Assessment of the Evaluation Framework for Social Innovation Action Plans

Deliverable D2.12

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Table of contents

1 Introduction 5
1.1 Purpose of the document 5
1.2 Relation to other tasks 5
1.3 Structure of the document 6
2 Social Innovation Framework of Actions, Indicators and Cases 8
2.1 Literature review: Deriving a framework for Social Innovation impact logic from interdisciplinary literature 8
2.2 Social Innovation Case Studies 10
2.3 Social Innovation Indicators 15
2.4 Social Innovation Actionable Pathways framework 16
2.4.1 Development of the Social Innovation Actionable Pathways 16
2.4.2 Categories of the Social Innovation Actionable Pathways and Related Indicators 18
3 Analysis of Cities' Social Innovation Actions and Indicators 26
3.1 Analysis of 445 Social Innovation actions of the first cohort of Pilots 26
3.1.1 Context 26
3.1.2 Frequencies of actions per Social Innovation category 27
3.2 Qualitative analysis insights from sensemaking sessions with Mission Cities, Pilots and Twin Cities' use of Social Innovation 28
3.3 Analysis of Cities' use of co-benefits in Pilots: suggested revision for Social Innovation indicators and co-benefits 30
3.4 Evidence from the results of the first cohort of Pilots 33
3.5 Insights on Social Innovation actions and indicators from CCC Action Plans 33
3.6 CCC Social Innovation Actions and Indicators Analysis 35
4 Dissemination and evidence of use of SI indicators and resources 37
4.1 Use of Social Innovation Resources on the NZC Portal 37
4.2 Dissemination and Scientific Publications 38
5 Conclusions, outlook and implications for future policies and research agenda of the Mission "Cities" in FP10 39
References 40
Appendix A. Social Innovation Actionable Pathways categories and the NZC Transition Map 42
Appendix B. Illustrative Examples of Mission Cities' Social Innovation actions and indicators 42
Appendix C. Social Innovation resources on the NZC portal and their usage 53

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List of Figures

Figure 1: Visual summary of the systematic literature review on Social Innovation for Climate Neutrality (Source: Bresciani, Rizzo, & Deserti, 2022) 9
Figure 2: Social Innovation Actionable Pathways Interactive Map (https://netzerocities.app/resource-4104) 17
Figure 3: Categorisation of actions and related indicators related to SDGs (printable format, Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b) 18
Figure 4: Social Innovation Actionable Pathways Interactive Map: Prepare (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074) 19
Figure 5: Social Innovation Actionable Pathways Interactive Map: Act (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074) 19
Figure 6: Social Innovation Actionable Pathways Interactive Map: Accelerate (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074) 20
Figure 7: Emission Domains selected by the Pilot Cities to categorise their actions 27
Figure 8: Screenshot of the CCC AP template page related to Social Innovation (part 1) 34
Figure 9: Screenshot of CCC highlight "A diverse ecosystem of supporters" figure representing the number of signatories by group. 35
Figure 10: Screenshot of the SGA-NZC D1.10 CCC Resource pack 35
Figure 11: Number of Indicators Selected by City (Source: Notion Database) 36

List of Tables

Table 1: Classification of Social Innovation actions of Pilots according to the Social Innovation Actionable Pathways categories 28
Table 2: Emerging Social Inclusion, Innovation, Democracy and Cultural Impact Indicators from Cities' Customised Indicator Selections (Source: Mondal, Bresciani & Rizzo, 2024; SGA-NZC D2.11) 30
Table 3: Novel Behavioural Change Indicators proposed by cities in their Pilots (Source: Mondal, Bresciani & Rizzo, 2024; SGA-NZC D2.11) 32
Table 4: List of Open Access Scientific Publications on Social Innovation 38

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Abbreviations and acronyms

Acronym	Description
CCC	Climate City Contract
NZC	NetZeroCities
FP10	Framework Program 10
PED	Positive Energy District
SDG	Sustainable Development Goal
SI	Social Innovation
WP	Work Package

Summary

This deliverable presents the rationale, framework, methodology and instruments to design impact pathways and assess progress and outcome of social innovation actions for fostering climate neutrality in the NetZeroCities project. It provides a guide to resources on social innovation developed within the project, and on the analysis of social innovation action of NetZeroCities Pilot City Programme, Action Plans (part of the CCC), as well as the training activities. It outlines the importance of social innovation for lowering GHG emissions and increasing justice, participation and citizens' contribution to the Mission. While the title of this deliverable refers to "social innovation action plans", at the beginning of the NetZeroCities project in 2021, it was decided that social innovation plans should be integrated into the climate action plans, rather than being a standalone planning document, to foster a systemic approach to climate neutrality in the urban context. Thus, this deliverable due at the end of the NetZeroCities project, collects all the resources, tools, analysis, methods and cases on social innovation, created during the project to provide readers, intended as public administrators, consultants of cities as well as researchers, an overview of the pragmatic and scientific resources on social innovation for climate neutrality in urban contexts, and their evidence of use including specific cases from cities.

Keywords

Social innovation, impact assessment, climate neutrality, stakeholder-led solutions, people-based solutions

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1 Introduction

1.1 Purpose of the document

This document aims to provide cities' public administrators, researchers, consultants, as well as students and active citizens, a guide on how to deploy social innovation for driving systemic urban transformation toward climate neutrality, based on the work and experience of the project NetZeroCities over four years, from September 2021 to August 2025.

Readers will find in this compact document a catalogue of resources, based on scientific evidence and city's experiences, which include methods and cases on social innovation, tools, and analysis on NetZeroCities pilots use of social innovation actions and indicators, with links to over one hundred more detailed resources on social innovation available on the NetZeroCities Knowledge Repository. This deliverable is connected to T2.4.2, which sits within WP2 on Impact Metrics & MEL. It builds on previous work conducted in the same WP on social innovation (D2.7 "Report on Indicators & assessment methods for social innovation action plans" delivered in September 2022, one year after the start of the project, as well as on the overall WP2 assessment framework and indicators set delivered in D2.4 "Comprehensive indicator framework" delivered the following year).

The aim of this introductory section is to give the reader a global overview of the role of social innovation in the NetZeroCities project, in order to make the document self-contained. The NetZeroCities project started in 2021 as part of the EU Mission Cities and aims to support 100 European cities to drastically cut down greenhouse gas emissions through climate action to achieve climate neutrality by 2030, one of the biggest challenges our societies face today. The Mission recognises the need for cities to develop specific strategies that are tailored to suit local and regional contexts and thus supports them through NetZeroCities by developing tools, resources, and expertise. A core element of reaching climate neutrality lies in the elaboration of Climate City Contracts. To date, most of the 112 Mission Cities have submitted their CCCs. At the same time, Mission Cities could apply to take part to the Pilot City Program, which was issues in three cohorts over the years; while all cohorts are now closed for submissions, results on the development of the planned pilot activities are available only for cohort 1, thus the analysis provided in this document refer to the subset of cities for which data on implementation is available.

1.2 Relation to other tasks

The work outlined in this deliverable is developed in the WP2 subtask on social innovation impact framework development (T2.2.4) and assessment (T2.4.2), and is strongly connected to NetZeroCities WP9, the Work Package dedicated to Social Innovation. In particular, it relates and builds on the Social Innovation case studies developed in T9.1, the Social Innovation methods developed in T9.2, the social innovation impact pathways tool developed in T9.3, as well as the dissemination and training activities on social innovation developed in T9.4-6. The data on social innovation actions described in the Action Plans sits within WP1 (dedicated to Climate City Contracts), while the data on Pilots sits in WP4, and relations with the Twinning program in WP5.

In addition, as the SGA-NZC project runs in parallel to NZC from June 2023, data and resources found in this deliverable have been utilised in SGA-NZC T4.2 learning activities for Mission cities, including presentations of the here outlined methods and results at the social innovation sessions of the 5 seasonal schools, in national workshops, and webinars (details provided in Section 4). Knowledge on social innovation is also sourced from SGA-NZC T4.3 that supports Mission cities' sensemaking, as well as SGA-NZC 4.4 that supports Pilots' sensemaking (described in Section 3.4), SGA-NZC T4.5 on MEL (described in Section 3.3), and finally on SGA-NZC T4.7 knowledge production that provides effort for the development of scientific papers and blogs, of which one paper and one blog post were developed on social innovation (described in Section 4.2 and 5).

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Beyond the original scope of the deliverable and related task, this work feeds SGA2.NZC T1.3.2, which is related to the adaptation and creation of resources for mission-minded cities, as well as SGA2-NZC T1.4, which is focused on creating learning programs for Mission Minded Cities (including online hybrid courses) as described in Section 5. This deliverable is intended to be utilised as a guide for supporting training on social innovation for the above-mentioned learning tasks.

1.3 Structure of the document

The document follows the structure of the development of social innovation resources within the NetZeroCities project:

Chapter 2: Social Innovation Framework of Actions, Indicators and Cases

Section 2.1 summarises the literature review conducted on social innovation for climate neutrality, published as an open access article "Toward a Comprehensive Framework of Social Innovation for Climate Neutrality: A Systematic Literature Review from Business/Production, Public Policy, Environmental Sciences, Energy, Sustainability and Related Fields, in the journal Climate (Bresciani, Rizzo & Deserti, 2022), and earlier presented at the Cumulus conference (Bresciani, Rizzo & Deserti, 2023), which provides the stocktaking of scientific knowledge on social innovation for sustainability.

Section 2.2 outlines the social innovation case studies developed in T9.3 that have been analysed and coded to be utilised for deriving, together with the literature review, categories of social innovation actions described in Sections 2.3 and 2.4. Such cases are available in the Knowledge repository and have been published in D9.1 (Lumbreras et al. 2022).

Section 2.3 presents the social innovation indicators set and impact logic, described in detail in D2.7 "Report on Indicators & assessment methods for social innovation action plans" delivered in September 2022. Based on this work, an open-access Scientific Book has been published with Springer, "Assessment Framework for People-Centred Solutions to Carbon Neutrality: A Comprehensive List of Case Studies and Social Innovation Indicators at Urban Level" (Bresciani, Rizzo & Mureddu 2024). The same indicators are included in the overall NZC indicators set D2.4 v3 available on the NetZeroCities website.

Section 2.4 describes the Social Innovation Impact Pathways Tool, an interactive visualisation that provides readers with a compact overview of social innovation categories and related indicators, and relevant case studies from Mission cities and beyond (developed in NZC T9.1-3), with references to scientific literature. The social innovation impact pathways interactive graph is available on the NetZeroCities portal, and the extended explanation of its development and use has been presented in two conferences (Bresciani, Tjahja, Komatsu, & Rizzo, 2023a at EKSIG, and IASDR), published in the IASDR conference proceedings (Bresciani, Tjahja, Komatsu, & Rizzo, 2023b, focused on the methodology) and as a book chapter (Bresciani & Tjahja, 2025, focused on scaling)

Chapter 3: Analysis of Cities' selections of Social Innovation indicators and co-benefits

Section 3.1 presents the analysis of planned Social Innovation actions of Pilots of Cohort 1 according to the ten Social Innovation categories described in Section 2.4.

