore, REFLOW will experiment with a new policy model for neighbourhood trade in Milan, in which public spaces (markets) are enhanced by commercial activities focused on circularity, involving key players of the local agri-food supply chain.

Addressing technological development

One of the aspects of great interest in the agri-food supply chain is to guarantee the quality of agricultural products and the traceability of raw materials.
In this context, block chain technology, which is already applied on the traceability of large-scale and long-distance products, **can be tested on small peri-urban and rural-urban supply chain, located in**

the metropolitan Milan or Lombardy area in order to increase the relationship of trust between customers and sellers in the market.

Other technological asset will be used in co-designing solutions and co-production processes (open and distributed technologies, hardware and software technologies) and will consist in:
● Digital fabrication technologies;
● Services for on demand manufacturing;
● Specific technologies used in food chain.

Addressing capacity building / citizen / stakeholder engagement and education

One of REFLOW's goals is to reach the final target of the covered markets, that is the buyers of the products. They are the citizens of the neighbourhoods where markets are located, which tend to become real community and neighbourhood hubs, offering an alternative to large-scale retail distribution.
Furthermore, the presence of fab labs within the markets will contribute to creating hybrid spaces aimed at actively involving citizens/clients.
REFLOW will also contribute to the communication of events that the Municipality of Milan organises in the markets, such as the "Animated Market" initiative, a series of thematic events within the covered markets, which temporally transform commercial spaces into places of culture and knowledge sharing with citizens (with particular attention to the fragile people).

4.5.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, Pilot cities are in the process of refining these as part of other tasks in other workpackages as well. This paragraph is therefore a work in progress where additional information will be added as soon as clarity about additional KPI's is reported by pilots.

KPIs' from the GA

KPIs	Target value
Number of agri-food specific city resources identified (materials, infrastructures, etc.)	150
Number of specific agrifood streams identified	30
Number of governance / business models developed	6
% food regenerated (current 20% of complete stream)	25%
Overall stakeholder satisfaction with new models	75%
Number of new applications for food stream developed	6
Willingness to pay for regenerated products and materials	75%
Number of local makers and business reached through showcases	250
Number of citizens engaged through educational programmes	500

Additional KPIs to be developed: *The final KPI list will be completed after sharing the KPI long list by Metabolic and the ongoing activity with CBS on the ToC.*

4.5.5 Planning

This paragraph will detail the how proposed objectives will translate to an overview of actions over time. After identifying and detailing all actions envisioned at this point, a general GANTT chart is presented.

Milan Pilot is based on 3 main streams of actions:
- Action 1: Stakeholder engagement, mapping and research grounding
- Action 2: Co-design lab and co-design workshops
- Action 3: Prototype experiments

Action 1 will prepare Action 2 and 3.
Actions 2 and 3 will be reiterated in two subsequent cycles.

Planning of the actions:

Action 1: Markets engagement, mapping and research grounding	
Timeline	[M6-M12]
Role of the partners	Leader: MILAN Participants: POLIMI
Description	Action 1 consists of three sub-tasks: *A1.1 Market's manager engagement* The activity will start with the involvement of representatives of the covered municipal markets (i.e. AssoFood and ConfCommercio) for a first selection among the 23 markets. The criteria for the markets selection are based on different initial assets that can contribute to create a fertile environment which can be activated through co-design labs and workshops: - Material and immaterial resources: to be adopted in the new circular urban metabolism; - Strategic territorial localization: as starting point to consolidate the markets as community and neighborhood hubs; - Local active networks: to activate local-based partnerships to guarantee a long-term view of the proposed activities; - Open-mindness of markets's managers: traders potentially ready to face the challenge of the circular economy as opportunity to develop new business activities. *A1.2 Mapping* Desk and field research (ethnographic observation, interviews) on the Municipal Markets. The desk analysis aims to analyse the dynamics related to logistics, conservation, transformation, management of the waste cycle of the whole supply chain. The field research aims to observe all the stakeholders involved with a focus on practices, configuration of places, range of activities and stimulating the emergence of needs in terms circular economy. *A1.3 Research grounding* The action identifies the possible scenarios of projects - system - process - product - service solutions that have particular characteristics of innovation linked to REFLOW's approach to circular economy. These scenarios will be used as a starting point for developing the subsequent co-design activities. Main goals: - to draft a catalogue of the emerging solutions which are perceived as relevant by the stakeholders relating to periurban agri-food system; - to draft a report which analyses and describes emergent needs/areas of opportunity connected to the environmentally friendly transformation of the Municipal Markets System; - to identify a provisional set of design-driven scenarios aimed at drafting a feasibility plan of project activities. Potential areas of opportunity for municipal markets can be referred to **different stages of the food value chain**: *production* (with attention to organic food and agro-ecological techniques for

	clean soils), *food processing* (for food produced locally), *food distribution* (for safe and traced food), and *food waste* (surplus food and city organic waste). Consequently, circular and technological solutions to be defined in the **catalogue** can interest one of the stage of the agri-food chain. Some examples are referring to use of food surpluses (how edible food waste from markets can turn into new food?) as dried food or transforming non-edible food waste into renewable energy sources to micro bio-digesting system. At productive level, attention can be put on indoor farming with DIY system for production of vegetable (aeroponics, hydroponics), mushrooms (from food waste), super food (i.e. spirulina algae) or yeast from collected wasted sugar. About processing and logistics, solutions to be developed can consider the traceability of local food supply chains (certified with blockchain technologies) and sustainable mobility to distribute fresh products (ex. Cargo bikes for cold chain products transport).
Results	R.A1.1: group of municipal markets identified to be engaged in REFLOW. Selection of 3 to 5 markets to experiment solutions. R.A1.2: report on desk and on-field research. R.A1.3: catalogue of circular solutions for covered markets, report of needs and opportunities areas of markets, scenarios for markets experiments.

Action 2:
Co-design lab and co-design workshops

Timeline	First cycle: [M16-M18] – Second cycle: [M20-M22]
Role of the partners	Leader: WMK+OD+POLIMI (based on the lab and workshops managed) Participants: OD, WMK, POLIMI, MILAN
Description	Action 2 is based on the creation of a Co-design Lab. The Co-Design Lab will consist in two cycles of 3 Co-Design Workshops per year. This activity will involve all the Milanese project partners, the players of selected markets and different external stakeholders, based on the areas of development previously identified. The action will be based on results coming from the research grounding activities and from the collected needs and opportunities. The number of markets involved will depend on the results of the previous action. The workshops will concept the emerging projects-system-process-product-service solutions.
Results	R.A2: 2 cycles of co-design lab, consisting in 6 co-design workshops.

Action 3:
Prototyping experiments

Timeline	First cycle: [M24-M25] – Second cycle: [M28-M29]
Role of the partners	Leader: WMK+OD+POLIMI (based on the lab and workshops managed) Participants: OD, WMK, POLIMI, MILAN
Description	The 3 Fab Lab involved (OpenDot, WeMake and Polifactory) will collectively manage two cycles of prototype experiments. Each cycle of experiment is organised in 3 prototype workshops and use cases derived from the results of the previous co-design activities (Action 2). The workshops will be organised within the markets in physical space defined as "Circular Food Labs" involving external stakeholders, customers, citizens and market managers. Alternatively, experiments can be organised in FabLabs's premises needing specific instruments and equipment.
Results	R.A3:2 cycle of prototyping experiments, consisting in 6 prototyping workshops.

Planning Reflow/MIL		2019				2020				2021				2022			
Milan Pilot Project activities	Lead:	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Action 1: Markets engagement, mapping and research grounding																	
A.1.1 Market's manager engagement	MILAN			▓	▓												
A.1.2 Mapping	POLIMI			▓		▓											
A.1.3 Research mapping	POLIMI																
Action 2: Co-design lab and co-design workshops																	
A. 2.1 Co-design workshops	MILAN + OD + WMK + POLIMI							▓	▓								
A. 2.2 Co-design workshops	MILAN + OD + WMK + POLIMI									▓							
Action 3: Prototyping experiments																	
A. 3.1 Prototyping workshop (first cycle)	MILAN + OD + WMK + POLIMI										▓						
A. 3.2 Prototyping workshop (second cycle)	MILAN + OD + WMK + POLIMI											▓	▓				

Chart 4 // Overview of actions over time

4.5.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the different interventions a success. The local partnership can be summarised with the following diagram which also indicates the relationships between the subjects:
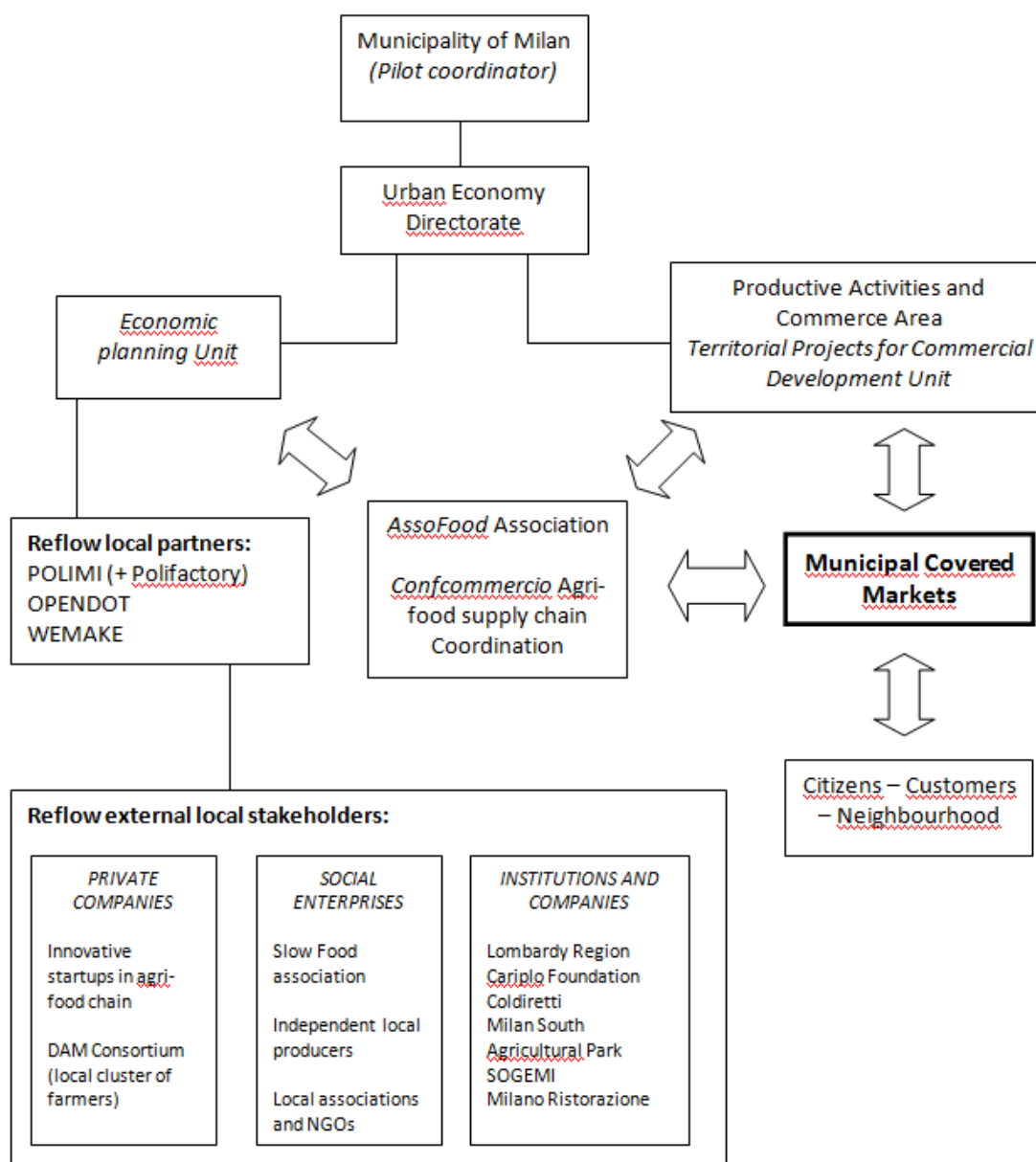
Figure 24 // Stakeholder coherence overview

The engagement of external actors will be organised on the opportunities of collaborations with the market's managers for co-creation activities. In the following scheme, each actor's potential role is indicated.

Private actors:

Stakeholder	Possible role in co-creation
Farmers and producers of the periurban ecosystem [Rural districts in Metropolitan area]	Acting in the Pilot like traditional farmers, they could also be interested and capable in food system innovation.
Innovative farmers [ex. Davide Longoni, Cascinet]	Acting in the Pilot like traditional farmers, they could also be interested and capable in food system innovation.
Startups/Scaleups in foodtech and agritech (working in Agritech, Foodscience, Delivery and retail, Foodservice, Media, Coaching subsectors)	Open knowledge and ideation processes bringing their expertise when dealing with new technologies for the food system. They can also be involved in the solution

	testing phase. Their main missions of "making quality products accessible to the greatest number of people and ensuring that agricultural production becomes increasingly sustainable over long term" converges with some of the CE projects goals.
Incubators and Accelerators (eg. Foodtech accelerator Deloitte, Talent Garden, Plug & Play, Unicredit StartLab)	They can invest through dedicated crowdfunding programs in specific Pilot solutions
Private Investors (eg. OltreVenture, LVenture, Innogest, Garnell, P101 investing in FoodTech in Milan)	Investors in the the projects
Chemical industries (es. Novamont)	They can specifically be involved for new materials/products development (co-design and implementation)
Small local Food retailers (bakeries, butcheries...)	Mapping activities, test prototypes in close connection with users/clients, flows mapping
Wholesale markets (e.g. So.Ge.Mi, Ortomercato di Milano)	Mapping exercise, data gathering
Large-scale distribution (GDO) (es. Esselunga, Carrefour, Penny Market…)	Resource flow mapping, data gathering, prototypes testing
Big Food brands (es. Barilla)	Resource Flow mapping, prototypes testing and data gathering

Associated companies:

Stakeholder	Possible role in co-creation
Energy providers (es. a2a)	Co-implementing new solutions
Waste managers and disposers (es. Amsa)	Data gathering and flow mapping activities, prototypes testing
Catering Services Providers	Prototypes testing and data gathering, flow mapping activities

Public:

Stakeholder	Possible role in co-creation
(School) Canteens	Prototypes testing and data gathering
Policy makers (Municipality's Directorates)	Co-design, ecosystem and flows mapping, dissemination

Private and public:

Stakeholder	Possible role in co-creation
Universities and Research centers (es. Politecnico di Milano, Barilla Center for Food and Nutrition, EStà Research Center, Milan Center for Food Law and Policy)	Co-defining Pilot principles and the related performance indicators, to then being involved In the project Pilot assessment and iterations design, orchestrating the whole co-creation process (ideation?), open knowledge activities for ecosystem and flows mapping

Philanthropic sector:

Stakeholder	Possible role in co-creation
Foundations (e.g. Fondazione Bracco, Fondazione Cariplo)	Open knowledge activities for ecosystem and flows mapping, funding programs for projects based on social, environmental/sustainability objectives
Charities and Food banks (e.g. Caritas, Siticibo Banco Alimentare)	Prototypes testing and data gathering, flow mapping activities
Social enterprises (e.g. NGOs/Cooperatives/..)	People engagement for solutions co-production.

Other:

Stakeholder	Possible role in co-creation
Citizens (single citizens, students, …)	They are involved in project dissemination activities and they could be involved in educational programs and events
Citizens associations/volunteering networks (eg. RECUP, Io non butto)	Prototypes testing and data gathering, co-production of the project values
Regional associations/consortium (eg. Assolombarda, Camera di Commercio di Milano Monza Brianza Lodi)	Stakeholder engagement, ecosystem and flows mapping, funding, project dissemination
National associations/consortium (eg. Legambiente, Confindustria, Cial, Comieco, Corepla, Ricrea)	Stakeholder engagement, ecosystem and flows mapping, funding, project dissemination
Technology providers (private companies (eg Foodchain), FabLabs, makerspaces)	Project implementation

4.6 Paris Pilot Action Plan

4.6.1 General introduction

Paris concentrates a huge number of events and temporary structures in France. This sector of activity, which is important in the capital, produces a large amount of waste of wood and packaging that are used only for a short period of time. In this ecosystem of different agents (designers, event planners, site managers, waste management companies) there is a lack of specific agents taking care of coordinating the flow and life cycle of materials involved in the sector.