Section 3.2 provides insights from qualitative analysis on Social Innovation from Pilots and Twin cities, based on the sensemaking sessions

Section 3.4 outlines evidence from the initial results of Pilots cohort 1 on the use of social innovation actions and indicators

Section 3.5 describes Action Plans' insights on cities' deployment of social innovation

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Chapter 4: Dissemination and evidence of use of Social Innovation Indicators and Resources

Section 4.1 describes the use of social innovation resources, including indicators

Section 4.2 presents dissemination activities in the scientific community and with cities

Chapter 5: Conclusions, outlook and implications for future policies and research agenda of the Mission “Cities”

Suggestions for exploitation and future work and research directions are provided.

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2 Social Innovation Framework of Actions, Indicators and Cases

2.1 Literature review: Deriving a framework for Social Innovation impact logic from interdisciplinary literature

The European Commission defines Social Innovations as “new ideas that meet social needs, create social relationships and form new collaborations. These innovations can be products, services or models addressing unmet needs more effectively.” In the European Commission document “This is European Social Innovation” (2010), in the definition provided is: “Social innovation is about new ideas that work to address pressing unmet needs. We simply describe it as innovations that are both social in their ends and in their means. Social innovations are new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations” (pg. 9). This definition is based on the social innovation conceptualization in the open book of social innovation, which defines it as “social in the means and in the ends” (Murray, Caulier-Grice, Mulgan, G., 2010). For the OECD (2025) "social innovation refers to conceptual, process, product or organisational changes, with the ultimate goal of enhancing the welfare and well-being of individuals and communities. The sectoral and policy applications of social innovations are broad, and include for example, addressing healthcare shortages in remote areas, providing community-driven educational programmes, and tackling unemployment through multi-stakeholder collaborations.” and “it involves developing new solutions to social needs through collective, collaborative, and citizen-led processes (the means), and these solutions ultimately aim to improve social well-being, empowerment, and inclusion, especially for vulnerable groups (the ends).”

In NetZeroCities, Social Innovation (SI) is specifically considered for the application to climate neutrality. It is defined as actions that innovate **social practices** that address the challenge of achieving climate-neutrality with a collaborative, bottom-up, holistic, and people-centred approach, that enhances society’s capacity to respond to the climate to the climate challenge collectively. In doing so, Social Innovation emerges as a critical lever for systemic urban change toward sustainability and effectively accelerates the pace of systemic change by activating diverse communities to the Mission and empowering them with platforms to co-create, share knowledge and expertise, and even co-finance innovation. It enables prototyping and quick experimentation to create new products or services, or to implement innovative business models that improve community wellbeing and promote behavioural change by responding to local needs and acting within a cultural context. Within the systemic approach, social innovation thus complements technical innovation, ensuring economic development and overall well-being while reinforcing the co-benefits of climate mitigation like public health, job creation, and public budget savings. For more information on Social Innovation in NetZeroCities, readers can refer to the “**Quick read** on Social Innovation short video Creating an Ecosystem for Change: The NetZeroCities

A framework for assessing how Social Innovation (SI) contributes to climate neutrality was derived through an extensive systematic literature review of 267 scientific resources. The research addresses the critical fragmentation of knowledge on the role of SI plays in climate neutrality and the absence of systematic methods or frameworks to measure the impact of SI on climate neutrality, which is crucial for the NetZeroCities project.

The literature review highlights that SI is considered vital for achieving climate neutrality for several key reasons. Firstly, it fosters essential social acceptance amongst citizens, organisations, and governments, which is fundamental for successful energy transitions. Secondly, SI helps shape both individual and collective behaviours towards more sustainable practices, such as sharing and reusing, significantly aiding emissions reduction. Thirdly, it is capable of reconfiguring complex socio-technical systems, including markets, policies, and user practices, moving beyond purely technological advancements. Furthermore, social innovation empowers various actors, including citizens, to actively participate in climate action, leading to coordinated collective efforts and the emergence of new

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sustainable business models. Thus, social innovation is a fundamental lever to achieve systemic innovation, focusing on innovating social practices (such as sharing, networking), in addition to more top-town and/or technical practices, to achieve systemic change. Finally, SI ultimately aims to enhance overall societal well-being, demonstrating that effective climate mitigation solutions can simultaneously improve the quality of life.

The systematic literature review led to the derivation of 4 critical dimensions that helped shape a systematic framework to assess SI innovation: **the surrounding context**, the necessary **input (resources)**, the specific **social innovation activities** undertaken (such as capacity building and scaling), and **the results** achieved (including outputs, outcomes, and long-term impact on wellbeing). This framework offers a highly relevant, timely and structured approach to assessing the effects of social innovation, provides insights for continuous improvements, and serves to inform **policy-making effectively in cities**.

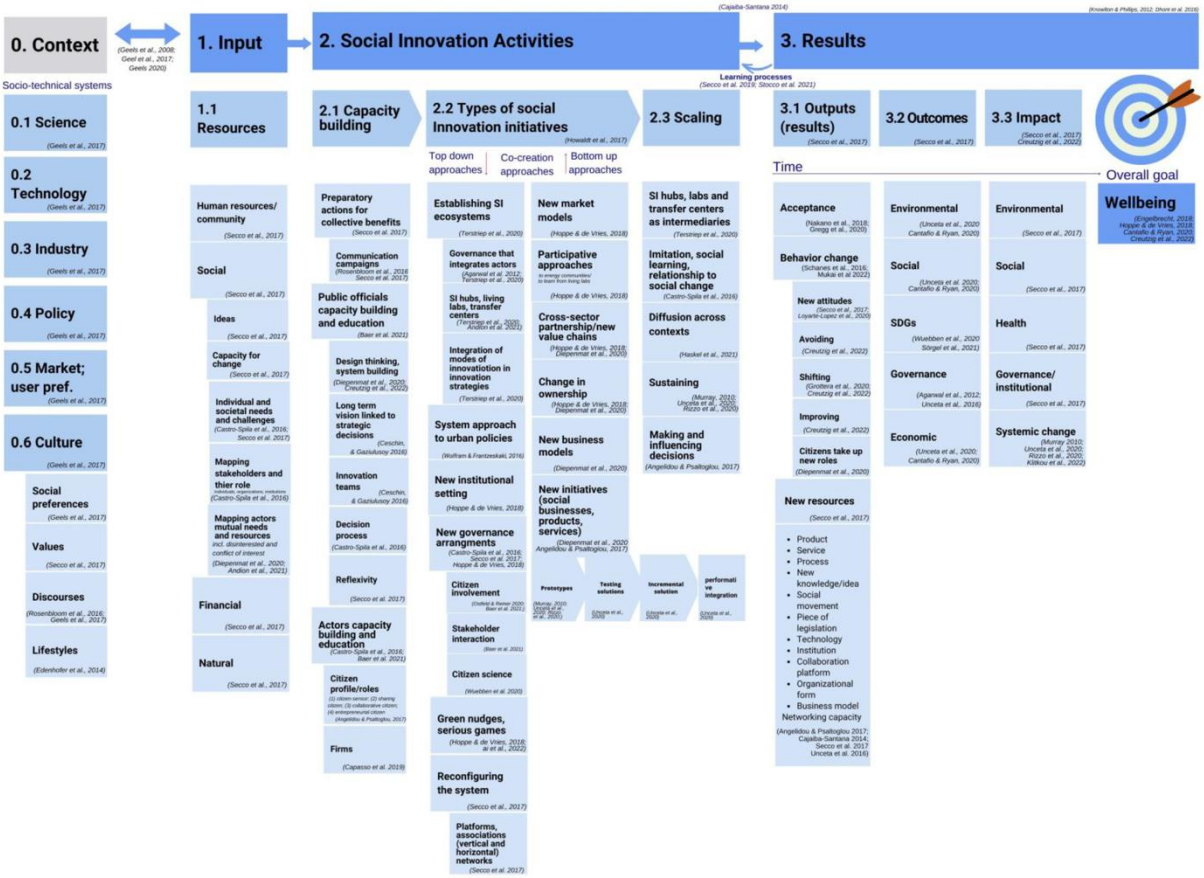

Figure 1: Visual summary of the systematic literature review on Social Innovation for Climate Neutrality (Source: Bresciani, Rizzo, & Deserti, 2022)

This framework, based on interdisciplinary literature, synthesises a wide range of scientific literature into a clear model based on the logic model framework (Knowlton & Phillips, 2012), making the topic more accessible and actionable for policymakers, practitioners, and citizens (Figure 1). The framework is designed to simplify the complexity of SI by mapping out its components across four key areas:

- **Context:** The context refers to the broader socio-technical environment that shapes the conditions for innovation. Based on Geels' model, this includes science, technology, industry, policy, market/user preferences, and culture. Culture is explored in more depth, particularly in relation to social preferences, values, media discourses, and everyday lifestyles—all of which influence the emergence and direction of social innovation.

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- **Inputs:** The inputs are the resources that support innovation, including human, financial, social, and natural resources. These inputs enable the development of social innovation initiatives and are shaped by the surrounding context.

- **Activities:** Central to the framework are social innovation activities, which are broken down into three sub-categories: **capacity building, types of initiatives,** and **scaling strategies**. Capacity building is treated as a foundational step, involving efforts to prepare communities, officials, and organisations for innovation through training, education, and collaborative preparation. Once capacity is in place, initiatives can emerge through both top-down approaches (led by public institutions through new policies, governance structures, and participatory tools like citizen science) and bottom-up approaches (such as grassroots or market-driven initiatives, including energy communities, alternative ownership models, and social enterprises). These typically follow a sequence of prototyping, testing, refining, and integrating.
  Scaling focuses on expanding successful initiatives and sustaining their impact. Strategies include the use of innovation hubs and labs, social learning, diffusion across contexts, and influencing policy. Sustaining change over time is crucial to avoid innovation fatigue and ensure lasting transformation.

- **Results:** The final element, results, is divided into outputs (short-term and measurable), outcomes (medium-term changes in behaviour and social practices), and impacts (long-term systemic and cultural change). These are assessed at various levels (social, environmental, economic, governance, and health) and linked to the **Sustainable Development Goals (SDGs)**. Importantly, the framework positions **wellbeing**, both physical and mental, as the overarching goal of climate-related social innovation, expanding the focus beyond emissions reduction to holistic societal resilience and quality of life.

2.2 Social Innovation Case Studies

Several examples of Social Innovation in action are already being enabled by the cities. The 37 cases of social innovation for climate neutrality developed in the first months of the NetZeroCities project have been systematically analysed with the purpose of deriving bottom-up categories of social innovation. In this Section, we provide a brief description of the cases that have already been described in D9.1 and are available in extended format in the NetZeroCities Knowledge Repository Social Innovation Focus Page on the knowledge repository (see section 5.13). and summarised in D2.7 (Bresciani, Rizzo & Mureddu, 2024). These cases provided foundational evidence for the development of the Social Innovation Actionable Pathways Framework (see Section 2.4).

Case studies:

- **1.5 Degree Lifestyles**: Finnish cities have been experimenting with a vision of sustainable living. The tool “1.5 Degree Lifestyles Puzzle” was used to help households and other stakeholders understand what changes they need to make in their lifestyles to significantly drop their carbon footprint. Individual carbon footprints were calculated at the project start, and the development was monitored over time.

- **Agroecology**: a local organisation promotes agroecology as an approach in transitioning towards more sustainable farming practices while training people in its application. The association aims to change production models to achieve higher combined economic, social and environmental production based on the founding principles of Agroecology.

- **Applause**: Applause is a project led by the city of Ljubljana, Slovenia, aiming to find solutions to invasive alien plant species (IAPS) in cities. Ljubljana is applying a zero-waste and circular economy principle to deal with these harmful plant species. Ljubljana is moving from a linear model for managing IAPS to a circular one that is valuable for the entire ecosystem. This

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process involves six steps: plant identification, biomass harvest, processing & storage, value recovery, final production, and new products & services to market.

- **Barcelona Citizens' Assembly**: The Citizens' Climate Assembly was a deliberative process of 100 people chosen by lottery between the ages of 16 and 75 to discuss the climate emergency situation in the city, and they defined actions and solutions to improve it, answering the question: What can we do to address the climate emergency?

- **Better Reykjavik**: Better Reykjavik is an online platform for the crowdsourcing of solutions to urban challenges launched in May 2010. Better Reykjavik is a co-creation project of the Citizens Foundation, Reykjavik City and its citizens that connects them and improves trust and policy. It's a platform for crowdsourcing solutions to urban challenges and has multiple democratic functions: Agenda setting, Participatory budgeting and Policymaking. Innovations include unique debating system, crowd-sourcing, submission of multimedia content and extensive use of AI to improve the user experience as well as content submitted.

- **Blok 19 Renewal Program**: The programme of comprehensive renewal of the historical centre of Zagreb is a pilot project that combines 12 studies on an area of Zagreb called "Blok 19" in order to present the pathway to comprehensive renewal for all of Zagreb's 168 areas. The idea for the Programme came after the devastating earthquake that hit the City of Zagreb. It was clear that a fast renovation needed to be done, but the city wanted to go a step further and make the renovation inclusive, meaning that not only would the needed renovation be done, but measures for climate change mitigation and adaptation would also be included, which is in line for the energy transition plan for the historic centre of Zagreb until 2050.

- **Brainport Smart District (BSD)** is a smart city district in the city of Helmond, the Netherlands, designed to integrate cutting-edge innovations in participation, health, data, mobility, energy, and circularity.

- **Citizen Collaboration Pacts**: Bologna's Participatory Budget and Collaboration Pacts offer a unique model of how structural changes can create the enabling conditions for citizen mobilisation around strategic goals by providing pathways for citizen-led (public) value creation. By providing citizens with the right tools and channels to express, deliberate, and co-design goals from the neighbourhood level, the city can engage citizens in civic life by allowing them to solve and prioritise their own needs.

- **City Experiment Fund**: Five cities from across the South-Eastern European and Central Asian region embarked on an exploration of a new approach to problem-solving, which is rooted in systems thinking. The city councils began designing what are called systems thinking portfolios for urban transformation with the support of UNDP Europe and Central Asia.

- **City Studio Program**: City Studio is a scientific collaboration programme between cities and universities. Cities work together with university students to design solutions that contribute to sustainable urban transformation through final theses of master's and bachelor's degrees. Students will develop their applied research work, including the design phase of a prototype, with dual mentoring: a university lecturer and a civil servant. Each student receives a scholarship for the duration of their work, which can be financed by the university, the municipality or joint funds

- **Clean Cities ClimAccelerator**: Clean Cities ClimAccelerator is a 9-month accelerator program targeting startups that help cities achieve climate neutrality, particularly through the use and commercialisation of clean technology. The program is focused on system-level innovations and is demand-led, matching startups in an early phase with challenge-owners.

- **Climate Quarter Project**: The goal is to create a residential quarter that prevents the necessity to travel more than 15 minutes to get the most essential goods and services and therefore reduces the amount of carbon emissions related to transport – the key to averting the so-called heat-island effect. An important aspect of the implementation will be the involvement of citizens

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and the active cooperation of all parties (city units) to discuss the problems, vision for the Climate Quarter and future interventions

- **Climate Meal:** Case Study on the Climate Meal Project by Forum Virium in Helsinki
- **Cloughjordan Ecovillage:** The Cloughjordan Ecovillage started as a plan to create a community of dedicated environmentalists, to buy a site on which they could build their lives. The very first residents of Ireland's first ecovillage moved into their homes in 2009. Today, with 55 low-carbon homes, a carbon-neutral district heating system, a community farm, a green enterprise centre, a planned reed-bed treatment plant, a photovoltaic power plant, and Ireland's lowest ecological footprint, the ecovillage is demonstrating different ways to achieve ecological, economic, and social sustainability.
- **EcoHouse Antwerp**: Ecohouse is a one-stop shop advice and demonstration centre for sustainable building and living run by the City of Antwerp (Belgium). Its focus is on energy reduction and using renewable energy. It is open to the general public, with a substantive part of its work focused on more vulnerable groups. It offers workshops and advice on energy retrofitting, as well as both short and long-term solutions for saving energy and money.
- **El Día Después**: is a multi-stakeholder platform for networks to address the sustainable development goals, specifically SDG 17. There are four communities within this project: environment & health, cooperation & global governance, city transformation, and inequality & new economic model. Within these groups are experts and professionals from the field who collaborate to create different services towards change. Through these collectives, lessons can be drawn from meetings that can catalyse and accelerate the transition towards models and systems that support cities, the environment, and global governance
- **Elektrizitätswerke Schönau (EWS)**: In the aftermath of the Chernobyl nuclear accident, a handful of committed citizens in the Black Forest (Germany) decided to create a nuclear-free and coal-free energy supply belonging to citizens. Today, the Elektrizitätswerke Schönau (EWS) supplies people throughout Germany with green power and eco-gas and works in various ways towards bringing about the energy revolution.
- **Entrepatios Las Carolinas**: Entrepatios Las Carolinas is the first ecological co-housing built in the city of Madrid, a nearly-zero energy building which operates with the Right of Use of the dwelling, but not ownership of it. It is a nearly zero energy residential building that consists of 17 houses, zero CO2 emissions and is made of wood, under the Right of Use regime in the Community of Madrid.
- **EVA Maakt Het Plantaardings**: EVA is a bottom-up initiative that promotes plant-based diets through cooking workshops & awareness. EVA believes that, on average, plant-based products have the greatest overall positive impact on the well-being of people, animals and the planet. Working on a larger scale with restaurants, hospitals and schools through guidance at institutional kitchens will have a large-scale impact.
- **Green Squares**: The Green Squares project aims to support the local communities in climate action by piloting a model for joint engagement of residents, students, local artists and civil society in a collaborative process of co-designing solutions for neglected urban pockets in line with particular needs of local communities. The goal of the project is for communities to collaboratively design micro public spaces to improve air quality in Niš.
- **Just Transition Listening Platform**: The Lada and Velilla Social Innovation Platform aims to promote the collaboration between companies, public entities and the population living and working in the region in order to unlock the just transition of the region after the closing down of a thermal coal plant.
- **KLIK (Križevci Climate Innovation Laboratory)**: The energy cooperative Križevci Climate Innovation Laboratory (KLIK), supported by the City Council of Križevci (Croatia), aims to help make Križevci an energy self-sufficient city, but above all to engage citizens in energy transition

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by empowering citizens to produce and consume their own energy. It works on identifying the needs of the local communities and empowering them through capacity building.

- **Local Energy Communities**: The City Council of Valencia (Spain) promotes local energy communities by giving legal advice to communities of neighbours, guaranteeing energy access to the most vulnerable people who participate in the energy community. A one-stop shop provides guidance and training to hundreds of families, addressing the issues of energy billing, energy efficiency, renewable energy and the right to energy.

- **Milan Food Policy, Milan, Italy**: The Milan Food Policy is the first step taken by the municipality of Milan to address food-related issues at the urban level. Through 37 recommended actions, clustered in 6 different categories, the Milan Urban Food Policy (MUFP) has the goal to provide permanent and reliable access to adequate, safe, local, diversified, fair, and healthy food for all citizens.

- **Nappi Naapur (Nifty Neighbor):** The purpose of Nappi Naapur is to increase real encounters between people who live close to each other. It is intended for neighbourly help, getting to know each other, gig work and promoting the sharing economy. Everyone is welcome to become a user!

- **Online transparency platform for budgeting and governance**: Sveta Nedelja is the leading city in the Republic of Croatia when it comes to innovative solutions for accessing information and improving communication with the city's residents. Sveta Nedelja has prioritised transparency and effective communication as key pillars of its governance. Through various technological advancements, the city has revolutionised how information is accessed and disseminated, leading to greater citizen engagement and participation in municipal affairs.

- **Paris 15-min City**: 15-Minute City is an urban plan established by the city of Paris whose goal is to make most daily necessities accessible by either walking or cycling from residents' homes in a maximum of 15 minutes.

- **Participatory Budgeting: Local Voices in Resource Allocation. City of Dubrovnik**: Since 2018, Dubrovnik has implemented a participatory budgeting project, allowing residents to directly influence the allocation of public funds to community projects. This initiative aims to enhance civic participation, improve local infrastructure, and foster a sense of community ownership.

- **PentaHelix:** PentaHelix aimed to empower local and regional authorities to find innovative and cost-effective approaches to develop, finance, implement and improve sustainable energy and climate action plans (SECAP) that contribute to reaching national and European climate and energy goals and policies. To achieve this, the PentaHelix project developed and tested a new approach for integrating multi-governance planning for sustainable energy, both horizontal and vertical, together with close interaction with key stakeholders in energy efficiency and sustainable energy solutions.

- **Play!UC:** Play!UC is an initiative that developed a series of serious games and following participatory processes to raise awareness and deal with the individual carbon footprint of young adults. The term ‘serious games’ can describe all kinds of physical or digital games that are developed and played not only for entertainment, but have a functional scope as well, like education, training or exploration.

- **Pop-up Återbruk in Stockholm, Sweden**: Pop-up Återbruk is a temporary recycling service provided by Stockholm Vatten och Avfall. From April to November, two metal sheet containers move around all neighbourhoods of Stockholm offering two main services: the collection of small objects to recycle and a second-hand shop where citizens can buy things collected on the same containers.