The REFLOW Paris Pilot is focusing on creating specific conditions for these agents in order to coordinate the use and reuse of materials involved in the event and temporary structure sectors. For that the Paris Pilot is developing:

- a "tracking label" for materials and furnitures from the exhibition stand supplier to the re-use status of materials in order to transform a highly segmented sector into a more connected and integrated one;
- new tools for scanning and transforming reused materials; a waste management protocols for storage
- and a repertory of actors to be integrated to REFLOW OS; an incubation program focusing on developing new solutions on computational design, computational fabrication, data visualization and machine learning that take as a basic constraint the life cycle of materials before and after the exhibitions.

City's policy and actions

As part of the implementation of its Circular Economy Plan, the City is carrying out several actions aimed at promoting reused activities, both with professionals and individuals:

- The City provides support to generalist or specialized recyclers operating in the City (fifteen at the end of 2019). The City also participate in the opening of new recyclers (two openings planned for early 2020, three others in projects) and aims to create a large hub for reused materials allowing massification of deposits and improvement of their upgrading;
- The DILT (real estate, logistic and transport department) has set up a reuse platform for office equipment of the Paris administration;
- The DCPA (construction, heritage and architecture department) promotes the reuse of building materials on Pilot sites and standardizes its purchasing procedures to encourage the use of reuse.

Event and temporary structure sectors

Paris is the capital city of France and the largest city of France for its population. With about 2,274,880 inhabitants for a surface of about 105 square km, it is also one of the densest cities all over the world. The city is the first tourist destination world-wide, and also the leading city for conventions and exhibitions. 450 exhibitions and trade shows are held every year, attracting nearly

- 10 Million professional visitors out of the 32 million tourists
- 100.000 exhibitors
- 21 big site
- Cultural capital

Moreover, as Paris is hosting the 2024 Olympics and Paralympics Games, it makes for Paris a necessity to set an example and work hand in hand with the Pilot partners from the innovation ecosystem but also the tourism and hospitality industries. Finding new solutions to help tackle the challenges of circular economy and sustainable economic development at a city scale is at the heart

of Paris' innovation strategy which led Paris to be awarded the Capital of Innovation 2017 title by the European Commission.

Starting from these events, that have the critical mass to start the experimentation, the Pilot first aims to create a circular protocol and a set of digital tools that could be generally implemented in the city and the region for other events and temporary structures, consolidating a circular economy, tracking label for material and a circular economy certification for trade fairs and events.
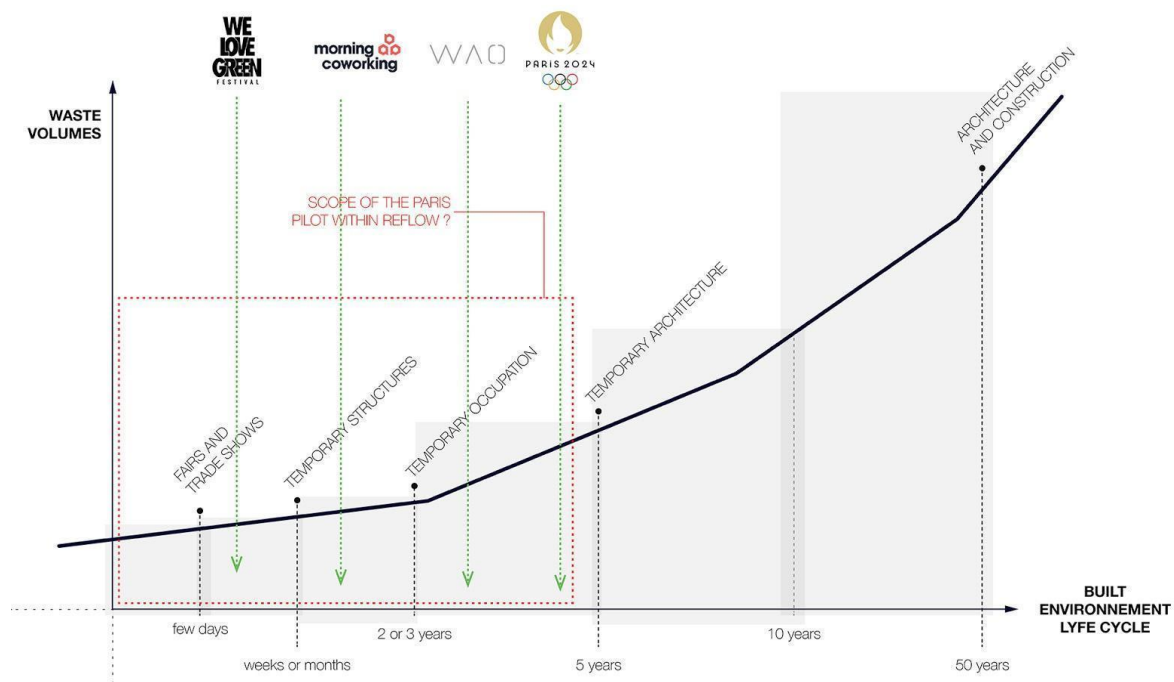
Figure 25 // Project trajectory

We open the scope of events as temporary architectures, we are looking to design processes, materials, certifications and protocols used for the sector of events that can be connected to other relevant challenges the city is facing and addressing:

- Temporary urbanism and urban regeneration processes, which also means fabricating urban temporary environment and that could benefit from materials and processes developed by the trade sector and vice versa. Some experiences of this kind have been recently carried out during evolutive architecture and building usage renewals.
- Real Estate stakeholders and the Municipality are more and more interested in developing prototypes of evolutive architecture and buildings, in which buildings are designed integrating the idea of having evolutive usages within the life of the building (from office to housing, from warehouses to coworking spaces).
- Strengthen the culture of digital technologies and circular economy through education.
- Find and organise new sources of raw material for designers, artists, craftsmen supported by city council to develop the Productive City strategy.

Ecosystem

Fab City Grand Paris is a local network of makers, designers, architects, urban farmers and innovators engaged in the rise of the circular and collaborative economy in the parisian urban area.

Paris and its region has both an incredibly dynamic scene of urban innovators and changemakers as

well as a long tradition of local production and urban craftmanship. Together with a solid support of political institutions impulsing digital innovation and the makers movement, the city has an enormous potential to implement effectively the Fab City approach.

The informal network was established as a non-profit association in 2017. The organisation promote and implement the Fab City movement and it was in charge of the organisation of the 2018 edition of the Fab City Summit in Paris.

The association is composed around thirty members and sympathizers, from associations to consulting companies. They also have various interests and subjects such as urban farming, fab lab, circular economy etc. These members are great resources for REFLOW .

For the project REFLOW, the Parisian team, coordinated by Fab City Grand Paris, is composed by Ars Longa and Volumes and supported by the City Hall of Paris (a more detailed description of the local partners in Paris can be found in section 4.6.6).

4.6.2 Objectives

The objective of the Parisian Pilot is to build a circular economy approach for events production and temporary activities aiming to coordinate the use and reuse of wood materials in the territory of the Great Paris.

The objective is twofold :
- in a short term vision, the objective is to understand and accompaign the sector's actors for completing circular supply chains by **developing technological solutions and new business models**.
- in a long-term vision, the Parisian consortium aims to develop an active lobbying activity towards the European institutions and other relevant stakeholders to **upgrade waste regulations**.

For the REFLOW project, he following goals have been set :

1/ Developing technological solutions
First, the Pilot needs to understand what are the issues and problems of the sector's actors through an analysis. Then, semi-industrial solutions will be developed for helping the sector and SMEs to sustain their activities. The tools that the Pilot will conceive will be "open" as much as possible in order to share it with REFLOW partners and create a community around it. A handbook of good practices will be delivered to help the actors and to explain how to use and apply the REFLOW solutions.