- **Positive Energy Districts (PEDs) in Norway**: Currently, Norway has one of the largest number of PEDs in Europe. This case study highlights the social aspects of positive energy districts,

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which aim to improve energy efficiency, increase social renewable energy production significantly and utilise energy flexibility, in order to reduce the environmental impacts of districts' energy systems.

- **Ride Sharing Service**: Ride-sharing service initiated by local football club PPJ started from an agile pilot and became a permanent activity in the club. After school, school children get transported from school to football training on a minibus. This saves time and reduces the number of total trips otherwise taken by each individual child driven by their [parent]. Lower price of early practice hours compensates for the transportation costs.
- **Real Junk Food Berlin**: Real Junk Food Berlin is part of the international organisation The Junk Food Project that aims to raise awareness around the topic of food waste and new sustainable food systems. Their activities include the use of food that would otherwise go to waste and the conduct of workshops and courses sharing ways to avoid food waste.
- **Residents Assemble for Climate, Tartu, Estonia**: In 2022, Tartu organised its first climate assembly. Over two weeks, 55 local people gathered twice to hear from experts, discuss policy measures, and make their own recommendations. The Estonian city has committed to achieving climate neutrality by 2030. To manage this, the local administration is improving energy efficiency and increasing the use of renewable energy, as well as taking steps to protect people from the effects of climate change.
- **SONNET Bristol City Lab**: The City Council of Bristol (United Kingdom) established the SONNET City Lab to make use of crowdfunding to collectively raise capital to install energy efficiency measures in local community buildings. The Bristol municipality, working with the Bristol Energy Network, engaged building managers to assess the costs and energy-related savings associated with energy efficiency works in community buildings. They investigated the possibility of using a Community Municipal Bond (CMB) mechanism to fund this work.
- **SONNET Mannheim City Lab**: The City of Mannheim (Germany) implemented the SONNET City Lab to mobilise citizens of the neighbourhood Neckarstadt-West in energy transition efforts. The neighbourhood has many residents with a migration background, and where language barriers posed a challenge to the city to engage them. The project implemented pop-up installations and events in public spaces, providing information and facilitating the exchange of ideas for the neighbourhood's energy transition.
- **Smart House Training Program:** The main goal of the project was to implement a complete solution for a smart and sustainable urban environment, which would inspire residents to make environmentally conscious decisions and would later be implemented in various European regions.
- **Superblocks (Vitoria-Gasteiz):** The concept of “Superblocks” is an urban innovation that aims at low-carbon mobility following a participatory approach at the city and neighbourhood level. The idea is that the city, at the neighbourhood level, is reorganised into car-free areas that maximise public space for new social uses and keep road traffic outside the neighbourhoods – so-called superblocks. Inner streets are redesigned for the primary use by pedestrians.
- **SynAthina:** SynAthina is a social innovation online platform for engaging members of the community in problem-solving and reform. Citizens and community groups can submit innovative ideas on how to make their city a better place to live in and are then connected to the relevant stakeholders who can support their efforts.
- **The co-creation toolkit, City of Espoo (Finland)**: The co-creation model is a toolkit for developing sustainable and smart urban areas. It describes a general model for urban co-creation, considering the conditions and different starting points. The model originates from the SPARCS project, in which ideas and co-creation practices, their potential and constraints, were initially tested in the City of Espoo’s Kera district in Finland.

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- **Torino Social Innovation**: Torino Social Innovation fosters social innovation and entrepreneurship by bringing together over 40 public and private organisations to support sustainable business projects addressing societal needs in education, sustainability, employment, mobility, health, and inclusion. TSI is the first attempt to adopt a territorial and systemic approach to developing social innovation policies in Italy.
- **Turku's Climate Team**: Turku's Climate Team is a network aimed at companies and communities in the Turku region (Finland). It aims to make the fight against climate change visible, effective and communal. The Climate Team started as a campaign-based activity in 2018 and got a more formalised network structure in a few years. It shares information about climate work and organises regular events.
- **VeniSIA (Venice Sustainability Innovation Accelerator) Venice, Italy**: VeniSIA, the Venice Sustainability Innovation Accelerator, aims to develop and scale business ideas and technological solutions to address environmental, social, and economic challenges in Venice and beyond. Conceived by Carlo Bagnoli, Professor of Strategy Innovation at the Department of Management of Ca' Foscari University of Venice, the initiative targets companies (both corporations and SMEs), startups, researchers, master's students, donors, and institutions interested in pursuing or supporting sustainable innovation.
- **Viable Cities**: Viable Cities is a Swedish strategic innovation programme focusing on the transition to climate-neutral and sustainable cities. Viable Cities aims to create transformative system change based on the mission Climate Neutral Cities 2030, with a good life for everyone within the planetary boundaries. The mission means that cities' climate transition should take place from a broad perspective, where social, ecological and economic sustainability is taken into account.
- **You Decide**: You Decide is a participatory budget initiative aimed at promoting greater participation of young people and at increasing their contribution to the development of the city.
- **Zklaster**: it is the Cluster for the Development of Renewable Energy Sources and Energy Efficiency in Zgorzelec (Poland). It aims to set up a regional Renewable Energy System (RES) to replace coal mining in the region. Representatives of local authorities in the area signed an agreement and engaged in a multi-stakeholder process with businesses and citizens. The aim of the project is to build an alternative local energy system, using renewable energy sources and high-efficiency generation of heat and electricity simultaneously.

2.3 Social Innovation Indicators

Building on the extant scientific literature on Social Innovation presented in Section 2.1 and emerging bottom-up evidence from case studies of cities enabling social innovation presented in Section 2.2, the social innovation impact logic is defined, and indicators are derived for assessing social innovation actions' progress and outcomes. Such indicators set and related impact logic are described in detail in D2.7 "Report on Indicators & assessment methods for social innovation action plans" delivered in September 2022 (Rizzo, Mureddu & Bresciani 2022). The same indicators are included in the overall NZC indicators set D2.4 v3 available on the NetZeroCities website and provided to cities in 2023.

Based on this work, an open-access Scientific Book has been written (in T9.3) comprehensively address Indicators of Social Innovation, linking them to the NZC Theory of Change, and published with Springer "Assessment Framework for People-Centred Solutions to Carbon Neutrality: A Comprehensive List of Case Studies and Social Innovation Indicators at Urban Level" (Bresciani, Rizzo & Mureddu 2024). The book provides the rationale for deploying social innovation to support urban transitions (Chapter 2), followed by the impact framework (Chapter 3) and related indicators that cities can utilise for monitoring their efforts. Implications for theory and practice, alongside a discussion of future developments,

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conclude the book (Chapter 4). In greater detail, an overview of the content of each chapter is provided below.

The first Chapter provides an overview of the book's purpose, a presentation of the NetZeroCities project, and an explanation of the methodology. It then outlines key insights from scientific literature concerning the relationship between social innovation initiatives and environmental sustainability. Finally, 37 case studies are briefly presented to provide readers with existing examples of social innovations' relevance for achieving climate neutrality at urban and regional levels, which provides the grounding for the bottom-up categorisation of social innovations, from which the evaluation framework is derived.

This second Chapter presents the proposed assessment framework for social innovation aimed at achieving climate neutrality at the urban level. The framework comprises ten categories derived from an analysis of social innovation action plans deployed worldwide, scientific literature, insights from case studies, and the impact pathways developed within the NetZeroCities project. The general intervention logic—a crucial initial step in establishing an impact assessment framework—is described, followed by the specific intervention logics for each category, which link actions to their anticipated impact. By defining the project objectives and inputs relative to the expected results in terms of outputs, outcomes, and impacts, these intervention logics form the foundational basis for what the impact assessment methodology aims to measure.

The third Chapter provides a list of social innovation indicators designed to assess cities' action plans concerning social innovation for climate neutrality. The general intervention logic of the NetZeroCities social innovation component, encompassing both action plans and specific initiatives, is operationalised through indicators clustered according to the framework's categories. For each of the ten categories, a specific list of indicators is provided. In total, more than one thousand indicators are presented, grouped by category and evaluation criteria (effectiveness, efficiency, relevance, replicability, and scalability). The aim is to provide a comprehensive catalogue that cities can choose from, depending on their social innovation readiness level and the actions they plan to implement in their cities.

In the fourth Chapter, implications for practice and for theory development are discussed. Firstly, guidelines for implementing the framework within cities are provided to assist city administrators in defining the steps necessary to apply the indicators to their local contexts. Specifically, it presents the methodologies and tools for data collection and analysis. It then outlines the theoretical implications of the framework and its indicators, particularly regarding their role in supporting evidence-based design. In terms of practical implications, policymakers, designers, politicians, and civil servants can utilise the presented assessment framework and select indicators for assessing cities' social innovation action plans in support of climate neutrality.

2.4 Social Innovation Actionable Pathways framework

2.4.1 Development of the Social Innovation Actionable Pathways

The Social Innovation Actionable Pathways framework with social innovation impact pathways has been developed in T9.3 and published in the related deliverable D9.3. The framework was derived building upon the extensive review of scientific literature (described in Section 2.1, published in the related deliverable 2.7) and triangulating emerging dimensions from it with the cases of Social Innovation from NZC (described in Section 2.2, based on D9.1), thus triangulating pragmatic evidence with scientific knowledge, and aligning for each category the indicators concurrently developed in WP2 (described in Section 2.3, and published in the related deliverable D2.7).

The resulting framework of Social Innovation Actionable Pathways is composed of ten categories across 3 phases: (1) Prepare, (2) Act, and (3) Accelerate, that align with the steps NZC climate transition map (specifically the step "Co-design a portfolio"), enabling cities to embed Social Innovation at various stages of their climate transition(see Appendix A for the matching of the

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social innovation actionable pathways categories to the NZC Climate Transition Map sections). Indicators are matched to the categories to provide cities with contextualised guidance on social innovation actions and related indicators' selection.

This framework (developed in T9.3) has been designed to provide a city-friendly tool in the format of an interactive visualisation for public administrators and policymakers to have support in making informed decisions on social innovation actions in pursuit of climate neutrality. The social innovation impact pathways interactive graph is available on the NetZeroCities portal, and the extended explanation of its development and use has been presented in two conferences with proceedings: EKSIG (Bresciani, Tjahja, Komatsu, & Rizzo, 2023a) in which the tool co-design process with cities and experts is described, and IASDR (Bresciani, Tjahja, Komatsu, & Rizzo, 2023b), focused on the description of the categories in detail. In addition, within T9.3, the framework has been described in a book chapter (Bresciani & Tjahja, 2025) with a focus on scaling, describing cases and methods to scale social innovations. The framework and publications embed the indicators in the description of the social innovation categories and actions and their categorisation according to SDGs (Sustainable Development Goals), providing public administrators and consultants with a contextualised explanation of why and how indicators can be used to assess the progress and outcomes of social innovation actions.

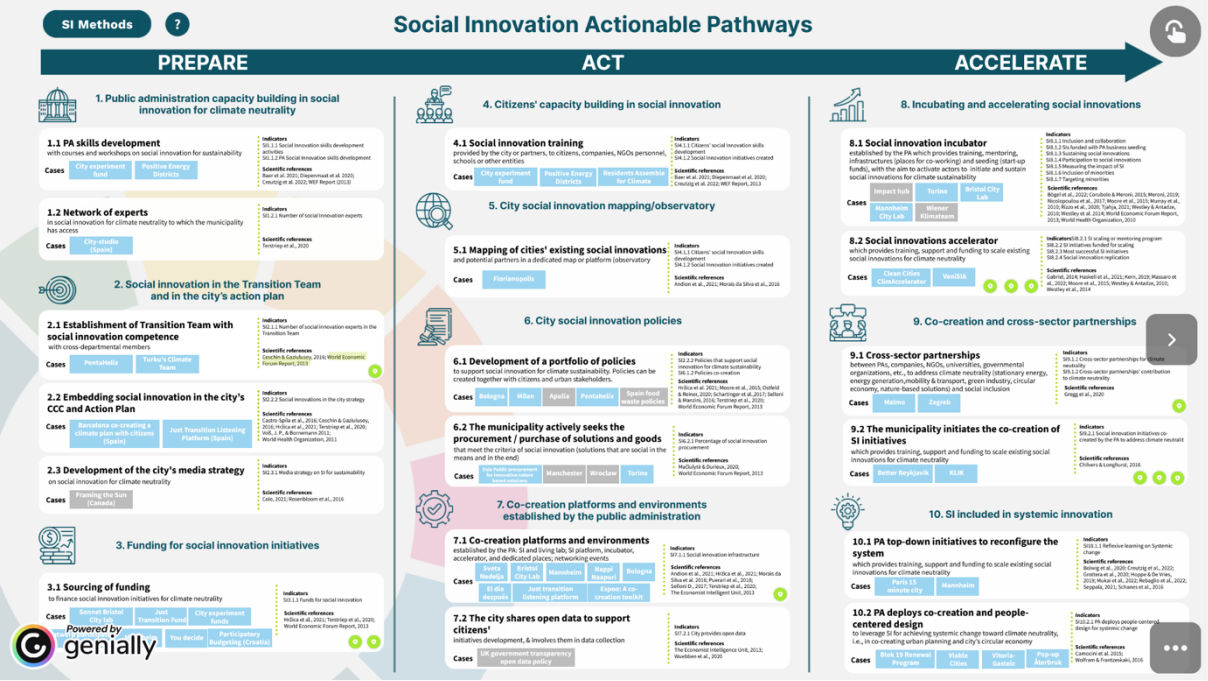

Figure 2: Social Innovation Actionable Pathways Interactive Map (https://netzerocities.app/resource-4104)

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2.4.2 Categories of the Social Innovation Actionable Pathways and Related Indicators

A total of 38 indicators are systematically categorised under the 10 broad categories, with their definitions, and type of data (numeric or textual). Social innovation indicators (published in D2.4.2 and 2.7) are related to specific social innovation actions as outlined in the social innovation actionable pathways in Deliverable D9.3 and related publications (Bresciani et al., 2023), as visualised in Figure 3-6.

Figure 3: Categorisation of actions and related indicators related to SDGs (printable format, Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b)

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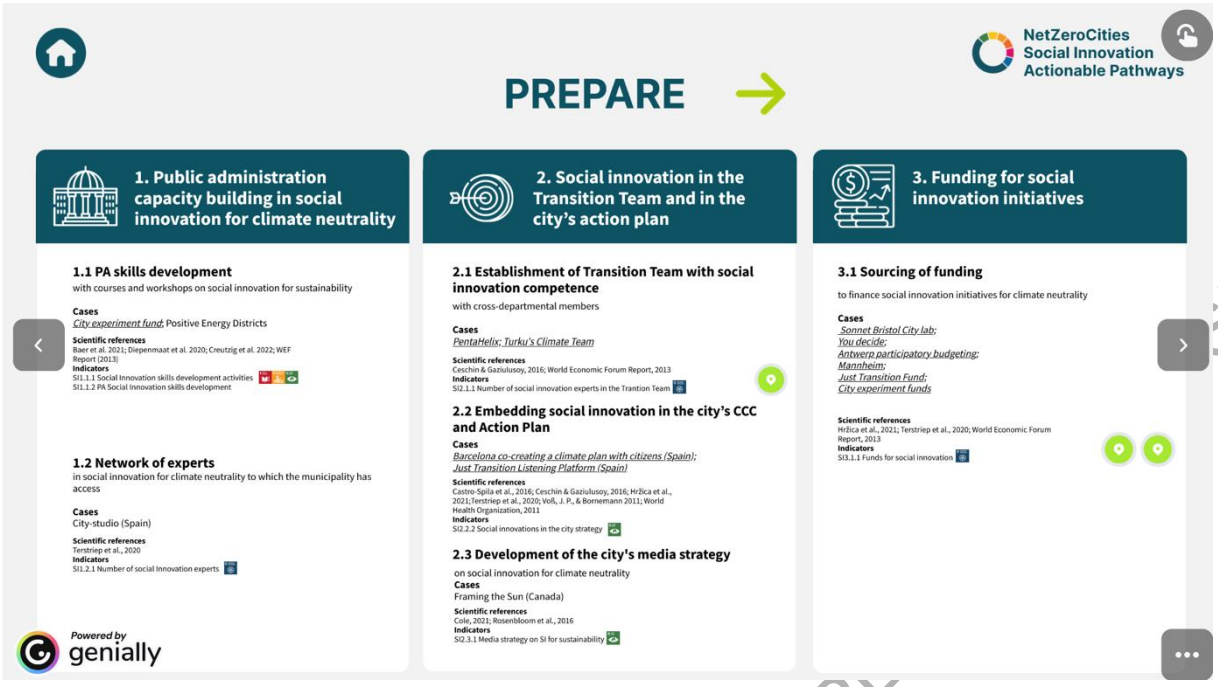

Figure 4: Social Innovation Actionable Pathways Interactive Map: Prepare (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074)

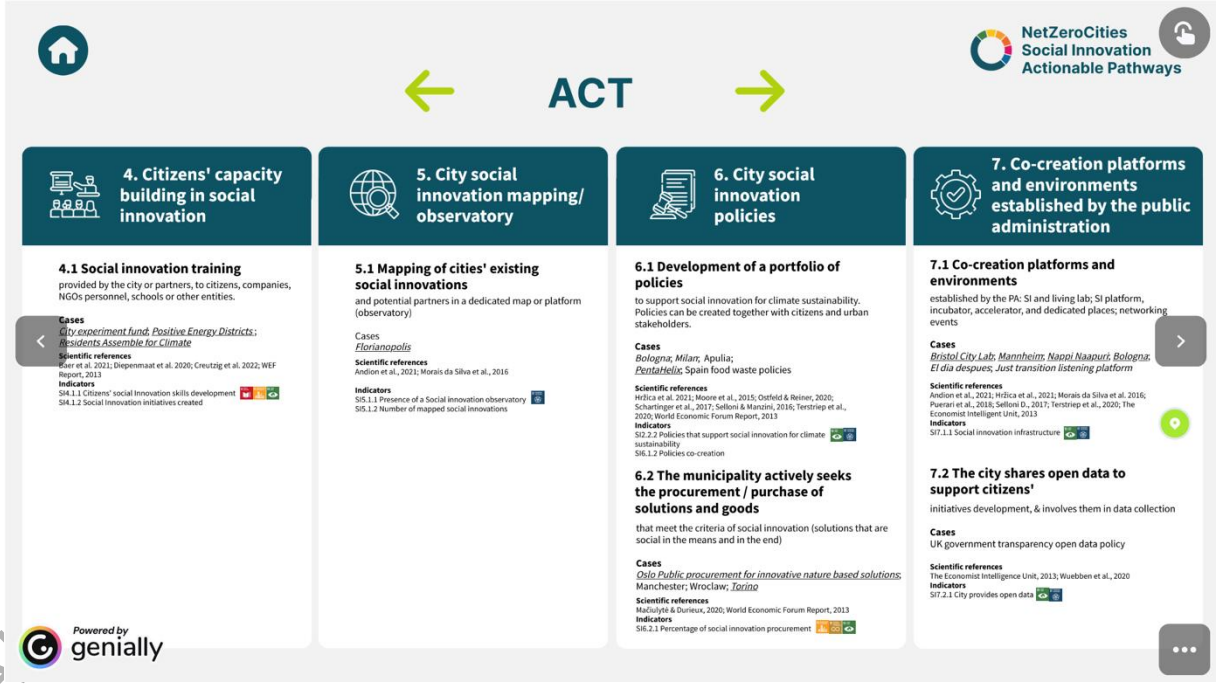

Figure 5: Social Innovation Actionable Pathways Interactive Map: Act (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074)

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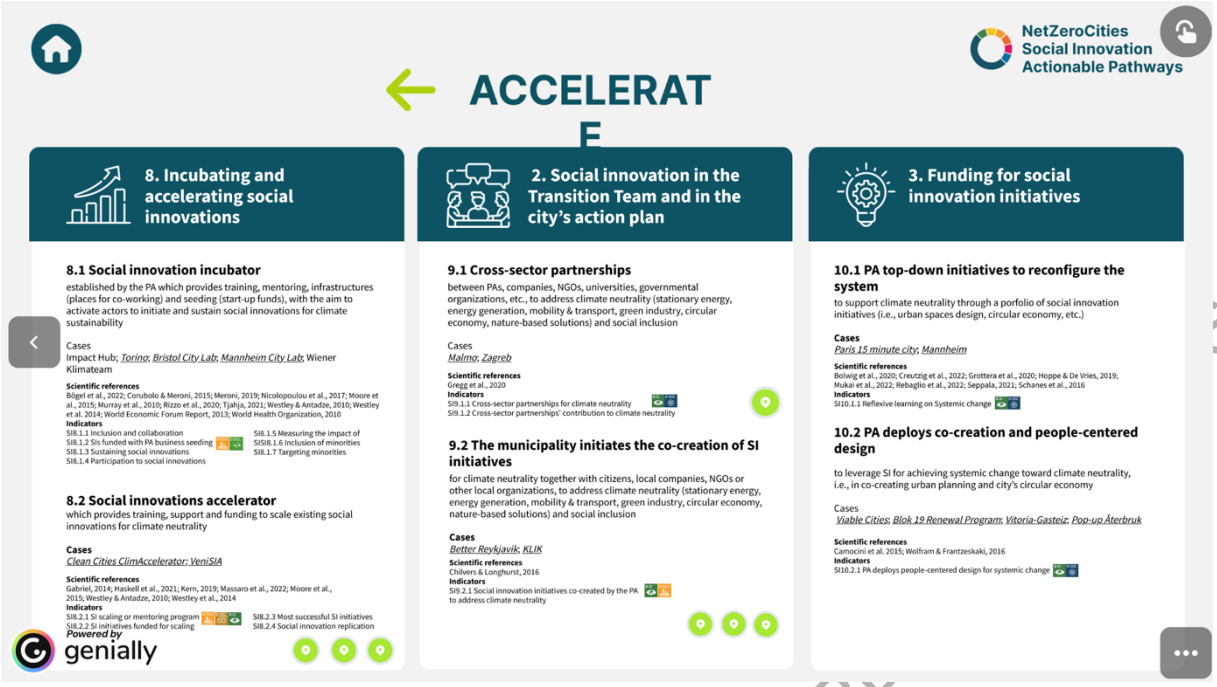

Figure 6: Social Innovation Actionable Pathways Interactive Map: Accelerate (Source: Bresciani, Tjahja, Komatsu, & Rizzo, 2023b; https://netzerocities.app/resource-4074)

The comprehensive framework identifies ten key categories of social innovation, actionable pathways, designed to assist cities in fostering robust social innovation ecosystems for achieving climate neutrality. These categories and related indicators (NZC D2.4.2 Appendix B) are:

1. **Public Administration Capacity Building in Social Innovation for Climate Neutrality:** This pathway focuses on equipping public administration officials with the necessary knowledge and skills. It involves dedicated training programmes and the establishment of networks of experts in social innovation, enhancing the municipality's internal capability to drive climate action.