2/ Developing new business models
We also need to understand how existing actors are sustaining themselves and what are the obstacles and difficulties they are facing. Based on the technical solutions the Pilot will develop, new economic models for events and temporary activities, consisting of services associated with the REFLOW tools will be designed.

3/ Upgrade waste regulations
The Pilot will collect data on current regulations and look at issues which prevent stakeholders from taking action and conduct a watch on law and public plans. The Pilot will then recommend reglementation solutions which will be identified with stakeholders.

4.6.3 Pilot strategy and activities

In the paragraphs below multiple complementary short and long interventions are described that together form the Pilot strategy. This is done along three central topics, 'addressing governance, network & policy', 'technological development' and 'capacity building'

Addressing governance, network and policy

I.1 / Conduct a watch of public policies and actions of the city
- Identify public policies and action plans at the city level
- Watch on progress on the implementation
- Understand the actions of other Pilot cities

I.2 / Analysis of issues and challenges actors
- Identify the actors in the events and ephemeral construction on the territory and the actors of the territory circular economy
- Understand the issues of the Paris area players in the event industry and construction ephemeral (managers, organizers, designers ...), the circular sector of the economy and the waste management sector
- Identify the actors with whom the Pilot will work
- Understand the impact of material flows at an event or ephemeral building

I.3 / Mapping the network
- Mapping of the production capacity and material flow in the city (5.2 patch) / 1 - data collection
- Mapping of the production capacity and material flow in the city (5.2 patch) / 2 - Data visualization
- Implement the action plan and map creation methodology for all cities as a "lead" for this spot

I.4 / Recommendations for best practices
- Identify best practices events and ephemeral construction on the territory
- Develop a best practices guide

I.5 / Prescribe identified solutions to actors
- Co-design of public policy solutions for cities
- Identify the different political strategies of various Pilot cities

I.6 / New type of governance for new business models (Incubation)
- Identify modes of innovative companies, existing
- Develop new forms of governance adapted to the incubated companies

Addressing technological development

II.1 / Open source technological development
- Identify firms and big corporations of events and temporary construction sector that have an interest in expressing their needs in circular economy (challenges)
- Identify local makers and designers willing to be incubated to develop their solutions
- Disseminate developed knowledge
- Co-design REFLOW OS by prototyping its application based on the Paris pilots needs and context

- II.2 / Develop open source toolsCarry a traceability protocol of matter as label tracker
- Design and build an intelligent storage
- Developing tools to help companies
- Run experimentations for testing the tools developed

Addressing capacity building / citizen / stakeholder engagement and education

III.1 / Analysis of business models of existing actors and their difficulties in their practice (with WP6)
- Identify business models of the events and temporary construction on the territory and the actors of the territory of circular economy
- Understand the specific challenges of the Paris area in the event industry and temporary construction (managers, orga, designers, elegance events), the circular sector of the economy and the waste management sector

III.2 / Incubate and develop innovative businesses
- Develop an incubation program for innovative companies in the sectors of the EC
- Consolidate "soft skill" of incubated companies
- Promote and boost sales of incubated projects

III.3 / Design and testing of new economic models (event and reuse)
- Design X economic models
- Experiment X economic models

III.4 / Developing services associated tools
- Services related to the tracking label
- Services related to new practices for companies
- Services related to the database and storage

III.5 / Disseminate tools developed by REFLOW
- Promote tools and develop the community
- Disseminate tools
- Engage citizens and society

III.6 / disseminate and communicate actions REFLOW
- Spread news about the incubation and education program
- Conduct communication actions
- Promote the solutions developed by consortium

4.6.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, Pilot cities are in the process of refining these as part of other tasks in other workpackages as well. This paragraph is therefore a work in progress where additional information will be added as soon as clarity about additional KPI's is reported by pilots.

KPIs' from the GA

KPIs	Target value
Number of wood and packaging specific city resources identified (materials, infrastructures, etc.)	150
Number of specific wood and packaging streams identified	5
Number of governance / business models developed	5
% wood and packaging regenerated	30%
Overall stakeholder satisfaction with new models	90%
Number of new applications for wood and packaging developed	15
Willingness to pay for regenerated products and materials	75%
Number of local makers and business reached through showcases	1000
Number of citizens engaged through educational programmes	600

Additional KPIs:
The final KPI list will be completed after sharing the KPI long list by Metabolic and the ongoing activity with CBS on the ToC.

4.6.5 Planning

This paragraph will detail how proposed objectives will translate to an overview of actions over time. Based on the activities from chapter 5.3 a general GANTT chart is presented below.
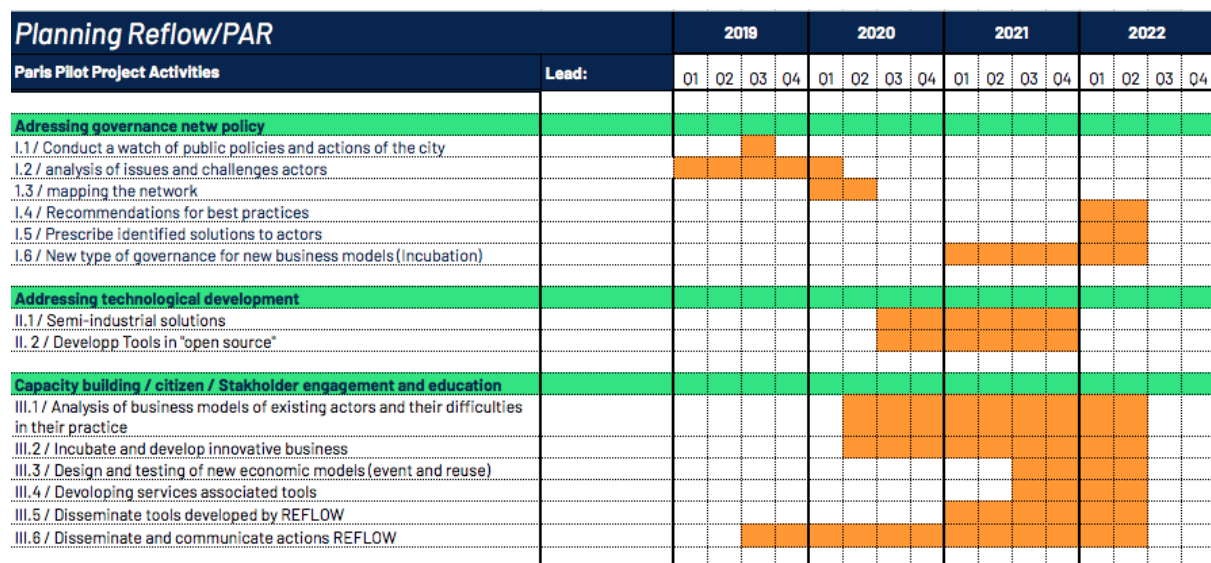
Chart 5 // Overview of actions over time

4.6.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the different project activities into a success. To identify these different parties the Paris Pilot partners have drafted the stakeholder overview presented below.
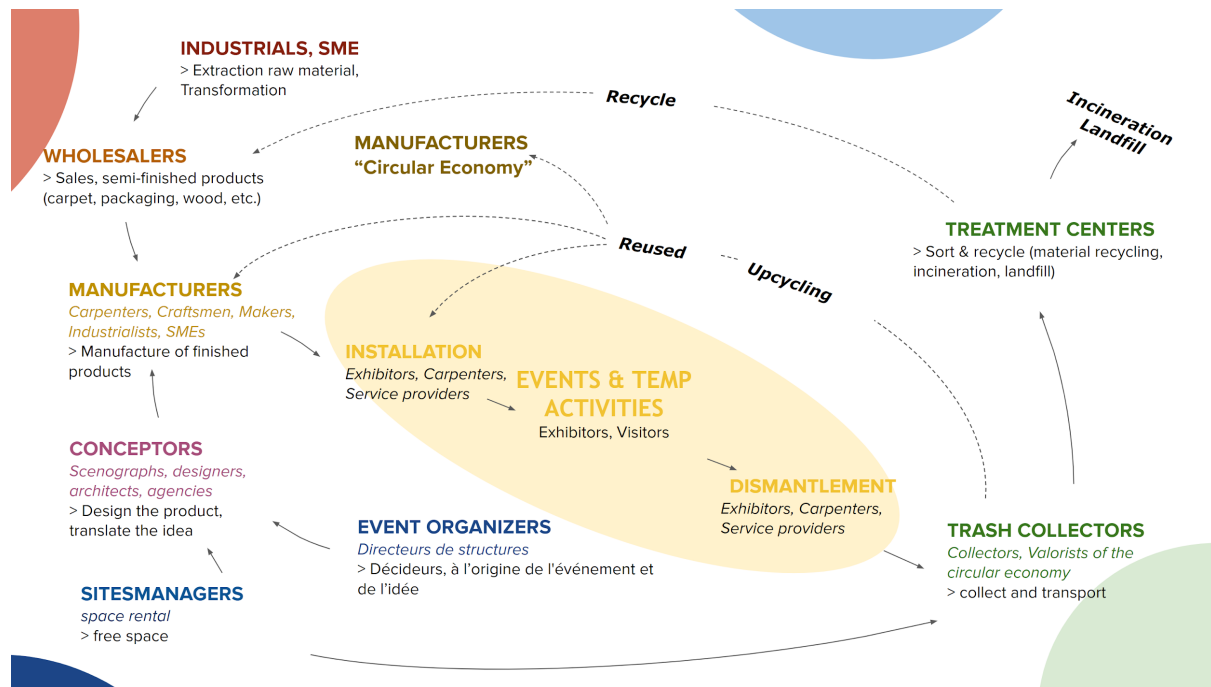
Figure 26 // Stakeholder category overview

Below a more specific list of partners is presented that will potentially be involved within the Paris pilot.

Stakeholder	Possible role in co-creation
Makers and space of the Parisian ecosystem [Metropolitan area] ● Re-Store ● WoMa ● WAO ● Initiatives solidaires	Developing solutions and experimentation. Storage and open hardware project
Events & event manager ● We Love Green ● FIAC & Reed Expo ● Maker Fair	Giving access to data and potentially applying conceptual approaches for modular design
Event organisation ● Unimev ● VIPARIS	Giving access to data and network potentially applying recommendation
Waste collectors	Testing solutions developed for REFLOW Giving feedback

● La réserve des arts ● Co-recyclage	
Temporary space manager ● Morning coworking	Testing solutions developed for REFLOW Giving feedback
Space for event ● Petit palais ● Cité des sciences / Universcience	Giving access to data and materials for experimentation. Application of recommendation and solutions
Association ● les Canaux	Help to disseminate REFLOW solutions and the incubation

4.7 Vejle Pilot Action Plan

4.7.1 General introduction

Introduction, analysis of current situation in terms of government, legislation, ecosystem, material flows.

Vejle Municipality will focus on plastic, with "Vestbyen in Vejle" as the test area. The Pilot has design thinking as a method, which connects to FABLABs and prototyping workshops. The Vejle Pilot will be designing new sustainable solutions to reduce the need for plastic and co-create circular strategies for plastic as a resource – together with local stakeholders from both public and private sector and citizens.

As a part of the public sector, the Vejle Pilot aims to bring innovation into action and connect civil society, companies and public institutions when developing new solutions. The social and civic responsibility of gathering waste and motivating to reuse is also a focus in the municipality.

The material stream being explored is plastic used in 7 different sites in the west area of Vejle – representing both public institutions (elder care center, school and hub for entrepreneurship), private companies (retail and construction) as well as public households (apartments and residential neighborhoods).

The Pilot aims to provide realistic best practices through a people-centered approach by 1) mapping plastic streams in 7 micro test sites; 2) involving and connecting a wide range of local stakeholders; 3) developing new prototypes and consequently enable scaling and replication in other cities and 4) executing citizens' engagement and capacity building activities.

Current situation
Plastic and plastic-based waste, which is not recycled, plays an important role in the municipality of Vejle. The city already has a high-developed welfare-system and amount of awareness towards the environment. One of the challenges in the city of Vejle, is to create methods and possibilities, so citizens, local companies and the municipality, have the tools to reuse plastic or to replace a bigger amount of the plastic in products. Also, there is a need to create a fellow structure and collaborate even more to make plastic part of a circular thinking. Also sharing knowhow and trying out innovative solutions is a challenge when the city has very heterogeneous citizen-groups in the city.

The municipality and city of Vejle wants to be innovative in being circular alongside a growing population, a growing consumption and a shift in the welfare-system, where the citizens and companies play a bigger part by self-help and being resilient to preventing the challenges of tomorrow. Also combining use of technology, design-methods and include stakeholders in the challenge, will show the way forward when making plastic circular and reducing the need of plastic.

Vejle is a part of Rockefellers 100 resilient cities of the world. This means Vejle has a strong focus on creating citizen-resilience, environment-resilience and digital-resilience. The city will build up enough resilience to cope with future problems such as rising waters, making sure Vejle's citizens have a secure community and are digitally aware of possibilities in the fourth industrial revolution. All as a part of a sustainable future.

The municipality works together with surrounding municipalities with the task of bringing knowledge about circular economy into the public sector, bigger companies and into the everyday life of the citizens. This work will also be a backbone of knowledge in the Pilot.

Spinderihallerne (The spinning mill) is Vejles Center of innovation and creative entrepreneurs. 80 entrepreneurs and companies with under 10 employees are a part of the environment. Placed in the western part of Vejle, it also has its share of entrepreneurs with technology-skills.

In the first phase of REFLOW, seven sites have been selected. Here the Pilot will analyze what kind of plastic the citizens throw out. In February, the results are presented, and they become decisive – supplemented by the Metabolic scans - for which specific areas we will use as test sites throughout the project.

4.7.2 Objectives

The Vejle Pilot focuses on mapping out and analysing the streams of plastic in specific sites in the west part of the city. Furthermore, focus is on engaging stakeholders, designing new solutions and developing new (and improved) business models in order to create both short- and long-term impact in the public and private sector.

The Pilot aims to change organizations and citizens behaviour regarding the reuse, reduction and recycling of plastics. A strong focus will be on engagement and creating awareness and behavioural change through practical incentives / prototypes that revalue the plastic waste.

In the long term, the Pilot aims to create impact through a line of principles that will enable our solutions and methods to be scalable to other contexts to benefit public and private actors.
The short term goal is to engage citizens, entrepreneurs and small-scale companies through new creative engagement methods as well as working within the Municipality on policy level to improve the focus on plastic.
The overall goal is to achieve 25% plastic regenerated on specific, selected sites using new scalable models and methods.

4.7.3 Pilot strategy and activities

In the paragraphs below multiple complementary short and long interventions are described that together form the Pilot strategy. This is done along three central topics, 'addressing governance, network & policy', 'technological development', 'capacity building'

Addressing governance, network and policy
- The Pilot aims to facilitate connections/exchange knowledge between civic, business and policy level
- The Pilot aims aims to create arguments and showing potential for a more circular procurement policy (locally and nationally)
- The {ilot aims to identify potential barriers among stakeholder for a sustainable transformation (and present them at a policy level)

Addressing technological development
- The Pilot aims identify the potentials for implementation of Blockchain in a local context to track the plastic streams and visualise the potential for a change of behaviour
- Development and launch a list of digital communications tools/channels that can help the Pilot spread the knowledge generated by REFLOW (social media, newsletter, homepage etc.)

Addressing capacity building / citizen / stakeholder engagement and education
  - Engage with citizens for behavioural change
  - Information-meetings, events and workshops throughout the project period (local and national level)
  - Events and workshops with designers/businesses/citizens/educational system

4.7.4 KPI's

Linked to the objectives, multiple Pilot specific KPI's have been formulated. These KPI's are - at this point - primarily sourced from the grant agreement. However, many Pilot cities are in the process of refining these as part of other tasks in other workpackages as well. Vejle has succeeded in doing so already. Below, the original KPI's, as well as a list of ToC based additional KPI's are presented.