   Indicators:

   - SI1.1.1 Public administrators' social innovation skills development activities (Numeric): Total number of people involved in capacity building or training activities on social innovation for climate neutrality (i.e., workshops/awareness campaigns for increasing awareness of social innovation for climate neutrality to the public administration, citizens, urban stakeholders, etc.)

   - SI1.1.2 Public administration Social Innovation skills development (Textual): According to the city's civil servants, what is social innovation, and what are the main benefits of supporting social innovation for climate sustainability? Do they believe that their knowledge of social innovation has improved as a consequence of training? Are there any social innovation initiatives boosted/supported by the civil servants who underwent the course?

   - SI1.2 Number of Social Innovation experts (Numeric): Total Number of experts in social innovation to which the municipality has access, including public administration employees and other professionals with skills related to social innovation or co-creation for climate neutrality (i.e., public officials who participated to social innovation for climate neutrality training, professionals from university centres focusing on social innovation, professionals from social innovations consultancies, etc.)

2. **Social Innovation Task Force and Strategy Making:** This category entails creating dedicated, multi-disciplinary, and cross-departmental teams within municipalities. These task forces are responsible for developing clear and coherent strategies, including media strategies, to

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proactively support community-led innovation for sustainability.

Indicators:

SI2.1 Social innovation experts participating to the city transition team/climate task force (Numeric):
Number of social innovation experts (public administrators or external experts) participating in the city' transition team/task force, with expertise on social innovation for climate sustainability

SI2.2 Social innovations in the city strategy/climate action plan (Numeric):
Number of social innovations supporting initiatives embedded into the city's strategy/climate action plans for climate neutrality (i.e., urban planning, circular economy, etc.) or co-created with citizens, to achieve systemic change for sustainability

SI2.3.1 Media strategy on SI for climate sustainability (Textual):
Has the city developed a communication and (social) media strategy to boost the press coverage of the cities' initiatives on social innovation for climate sustainability? How are the information for the media collected and distributed? What are the main lessons learned?

SI2.3.1 Press and media coverage on city's initiatives for climate neutrality (Numeric):
Number of articles in the press, appearance in broadcast media and social media covering the city's initiatives for climate neutrality

3. **Funding for Social Innovation Initiatives:** Recognising the critical need for financial resources, this pathway highlights the role of municipalities as facilitators. They are encouraged to enable and secure funding from diverse channels such as philanthropy, crowdfunding, social bonds, public-private partnerships, venture capital, and various European funds to ensure the sustainability of social innovation efforts.

Indicators:

SI3.1 Funds for Social Innovation (Numeric):
Total Amount of funding dedicated to the city's Social Innovation initiatives (for training, for social innovation business seeding, creating and managing platforms, etc.) per category: philanthropy, crowdfunding, social bonds, cross-sector partnerships, change in ownership, platform for attracting investors, in-kind donations, hours of volunteering, others.

SI3.1.1 Funds for incubating and accelerating social innovations for climate neutrality (Numeric –Euros):
Amount of funds the city invests yearly for incubating and accelerating social innovations for climate neutrality

4. **Citizens' Capacity Building:** This pathway is centred on empowering urban stakeholders, including citizens, companies, NGOs, and educational institutions, through social innovation training. The objective is to enable their active participation and collaboration in initiatives aimed at achieving climate neutrality.

Indicators:

SI4.1.1 Citizens' Social Innovation for climate neutrality skills development (Numeric):
Number of beneficiaries who attended Social Innovation for climate neutrality training provided by the city or partners, per category: citizens, companies' personnel, NGOs personnel, schools, or other.

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SI4.1.2 Social innovation initiatives created (Numeric): Proportion of participants in SI training initiatives that created social innovation for climate neutrality

5. **City Social Innovation Mapping/Observatory:** This involves systematically identifying and mapping existing social innovations and potential collaborative partners within a city. This is often facilitated through dedicated observatories and platforms that promote knowledge exchange, foster new collaborations, and strengthen existing communities of innovators.

   Indicators:

   SI5.1.1 Activities and partners mapped in the city's Social Innovation observatory (Textual): Number of social innovations and potential partners actively mapped in a SI innovation observatory or social innovation urban mapping/tracking platform

   SI5.1.2 Number of social innovations for climate neutrality in the city (Textual): In the city, how many social innovations, NGOs and social enterprises focus on social innovation for climate sustainability?

6. **Social Innovation Policies:** This category focuses on the development and implementation of supportive policies. These policies are designed to actively back social innovation for climate sustainability and can even be co-created with citizens and other urban stakeholders. It also includes influencing public procurement to favour socially innovative solutions.

   Indicators:

   SI6.1.1 Policies that support social innovation for climate neutrality (Textual): Which policies has the municipality developed to support social innovation for climate neutrality? What are the benefits, challenges and lessons learned?

   SI6.1.2 Co-created policies that support social innovation for climate neutrality (Textual): Which social innovation initiatives have been developed from policy initiatives co-created with citizens? What are the benefits, challenges and lessons learned compared to developing policies not co-created with citizens?

   SI6.2 Percentage of procurement from sustainable providers (Numeric %): The percentage of procurement of public services of the city from sustainable providers or social innovations out of the total number of public services procured

7. **Co-creation Platforms and Environments:** This involves public administrations establishing both physical and online spaces specifically designed to enable urban stakeholders to meet, network, and collaboratively experiment with innovative solutions to climate change challenges.

   Indictors:

   SI7.1.1 Social Innovation Infrastructure (Numeric): Number of co-creation platforms (i.e., SI lab, living lab, SI platform, SI incubator, SI accelerator, networking events, SI dedicated places, dialogue platforms, other)

   SI7.1.2 Social Innovation Infrastructure (Textual): Which co-creation platforms has the PA established (i.e., SI lab, living lab, SI platform, SI incubator, SI accelerator, networking events, SI dedicated places, other)? What are the main benefits, challenges, and learnings for each platform?

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SI7.1.3 Number of newly established enterprises, initiatives or social Innovations for climate neutrality (Numeric):
How many new social enterprises or social innovations (networks/partnerships) have been established in the city to tackle climate neutrality thanks to the co-creation platforms established by the public administration?

SI7.2 Open data for climate action initiatives (Textual):
Is the city providing open data and platforms to share public administration data (such as citizen science)? How is open data used by citizens to develop initiatives for climate neutrality or social innovations?

8. **Incubating and Accelerating Social Innovations:** This pathway advocates for the establishment of incubators and accelerators. These entities provide crucial support, including training programmes, mentoring, dedicated co-working spaces, and initial seed or start-up funds to help initiate, develop, and scale social innovations for climate sustainability.

Indicators:

SI8.1.1 Public administration support for bottom-up social innovation projects for climate neutrality (Textual):
How does the public administration support bottom-up social innovation projects and activities for climate neutrality?

SI8.1.2 Social innovations for climate neutrality supported by the public administration (Textual):
Number of social innovations the public administration supported with consulting, mentoring and funding to start and scale up

SI8.1.3 Social innovations funded with PA business seeding (Numeric):
Number of initiatives funded with business seeding to start a social innovation for climate neutrality

SI8.1.4 Sustaining social innovations (Textual):
How do social innovations for climate neutrality of the city sustain their operations and impact over time? How can the city support innovators to sustain their operations to scale their impact toward climate neutrality?

SI8.1.5 Participation in social innovations for climate neutrality (Numeric):
How many people have joined or co-created initiatives for climate neutrality through the city's initiatives?

SI8.1.6 Assessing the impact of social innovations for climate neutrality (Textual):
How does the city measure the impact of the social innovations it supports or it has co-created? What are the main learnings from measuring the impacts?

SI8.1.7 Inclusion of minorities (Textual):
To what extent does the city promote participation among women, people with disabilities and minorities in social innovation for climate neutrality initiatives promoted by the public administration?

SI8.1.8 Targeting minorities (Textual):
How are social innovations targeted at vulnerable groups (i.e., disabled, unemployed, linguistic minorities, etc.) specifically supported (with dedicated training and funds) by the public administration?

SI8.2.1 Beneficiaries of mentoring or scaling program of social innovation for climate neutrality

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(Numeric):
Number of beneficiaries who attended a scaling or mentoring program of social innovation for climate neutrality

SI8.2.2 SI initiatives for climate sustainability funded for scaling (Numeric):
Number of high-potential social innovation initiatives for climate sustainability funded for scaling (an already established social innovation)

SI8.2.3 Most successful social innovation initiatives for climate neutrality (Textual):
Which are the most successful social innovation initiatives for climate neutrality in the city? What can be learned in terms of challenges, benefits and strategies for scaling? Please provide data and experiences referring to specific impact categories (stationary energy, energy generation, mobility & transport, green industry, circular economy, nature-based solutions)

SI8.2.4 Social innovations replication (Numeric %):
Proportion of Social innovation initiatives for climate sustainability replicated in other contexts, out of the number of SI initiatives joining the mentoring programme

9. **Co-creation and Cross-Sector Partnerships:** This emphasises fostering robust partnerships across sectors – between public administrations, companies, NGOs, universities, and governmental organisations. The aim is to collaboratively address both climate neutrality goals and broader social inclusion objectives, encouraging municipalities to lead co-creation efforts with local actors.