KPIs' from the GA

KPIs	Target value
Nr. of plastic specific city resources identified (materials, infrastructures, etc.)	*50*
Number of specific plastic streams identified	*5*
Number of governance / business models developed	*10*
% plastic regenerated	*25%*
Overall stakeholder satisfaction with new models	*75%*
Number of new applications for plastic developed	*12*
Willingness to pay for regenerated products and materials	*70%*
Number of local makers and business reached through showcases	*50*
Number of citizens engaged through educational programmes	*250*

Additional KPIs

Detailed KPI's	Activities	Output	Measurement
● Participation of minimum 50 households distributed on different types of housing and public and private buildings	● Preparation of plastic analysis ● Organising/hosting steering committee meetings (with representatives from local government, businesses, housing associations, citizens, DDC)	● 1 plastic analysis report that will show the plastic streams on 7 specific sites in the West of Vejle. The report will form the baseline for measuring our goals ● 1 steering committee agreement on specific test sites	● Endline report with elaboration of level of CE implementation (Knowledge/awareness, reuse, reduce recycle)
● 5 plastic streams identified	● Preparation of plastic analysis and overall report on plastic types used in Vejle	● 1 plastic analysis + report with outline of the different types of plastic	● Overview of measurements in the plastic analysis
● Development of 2-3 new business models	● Execution of events and workshops with	● Guidebooks/best practice (digital) with principles to	● Number of registered business models

- Development of 4-5 campaigns/ information meetings 3 examples of the project influencing the policy level	- different stakeholders - Ongoing dialogue with project partners (eg. fablabs, the local political stakeholders, stakeholders connected to the chosen test sites etc.) - Inclusion of experts and collection of knowledge - Collaboration with Oekolariet	- build, drive and scale similar, future projects - Implementation of initiatives with communicative purposes (e.g. unconferences, physical scenarios etc.) - More sustainable local procurement - Better local CO2 footprint - Better conditions for sustainable business models and ideas (on a local and national level)	- Number of campaigns/info events that have taken place - Number of political decisions (based on the results/recomme ndations from REFLOW) (all based on interviews with stakeholders/network)
75% of the stakeholders are satisfied with the new models/tested solutions (formats)	- Ongoing thorough project coordination - Ongoing involvement of and orientations for project partners/stakehold ers. - Actively using design thinking as a method to involve local stakeholders and secure co-creation	- Better foundation for future collaborations and new partnerships - Willingness to take part in other test projects - Learnings and insights form the process to share in the project's guidebooks - Willingness among the stakeholders to share knowledge and results from the project - Adoption and adaption of new models and solutions	Based on questionnaire and qualitative studies (e.g. interviews) with identified stakeholders.
12 new applications (e.g. websites, apps, blockchains, tech, videos, data generated)	- Workshops - Collaboration with fablab - Integration of expert knowledge + matchmaking between decision makers and solution providers - Communication initiatives (e.g. Web, newsletter, video, social media)	- New insights on developing tools/applications to help future development projects - Tools for others outside the project to use and get inspired from - Potential to scale solutions to benefit even more citizens, businesses and municipalities	Registered number of applications (based on quantitative and qualitative studies)

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	● Collection of data from plastic analysis		
● 70% are willing to pay for regenerated products or materials (solutions)	● Workshops with different segments ● Scenarios of the future to underline the possibilities people must choose differently and make a sustainable difference ● Two bigger events (e.g. Unconference) to foster new discussions and awareness within the CE agenda	● Knowledge and insights provided to businesses, citizens and the political level on how changed actions and behaviour can lead to a more sustainable future and how they can play an active role in it	● Reported willingness collected in a questionnaire and qualitative studies (eg. interviews)
● 5 partner agreements ● 45 participants in min. 3 workshops, conferences or similar	● Outreach and broad communication of the project and its initiatives ● Ongoing dialogue with project partners/stakeholders ● Min. 3 workshops conducted	● Broad anchorage ● Focus of REFLOW work/focus areas ● Qualification and counselling	● Registered number of partnership agreements ● Registered number of participants ● Photo documentation
● 150 citizens involved (through workshops) ● 50 students involved (through inspirational material) ● 50 citizens involved (through partnership agreements with housing associations and other actors of the civil society (local communities etc.))	● Conduct min. 10 workshops ● Develop materials to communicate REFLOW(initiatives) ● Give talks and hold/participate in meetings to disseminate REFLOW ● Ongoing dialogue and cooperation with local Fablab and schools	● Broad anchorage and knowledge sharing ● Educational materials done in collaboration with local institution Økolariet ● Local students playing an active part in the project	● Registration of participants in: ▫ Workshops ▫ Educational purposes ▫ Partnerships ▫ Photo documentation
● 25% plastic regenerated on specific sites	● 3 test sites are elected with the intention to implement interventions to reduce the use of plastic	● The goal is that the activities above will result in the 25% goal.	● The endline report will present the result and further potentials

Effect

To what extent has CE been implemented?

By the end of the project period the Vejle Pilot will complete an overall evaluation that specifies the effect of our initiatives. The different levels can be defined as:

- Awareness
- Knowledge
- Engagement
  - Reuse
  - Recycle
  - Reduce

The different levels will help the Pilot to outline/specify (evaluate and measure) the effect that the activities/initiatives have had. The model that will be developed will help the Pilot define the maturity levels regarding implementing CE.

4.7.5 Planning

This paragraph will detail how the proposed objectives will translate into an overview of actions over time. Based on the activities from chapter 6.3 a general GANTT chart is presented below.

The Vejle timeline is divided into quarters for each year: 2020, 2021 and the first half of 2022. Across all quarters, Vejle will have the following activities:

- Project-management and coordination
- Communication on local platforms (REFLOW Vejle - Homepage, Facebook, Linkedin, press releases and Newsletter)
- Administration and economy
- Evaluation-activities such as Surveys and qualitative interviews

All other actions are detailed in the overview presented below.

Planning Reflow/VEJ

Vejle Pilot Project Activities	Lead:	2019 Q1	Q2	Q3	Q4	2020 Q1	Q2	Q3	Q4	2021 Q1	Q2	Q3	Q4	2022 Q1	Q2	Q3	Q4
General activities																	
Project-management and coordination						██	██	██	██	██	██	██	██	██			
Communication on local platforms (Reflow Vejle – Homepage, Facebook, Linkedin, press releases and Newsletter)						██	██	██	██	██	██	██	██	██			
Administration and economy						██	██	██	██	██	██	██	██	██			
Evaluation-activities such as Surveys and qualitative interviews																	
2020 activities																	
Plast-analyses / Baseline (M8)						██											
Communication – local launch-plan incl. core storyline, social media, videos and www (M8)						██											
Local Steering-group committee (M9)						██											
D5.1 Detailed Pilot Planning & Evaluation Framework (M9)						██											
Stakeholder-analyses (M10+)						██											
Governance: Reporting to Nature and Environmental Committee (M10)						██											
International project-partner meeting (M10)						██											
Metabolic Scans incl. Value-chain (M9-12)							██										
Advisory board established (M11+)							██										
Governance: Local Waste-plan 2020-28 (M11+)							██										
Kick-off Fab-lab workshops (M11)							██										
D1.2 Cities' Circular Action Plans (M12)							██										
D4.2 Productive Cities Toolkit (review)(M12)							██										
Unconference 1 (M13)								██									
Local Steering-group committee (M13)								██									
Exhibition (M13+)								██									
Governance: Resilience-strategy 2.0 (M1)								██									
Prototype-workshops Test-sites 1+ 2+ 3 (M16-18)									██								
Governance: Local procurement-strategy (M16+)									██								
Fab-lab workshop									██								
International partner-workshop I (M18)									██								
Local Steering-group committee (M18)									██								
Governance: Reporting to Nature and Environmental Committee									██								
2021 Activities																	
Implementation plan for Test-sites 1+2+3 (M20+)										██							
Governance: Local Waste-strategy 2021 (M22+)										██							
Local Steering-group committee										██							
Fab-lab workshop										██							
Implementation of prototypes for Test-sites 1+2+3 (M24+)											██						
Fab-lab workshop											██						
International workshop II (M24)											██						
Governance: Reporting to Nature and Environmental Committee											██						
Prototype-evaluation - survey method (M27+)												██					
Local Steering-group committee												██					
Fab-lab workshop												██					
Fab-lab workshop													██				
Local Steering-group committee													██				
2022 Activities																	
Plast-analysis /End-line (M34)														██			
Governance: Local Waste-strategi 2022 (M34)														██			
Digital Best Practise (M34)														██			
Evaluation quantitative and qualitative data (M34)														██			
Unconference 2 (M35)															██		
Local Steering-group committee															██		

Chart 6 // Overview of actions over time

4.7.6 Local partnership

Multiple local consortium partners and external parties are / should be involved in making the different project activities into a success. Parties relevant for the Vejle Pilot are introduced below.

Local steering-group committee:
Different stakeholders in different segments. The purpose of the steering committee is to support the Pilot in achieving the KPI's. The tasks of the committee are to:
- Create coherence between REFLOW and own organisation
- Give REFLOW mandate and support and legitimize the Pilot actions
- Make overall decisions for the Pilot

The committee conducts meetings 3 times a year. Three times during the project period, the committee will visit relevant business. Each meeting has an agenda – and after each meeting, all receive a summary.

All formats about the committee's action and purpose are approved in a "Kommissorium" (Mission-plan).

The participants represent different organization relevant for the Pilot. The participants are:

Participant	Organisation
Karl Erik Lund	Politician, City Counsel
Søren Peschardt	Politician, City Counsel
Susanne Christensen	Chairman, Local committee in the West of Vejle
Tove Knudsen	Second chairman, Local committee in the West of Vejle
Tommy Richterhausen	AAB – Labour Housing Association
Gitte Buk Larsen	Aage Vestergaard Larsen - Plast reuse manufactory
Nanna Dreyer Nørholm	Environmental Protection Agency – National level
Christian Villum	Danish Design Centre
Jørgen Chris Madsen	Chief of Nature, Environment and Reuse, Vejle Municipality
Lisbet Wolters	City architect, Vejle Municipality
Mikkel Dragmose-Hansen	Program leader, Innovation and Entrepreneurship, Vejle Municipality
Peter Dahl	Chief of Fab-lab. Vejle Municipality
Ann Louise Slot	Project coordinator, REFLOW Vejle

Advisory Board:
The Advisory board will be appointed after M10.

Working groups for each sites
These will be appointed after M10, when the steering committee has chosen the sites in a process at a steering committee meeting. All the participants will have the report beforehand and receive a guide with the criteria of choosing sites. These criterias will correspond to the KPI's and the general focus of Reflow.
The purpose of each working group is to have people on the spot, taking daily action, moving the prototypes forward, and securing the anchoring of the project.
The working group will consist of 3-8 people – primarily local and internal from the Municipality and the sites.

Other external partners:
Fablab
Region of Southern Denmark
Økolariet
AffaldGenbrug

Concluding remarks.

This document describes the direction and initial steps the Pilot cities have taken and the management and monitoring methods chosen for the coordination approach.
The last chapter elaborates on the direction proposed by each of the six Pilot Cities.

The differences between cities start to emerge, under multiple aspects: in their choices of plans, and the intentions supporting those plans; in the characteristics of local context and resource streams; but also in the way the cities decide to tackle their journey, through the support provided by the complementary building blocks within REFLOW.

This document presents a starting point through which Pilots are: aligned in structure, guided through the same process and allows REFLOW as a whole to set further in place the needed monitoring of the Pilots development. The approach proposed within this document, for the coordination of the PIlots and the systems created, sets the ground for further managing the process of structuring the Pilot cities in their next steps.

The developed pilot framework introduces new procedures to foster and capture the internal dialogue between Pilots and WPs, that in return sets the ground for structured information exchange.
This exchange is indispensable when coordinating the progress of tasks, aligning the development of each pilot and sharing feedback, lessons learnt, and outcomes. Simultaneously, the KPI's designed and proposed by the Pilots, also present potential indicators to measure pilots' effectiveness, while clarifying the scope of action of the Pilots plans. The proposed KPIs will be further fine tuned in collaboration with other REFLOW building blocks, and will be monitored over time, with not only the interest of the pilot coordinator, but also the interest of other parties within the project.

In the next phases of REFLOW, the coordination of the Pilots will focus on further structuring the local Pilot teams, supporting them in clarifying their roles towards the other building blocks, by extending the responsibilities from a coordinating duo (Pilot coordinator and co-pilot), to a 'local Pilot collective'. This 'Local Pilot collective' is ideally formed by the coordinating duo, but is accompanied by 'referents', each responsible for ensuring coherent connection of their Pilot development, to one of the building blocks of REFLOW. This process of further structuring, should ensure shared responsibilities within the Pilot teams, beside aligning them in more detail with the REFLOW building blocks. It also aims to formulate one of the next steps towards a shared development in the strategy for the Pilot Cities Action PLan and their implementation in the six Pilot cities.

APPENDIX 1: Technical Annex

The Pilot Framework is the central online infrastructure in which different insights from Pilot cities are gathered for coordination purposes of WP5. An entire chapter of this deliverable has been written about how and why this framework has been deployed. On one hand the framework can be seen as a tool for gathering information from Pilots, while on the other hand it is also aimed to trigger and inspire those Pilot cities. It does so by letting these cities reflect on their daily practice from different perspectives. Simply by asking the right questions.

In this annex, a more technical approach to describe the Pilot Framework is chosen. This enables others to better understand its setup, and also makes it easier to replicate and customise. At this point, we are doing the basic development on a local GIT version. GIT is a distributed version-control system for tracking changes in source code during software development. We are however aiming to develop this framework as an open source solution. That is why we make use of multiple open source elements as part of the web application. While further developing our code, we also aim to make it more public. It will be made truly open and accessible to others. By embracing open source, we allow a broader community to benefit from our findings. In that sense it fits a broader public interest, that we also aim for in this project in its entirety.

In the following paragraphs, we elaborate on the web-app and framework, the central database, how the server is set up, considerations about location and URL, and lastly we explain how our chosen approach fits the flexibility we need within this project.

Web-app and Framework
What we call the "Pilot framework" can be technically described as a set of forms that can be controlled with a custom made content management system (CMS). This Pilot framework is built using the PhP framework called Laravel (laravel.com) . Laravel allows us to quickly construct a custom made web application using PHP.

The Laravel framework uses PhP as a basic backend programming language. The Laravel framework embraces Blade (a Laravel specific templating engine) and the view.js (vuejs.org) Javascript component framework to present the information to the user in a usable interface. The Tailwind (tailwindcss.com) Cascading Style Sheets (CSS) framework also contributes to giving the presented data it's final visual form.

Database
All pilot information submitted through the forms is persisted in a SQLite database. In this database, all questions and their location within the framework are stored. All information that Pilots submit to answer these questions is also stored in this database. All this information is stored in a multitude of tables. Currently, version tracking of these database tables allows us to also have insight in how this information changes over time. How version tracking related to coordination purposes is detailed in part one of this document.

Server

Both the Laravel web application and the supporting SQL database are being run on a Virtual Private Server (VPS). The storage space needed for hosting the entire infrastructure is 328 MB which is mainly taken up by the Framework itself. Information in the database only consists of >1/2MB at this time.

On the VPS we run the NGINX (www.nginx.com) web-server. NGINX is a free, open-source, high-performance HTTP server and reverse proxy, as well as an IMAP/POP3 proxy server. NGINX is known for its high performance, stability, rich feature set, simple configuration, and low resource consumption. The server is provisioned (set up) with an Ansible script. This script allows us to quickly install all needed assets. This allows us to quickly reinstall the infrastructure in case of error. It also allows for increased shareability of the entire "Pilot Framework"

A specification or server requirements to run Laravel has been specified below:
- *PHP >= 7.2.0*
- *BCMath PHP Extension*
- *Ctype PHP Extension*
- *JSON PHP Extension*
- *Mbstring PHP Extension*
- *OpenSSL PHP Extension*
- *PDO PHP Extension*
- *Tokenizer PHP Extension*
- *XML PHP Extension*

Location

Currently the framework is accessible through the server IP address: Adding a Domain Name System (DNS) entry for subdomain is still needed. This will be a subdomain of REFLOW project.EU like framework.reflowproject.EU.