Indicators:

SI9.1.1 Cross-sector partnerships for climate neutrality (Numeric):
Number of public-private or cross-sector partnerships developed for the aim of reducing GHG emissions/energy consumption through platforms set up by the public administration

SI9.1.2 Cross-sector partnerships' contribution to climate neutrality (Textual):
Which cross-sector partnerships and public-private partnerships have been developed in the city to boost climate neutrality through social innovation? What are the main positive and negative aspects of the partnership and the lessons learned? Please describe for each partnership how it has contributed to climate neutrality

SI9.2 Social innovation initiatives co-created by the PA to address climate neutrality (Textual):
Which social innovation initiatives has the PA co-created with citizens (including companies, NGOs, etc.) or other entities (including other cities, other public authorities) to address climate neutrality? Please describe how each initiative supports climate neutrality (stationary energy, energy generation, mobility & transport, green industry, circular economy, nature-based solutions) and social inclusion: what can be learned and how can they be improved?

10. **Systemic Innovation Approaches to Climate Neutrality Which Include Social Innovation:** This final category pertains to top-down initiatives led by public administrations that seek to reconfigure existing systems through social innovation. Examples include innovative urban space design, deploying 'green nudges', and utilising co-creation processes for systemic change in critical areas like urban planning, mobility, circular economy principles, and energy systems.

Indicators:

SI10.1 Systemic change (Textual):

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How is the city embedding social innovation as a lever to support systemic change toward climate neutrality in the city (for example, in urban planning, circular economy, energy communities, etc.)?

SI10.2 Social Innovation impact on climate neutrality (Textual): How do the social innovation initiatives fostered by the public administration contribute to climate neutrality? Please provide data and/or experiences according to specific impact category (stationary energy, energy generation, mobility & transport, green industry, circular economy, nature-based solutions).

SI10.3 Wellbeing derived from SI initiatives (Textual): How has the well-being of citizens and urban stakeholders changed as a consequence of social innovation policies and initiatives developed by the public administration? What still needs to be addressed?

These indicators have been used to assess the pilot actions submitted by 53 cities of Cohort 1. The analysis is described in detail in the next Chapter.

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3 Analysis of Cities' Social Innovation Actions and Indicators

3.1 Analysis of 445 Social Innovation actions of the first cohort of Pilots

3.1.1 Context

An analysis of Social Innovation in the 25 Pilot City Programme of cohort 1 (53 cities, 21 countries) was carried out in Task 9.3 (9.3 Upscaling Social Innovation - Update 2024). Building on this work, a more granular level of social innovation and related action of the Pilots cohort 1 has been performed.

Since the NetZeroCities comprehensive indicators set (D2.4.2) was published after the Pilot City Programme Cohort 1 submission deadline, cities did not have access to the suggested social innovation framework and related indicators thus the analysis was conducted by firstly mapping all the social innovation (and related domains) actions from all the Pilots of Cohort 1, and then classifying them according to the categories of the framework described in the previous chapter, with the purpose to improve and validate the framework with bottom-up city data.

The coding of the 25 Pilots of cohort 1 (comprising single- and multi-city projects for a total of 53 cities across 21 countries), brought to classify 445 actions about social innovation or related social science domains. Such actions were then analysed using the 10 categories and 38 associated subcategory indicators of the Social Innovation Actionable Pathway framework. **The analysis of the coded data reveals that 53.71% (239 out of 445) of climate actions across 53 cities are directly or indirectly related to Social Innovation as a lever of change.**

These actions encompass a diverse set of actions across the six emission domains of the NetZeroCities Impact Pathways framework (aligned to the GHG protocol for cities) on which the cities are focusing. In general, Pilots' actions covered all six standard emission domains, with the emission domain "Stationary Energy (including buildings)" emerging as the most frequently selected category by cities for their pilots, identified by 50 cities and representing 29.94% of the total across the. This is followed by "Other Scope 3", selected by 44 cities (26.35%), and "Transportation", selected by 35 cities (20.96%). The remaining three domains were selected less frequently, with "IPPU" (Industrial Processes and Product Use) accounting for only 2.4% of total selections (Figure 7).

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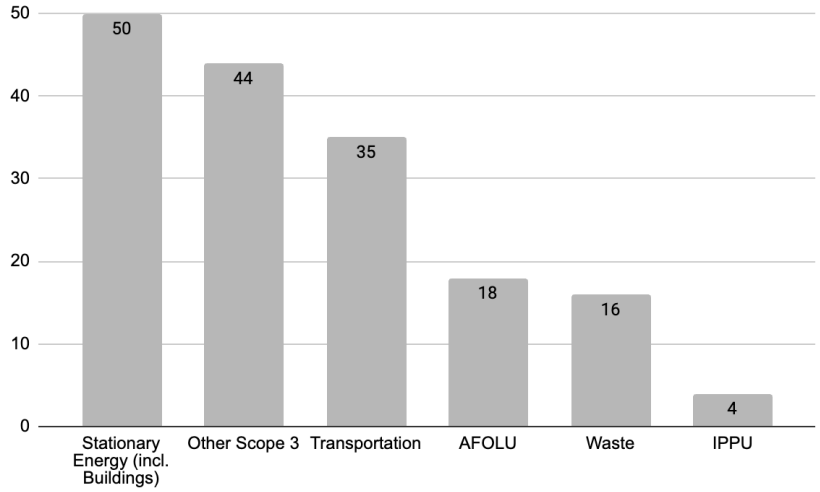

Figure 7: Emission Domains selected by the Pilot Cities to categorise their actions

Details of the analysis specific to social innovation are provided below.

3.1.2 Frequencies of actions per Social Innovation category

Specifically for Social Innovation, most Pilots indicated the use of Social Innovation. The coding of all the actions revealed that social innovation strategies are more commonly directed toward emission sources linked to:

– the consumption of non-electric energy for thermal uses in buildings and facilities (e.g., heating, cooking),

– the consumption of electricity for buildings, facilities, and infrastructure, and

– all forms of transport.

The analysis was conducted at two levels: (1) 10 broad categories of social innovations and (2) at the granular level of the SI indicators.

Table 1 shows the number of times that social innovation actions could be classified according to the 10 categories of the Social Innovation Actionable Pathways framework described in Section 2.4. Actions belonging to the "Prepare" phase (categories 1, 2, and 3) account for 21.26% of all climate actions related to Social Innovation, while the "Act" phase (containing categories 4, 5, 6 and 7) accounts for 24.67%. The remaining **54.07% are climate actions that correspond to the "Accelerate" phase of the SI actionable pathways** (categories 8, 9, 10). This result indicates that more than half of the social innovation climate actions planned by the analysed cities are focused on the acceleration and scaling phase.

This is further emphasised by the **highest occurrence of category 8 "Incubating and accelerating social innovations for climate neutrality", accounting for 28.35% of all Social Innovation category occurrences**. Furthermore, the **high occurrence of category 9 "Co-creation and cross-sector partnerships" at 21.26%** and Category 7 "Co-creation platforms and environments" at 13.12%, indicates the cities' in the NetZeroCities Pilots focus on co-creation, breaking away from traditional siloed approaches and adopting cross-sectoral partnerships.

Among the other frequently occurring categories, Category 1 "Public administration capacity building in social innovation" shows a significantly high occurrence of 10.76%, highlighting a common trend among cities to invest in capacity building towards organisational change for the public administration. Simultaneously, actions related to Category 4 "Citizens' capacity building in social innovation for climate

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neutrality" account for 7.87% of actions, highlighting an emerging trend among Pilot cities to involve and engage citizens in playing an active role through Social Innovations towards climate neutrality.

Table 1: Classification of Social Innovation actions of Pilots according to the Social Innovation Actionable Pathways categories

Social Innovation Categories (sorted from lowest to highest occurrence)	Count of Occurrence	% Frequency of Occurrence
8. Incubating and accelerating social innovations for climate neutrality	216	28.35%
9. Co-creation and cross-sector partnerships	162	21.26%
7. Co-creation platforms and environments	100	13.12%
1. Public administration capacity building in social innovation	82	10.76%
4. Citizens' capacity building in social innovation for climate neutrality	60	7.87%
3. Funding for Social Innovation initiatives for climate neutrality	42	5.51%
2. Social Innovation in the transition team and in the city's strategy-making	38	4.99%
10. Systemic innovation approaches which include social innovation	34	4.46%
6. Social innovation policies	22	2.89%
5. City Social Innovation mapping/ observatory	6	0.79%

Overall, while cities are clearly advancing Social Innovation to accelerate climate action, further attention is needed to understand the lack of selection of actions in the "Prepare" and "Act" phases, in particular in relation to citizens' training on social innovation for climate neutrality, which might be due to a lack of knowledge.

3.2 Qualitative analysis insights from sensemaking sessions with Mission Cities, Pilots and Twin Cities' use of Social Innovation

As part of SGA-NZC Task 4.3 "Peer-to-peer learning and reflexive monitoring for Mission Cities", and Task 4.4, "Peer-to-peer learning and collective sensemaking for Pilot Cities", Deliverable D4.8 "Mid-Project insights report: P2P learning for Mission and Pilot Cities" was developed, summarising six peer-to-peer learning sessions among Mission cities conducted from June 2024 to April 2025, and insights from 2 Collective Sensemaking sessions with Cohort 2 (comprising 26 Pilot Cities representing 22 pilots) and Cohort 3 (25 Pilot Cities representing 21 pilots) and their corresponding Twin cities. During these mutual learning events, 14 Mission Cities explored four topics critical to the effective implementation of their Climate City Contracts.

On the other hand, the pilot sensemaking sessions for Cohorts 2 and 3 revealed emerging evidence of challenges with governance silos, multi-level integration, aligning national funding with local needs, and systemic barriers (such as engaging the private sector due to stakeholder fatigue), capacity constraints and unclear value propositions. However, it also provided key insights on best practices and

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opportunities for enabling social innovation in thematic areas such as Citizen Engagement, Behaviour Change and Mobility & Transport.

The sessions highlighted the importance of **Multi-actor Collaboration**, revealing that private companies, particularly SMEs, highly value city support in the form of funding and technical assistance for their climate transition. Effective collaboration requires cities to act as facilitators and present clear value propositions to the private sector, fostering co-ownership of the cities' climate missions.

It was found that social innovation has been a key lever of change **to foster multi-actor collaboration and Governance** in pursuit of climate neutrality. Cities, positioned as facilitators, rather than top-down regulators, are actively working to link companies with financial opportunities and policy support to achieve higher buy-in. This approach is best exemplified by initiatives such as Guimarães's Climate Pacts and Budapest's "Green Budapest" brand, which formalise engagement and boost visibility for companies contributing to the city's climate goals. There is an emphasis that municipalities need to invest in dedicated, cross-departmental teams capable of managing partnerships and providing technical assistance, particularly for small and medium-sized enterprises (SMEs). Social innovation in this context also involves creating **shared platforms of exchange**, like workshops and forums, where businesses can engage in peer learning and **co-create cross-sectoral strategies**, **promoting shared responsibility and aligning priorities across business ecosystems**. A key lesson is the importance of tying climate initiatives to tangible incentives, such as grants or public recognition, to encourage stakeholders to make and follow through on commitments.