Flexibility

An application like this is special because usually, these systems are designed by collecting requirements and then setting it up in a working form. In this case, we want to allow ourselves room for an iterative approach. We are setting up and improving the Pilot Framework as we go and as we learn along the way. New insights will lead to new structure and content within the "Pilot Framework". Choosing the Laravel framework and creating a content management system allows us to have this needed flexibility for an evolving structure.

APPENDIX 2: Pilot City Action Plan comments by reviewers yet to address

Valuable feedback has been collected in the reviewing process for this deliverable. Some of that input regarding the Pilot City Action Plans, has not been fully addressed yet. Therefore, this section has been set up to properly capture these reviewer comments. By doing so comments are kept into consideration and they will not remain in a comment side-bar that will be invisible in the final public version of the deliverable. By repeating key comments in this section, coordinators can better and more openly refer to this valuable reviewer suggestions when further questioning the Pilot Cities about their Pilot City Action Plans as the project progresses.

1. **Amsterdam Pilot City Action Plan**
   a. No comments remaining to address.

2. **Berlin Pilot City Action Plan**
   a. Regarding: 4.3.1 / Resource flow paragraph. By: L. Lichtenberger. Comment: Maybe someone with a technical background finds it easier to understand, but I have a bit of difficulty understanding how the celsius degree heat translates to megawatts. Maybe you could add something like "2.2 megawatts, which are x liters of low-grade heat water"? (not sure if it makes sense though).
   b. Regarding: 4.3.1 / Gov and Legislation paragraph. By:Z. Ahmed. Comment: Please add reference where this data comes from.
   c. Regarding: 4.3.1 / Local gatekeeper paragraph. By: V. Niaros. Comment: Please specify the source of this information.

3. **Cluj-Napoca Pilot City Action Plan**
   a. Regarding: 4.4.1 / General Introduction paragraph. By: M. Kortlander. Comment: The information with CN description seems redundant. We suggest excluding it from the deliverable. Original text was: "From the demographics point of view, it is a regional, but also national magnet city. It hosts seven public universities (with Babes-Bolyai University being the biggest in the country and highest in international rankings) and several private ones, totalling over 80.000 students. This equals roughly a quarter of its official population. Cluj-Napoca is also an important business hub, especially in the IT sector, and has the second largest Class-A collection of office spaces after the country's capital, Bucharest. The innovative city - Cluj, spearheaded by the Municipality, aims to become the biggest innovation hub in Eastern Europe, as major companies relocate regional headquarters to the city".
   b. Regarding: 4.4.1 / General Introduction paragraph. By: Z. Ahmed. Comment: It currently states: "The World Bank have recently presented a study that revealed that housing needs for the next ten years is over 100.000 homes, while the building pace in the last years was around 7000 homes/year" Is that in Cluj only?
   c. Regarding: 4.4.1 / General Introduction paragraph. By: L. Lichtenberger. Comment: Please include a link to the Integrated Strategic Plan that you refer to.
   d. Regarding: 4.4.1 / General Introduction paragraph. By: Z. Ahmed. Comment:You state that: "Legislation regarding energy is out of reach for local authorities". Why is that?
   e. Regarding: 4.4.2 / Objectives paragraph. By: L. Lichtenberger. Comment: I think the objectives are well described, but I'm missing a bit the concrete link between proving

that energy efficiency makes economic sense and circular economy. Could you describe this in more clear terms?

f.   Regarding: 4.4.2 / Objectives paragraph. By: LA. Martelloni. Comment: You state that: "to prove how the measures taken to date by the City have impacted the energy efficiency of selected buildings;" Please specify if these are public property.

g.   Regarding: 4.4.3 / Addressing governance, network and policy paragraph. By: L. Lichtenberger. Comment: I think this section could be a bit clearer / more detailed. What will your activities be? How will you execute them? Furthermore you state: "Cluj-Napoca is prepared to make the most of the opportunities that arise from support schemes being implemented at the European or national level". What does this mean in practice?

h.   Regarding: 4.4.3 / Addressing technological development paragraph. By: L. Lichtenberger. Comment: also this section could be more detailed. What does it mean to be aspiring to be a smart city? What will you do to get there? How will you approach blockchain, Ai, Industry 4.0?

i.   Regarding: 4.4.3 / KPI paragraph. By: L. Lichtenberger. Comment: add specific numbers / target values for additional KPIs. Furthermore you state: "Proposal(s) for NZ energy buildings" What does NZ mean in this case?

j.   Regarding: 4.4.5 / Planning paragraph. By: L. Lichtenberger. Comment: You state: "Cluj-Napoca pilot will provide an analysis of energy consumption in municipality owned buildings and public lighting hubs, with a focus on those who have benefited from investments in energy efficiency in order to observe impact". Please explain what public lighting hubs are. If needed, make a glossary term out of this.

k.   Regarding: 4.4.5 / Planning specification and graph. By: L. Lichtenberger. Comment: What are the sub activities? Why are there no activities in Q3 2021?

4.   **Milan Pilot City Action Plan**

a.   Regarding: 4.5.1 / Second paragraph. By: L.A. Martelloni. Comment:You state that: "As a milestone of this process, the "Milan Food Policy" supports city government to make the city more sustainable starting from food-related issues. It focuses on actions that unfold in the short, medium and long term and promotes anything already available that can contribute to the implementation of food policies.". What does that last part mean?

b.   Regarding: 4.5.1 / Second paragraph. By: L. Lichtenberger. Comment: You refer to the the strategic program "Manifattura Milano". Can you add a reference to that?

c.   Regarding: 4.5.1 / 6th paragraph. By: L. Lichtenberger. Comment: You state that: "Recognising that Markets present a unique opportunity to contribute to the transformation of neighborhoods and to promote, the Municipality is looking to develop a strategy for Markets to anchor local culture, food traditions and healthy eating, to promote social integration culture, to complement public sector initiatives, to build capacity among local stakeholders and community partners, to create economic impact for vendors and local businesses.", but what is meant with "to promote" here?

d.   Regarding: 4.5.1 / 7th paragraph. By: L. Lichtenberger, L.A. Martelloni. Comment: You state: "The task intends to support this policy through the integration of the Markets within the social and urban fabric" but what task do you mean here?

e.   Regarding: 4.5.1 / 9th paragraph. By: L. Lichtenberger. Comment: You state that:"The Municipality of Milan has set a series of clear targets, to facilitate and speed up the transition to the circular economy", but these are not REFLOW targets right? I think

the differentiation between REFLOW and existing policies could be made a bit clearer. Maybe a reference to where these targets can be found would be good.

f. Regarding: 4.5.2 / bullet list first sentence. By: L. Lichtenberger. Comment: You state that: "spread circular practices in the agro-food field among the traders of the covered municipal markets, activating "market laboratories" managed by the three fab labs.". Please specify how you aim to do so and what "market laboratories" are.

g. Regarding: 4.5.3 / Addressing governance, network and policy segment By: L.A. Martelloni. Comment: From WP4 side, this needs further elaboration. As Milan is already so strong with specific policy-making, it would be important to better understand the specific 'policy challenges' as well as what are the specific governance ''hot points'' that we need to unlock to set up the pilots. Z. Ahmed adds: Perhaps consider dividing this into a policy level, a governance level, and an overall network level (just like the Berlin pilot).

h. Regarding: 4.5.5 / Action 2 description By: Z. Ahmed. Comment: You state "This activity will involve all the Milanese project partners, the players of selected markets and different external stakeholders, based on the areas of development previously identified." but who are those? Developed by who?

i. Regarding: 4.5.5 / Action 3 description (results cell) By: Z. Ahmed. Comment: What do you hope to achieve with these workshops? Be specific about your result.

5. Paris Pilot City Action Plan

a. Regarding: 4.6.1 / Event and temporary structure sectors descriptiont By: Z. Ahmed. Comment: Source is missing for the data presented in this part.

6. Vejle Pilot City Action Plan

a. No comments remaining to address.