Social innovation is also evident in the development of **innovative financing** and **people-centred initiatives** to overcome barriers to climate action. The deliverable highlights the use of innovative financing mechanisms by cities, including blended finance and green procurement instruments, to fund climate-related actions. While some cities like Aachen are exploring green bonds, these concepts are still complex and not fully understood by all stakeholders. At a more bottom-up level, cities are implementing smaller, incentive-based programmes for citizens, offering financial support for things like cargo bikes, renewable energy installations, and home renovations to demonstrate the cost-effectiveness of sustainable practices. The **importance of citizen engagement** (which is often referred to as a people-centred climate transition and co-development of solutions, thus social innovations) is frequently emphasised by cities. Effective strategies include framing climate action in terms of co-benefits and quality of life to increase citizen acceptance, as well as utilising creative communications and storytelling for broader outreach. Examples of this include Kronoby's participatory budgeting, Bordeaux's interest-based engagement via sports clubs, and Porto's community composting site.

The **Collective Sensemaking sessions**, held for Cohort 2 on 22nd November 2024 and Cohort 3 on 28th February 2025, inspired by the Open Space Format, fostered a peer-to-peer learning environment where cities co-create solutions and learn from each other's experiences. This is exemplified by the way the sessions were structured around thematic breakout rooms, allowing cities to collectively discuss topics like Governance Innovation, Behaviour Change, and Mobility, engaging in discussions that directly addressed their unique challenges. This peer-to-peer learning environment encourages cities to view pilots not merely as projects to be implemented, but as "**powerful learning instruments**" for uncovering institutional blind spots and policy contradictions.

The sessions revealed challenges of systemic transitions that go beyond technical issues. A key insight was that climate neutrality is as much an institutional and cultural challenge as it is a technical one. Cities face barriers like "internal silos" and fragmented collaboration, where cross-sectoral work relies on a few "motivated individuals" rather than being an embedded part of routine operations. For instance, a participant from Helsinki noted their energy efficiency team felt like their work was an "add-on, not core to everyone's responsibilities." The gap between the "political clock and the climate clock" (Riga, Trondheim) was also identified as a major challenge, as ambitious goals are often hindered by slow bureaucratic processes.

Despite these hurdles, the sessions provided a platform for sharing innovative solutions. In the face of citizen engagement challenges, cities learned that dictating action can backfire. Tampere highlighted the need to "inspire them" rather than "dictate them or blame people." Successful strategies involve

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framing climate action in terms of everyday benefits like well-being and cost of living. The sessions also revealed concrete examples of **good practices of social innovation and citizen engagement**, such as Bordeaux's use of sports clubs to engage families in climate action and Klagenfurt's participatory climate fund, which involves local institutions and citizens to attract private capital.

3.3 Analysis of Cities' use of co-benefits in Pilots: suggested revision for Social Innovation indicators and co-benefits

In the NetZeroCities project, cities could apply to the Pilot City Program in three cohorts, submitting first the plan, and after the results. The analysis of the social innovation indicators started after the submission of the plans of the first cohort of the Pilot City Program. Such plans do not contain data on performance, but the actions and indicators of the **planned** activities. Analysing such plans is relevant to inform research on training material for cities, to understand cities' core focus and how it aligns with indicators and materials provided to cities a priori.

An analysis of the co-benefit indicators selected by the Pilot City Program first cohort of applicants was conducted in SGA-NZC T4.5, published in D4.11, and as a scientific publication (Mondal, Bresciani & Rizzo, 2024) based on the selection of Standardised and Customised indicator selections made by 40 of the cities belonging to cohort 1. As explained in the guidebook for NetZeroCities Pilot Programme (pg. 36), pilots are invited to submit their plans by describing the impact pathways of their planned actions, according to the standardised set of indicators (which are an adapted subset of the NetZeroCities comprehensive indicators set published in D2.4), but can also propose their own indicators.

The primary purpose of this analysis was to investigate early evidence of what cities choose to measure in terms of customised indicators and how they compare with the comprehensive set of NZC Co-benefit indicators provided to them. The analysis involved the extraction and coding of all the indicators selected by the cities beyond GHG emissions. The result of this analysis yielded new recommendations for updating the standardised indicator set informed by the customised indicators selected by the cities (the proposed revised set of co-benefit indicators can be found in the Appendix of SGA-NZC D4.11). Furthermore, as testing sessions with cities revealed their interest in aligning indicators with SDGs (Sustainable Development Goals defined by the UN), the analysis categorised co-benefits also according to the 17 standard SDGs (indicated in Table 2, column on the right side).

Social Innovation could not be analysed in isolation because it is often merged, confused or embedded with other related domains such as citizen engagement, behavioural change, social entrepreneurship, social justice and stakeholder participation. Thus, all co-benefits have been analysed.

Among the indicators emerging from this analysis, 11 new indicators (proposed by cities beyond the standardised indicators provided) were found in the impact domain "*Social Inclusion, Innovation, Democracy and Cultural Impact"* (Table 2):

Table 2: Emerging Social Inclusion, Innovation, Democracy and Cultural Impact Indicators from Cities' Customised Indicator Selections (Source: Mondal, Bresciani & Rizzo, 2024; SGA-NZC D2.11)

Emission/Impact Domain	Subdomain	[New] Related Action(s)	Indicator	Suggested Unit of Measurement	SDGs
Social Inclusion, Innovation, Democracy and Cultural Impact	Citizen & Communities Participation	Capacity building for citizens on climate action	Stakeholders capacity building/training	Number or % of citizens/stakeholders /residents participating in the capacity building	16, 13, 12

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				programme activities/ energy and climate-conscious actions;	
Social Inclusion, Innovation, Democracy and Cultural Impact	Citizen & Communities Participation	Capacity building for communities on climate action	Improved citizen participation	Number or % of community/ neighbourhood engagement activities/ grassroots initiatives/ co-design events;	16, 13
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Capacity building for Public Administrations	PA training	Number or % of all employees in each city administration partaking in educational events/ or other initiatives/interventions;	16, 12,13
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Events for climate action	Knowledge sharing	# Number of Knowledge Transfer Events	17, 13
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Training Climate Team	organized events, training and webinars for the Climate team	Feedback on the organized events, training and webinars for the Climate team;	13, 16
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration		Improvement in skills and awareness;	As Applicable	13, 16
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Professional Training Programmes	Trained Individuals/ Professionals beyond the Pilot Activity Duration	# Number of trained individuals/Professionals beyond the pilot activity duration;	13, 16
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Production of Learning Materials	Learning Materials	# Number of Learning Materials	13, 4
Social Inclusion, Innovation, Democracy and Cultural Impact	Capacity of the public administration	Stakeholder Engagement	Engagement of stakeholders and decision-makers in guideline design processes;	As Applicable	16, 10
Social Inclusion, Innovation, Democracy and Cultural Impact	Scientific or Communication Outreach of the project	Surveys and Data Collection	Publication about the building types	Total # Publication about the building types	11, 9, 13

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Social Inclusion, Innovation, Democracy and Cultural Impact	Scientific or Communication Outreach of the project	Surveys and Data Collection	Publication/article about the survey results	Total # Publication/article about the survey results	17, 13

The customized indicators (1)Stakeholders' capacity building/training, (2) Improved citizen participation, (3) Public Administrators training, (4) Knowledge sharing, (5) organized events, training and webinars for the Climate team, (6) Improvement in skills and awareness, (7) Trained Individuals/ Professionals beyond the Pilot Activity Duration and (8) Engagement of stakeholders and decision-makers in guideline design processes, can be related to the existing categories of social innovation actionable pathways.

The analysis also provided evidence of **new impact domain categories and sub-domains of indicators that have not been captured in the Standardised Indicator Framework. These categories include (1) Operations, Decision Making and Reporting Indicators, (2) Behavioural Change Indicators and (3) Policy and Regulatory Indicators**. Particularly, for the category of Behavioural Change indicators, 3 new indicators can be identified (Table 3) and show the relevance for cities to measure Social Innovation in cities to foster behavioural change of citizens.

Table 3: Novel Behavioural Change Indicators proposed by cities in their Pilots (Source: Mondal, Bresciani & Rizzo, 2024; SGA-NZC D2.11)

Emission/Impact Domain	Subdomain	[New] Related Action(s)	Indicator	Suggested Unit of Measurement	SDGs
Behavioural Change	Pro-Environmental Behaviours	Citizen Behavioural Change	Observable, accelerated socially peaceful change in the behaviour of citizens towards climate neutrality (or, share or % of citizens exhibiting pro-environmental behaviours;)	As Applicable	16, 13, 12
Behavioural Change	Consumption Patterns	Monitoring Consumer Patterns	Climate impact per capita of consumption;	t CO2 equivalents / year/capita	12, 13
Behavioural Change	Pro-Environmental Behaviours	Promoting or incentivising PEB	Number of users of the public transport system	#Number (or %) of users of the public transport system	11, 12,13

The analysis also presents the Sustainable Development Goals (SDGs) that are likely to be addressed across European cities based on the indicators they select to measure the impact of their climate actions. Besides SDG13 (Climate Action), the study shows, SDGs related to Social Innovation, including SDG11 (sustainable cities and communities), SDG12(responsible consumption and production) and SDG16 (peace, justice & strong institutions), are among the highest occurring SDGs based on the indicator selections of the cities. This enables cities to gauge their planned actions beyond GHG emissions reduction with a globally accepted framework, aiding decision-making at the local and national policy level. The analysis has also been published as an open-access scientific article with several novel

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insights and reflections drawing from the NZC project (Mondal, Bresciani & Rizzo, 2024).

3.4 Evidence from the results of the first cohort of Pilots

As **results** of the Pilot City programme cohort 1 become available after summer 2025, analysis and results of the pilot activities conducted in 2 years (thus not only the plans but also the initial results) are limited by time constraints. Specific results will be found in D4.6 (forthcoming). At the end of their 2-year pilot journeys, the 53 cities belonging to the 24 Pilot City Programme of cohort 1 (single- and multi-city projects in 21 countries), have submitted their outcomes and insights reports, presenting the 3 most significant outcomes and reflections on successes, lessons learnt, barriers, challenges, opportunities and future directions for scaling and replicating.

Although the reports are in their early stages of evaluation at the time of preparing this deliverable, there is emerging evidence of successful implementation of social innovation in cities that have resulted in observable behavioural changes (among citizens and other stakeholders), and increased community engagement and participation, including cities such as Budapest (Hungary), Bristol (UK), and Aachen, Manheim Munster (Germany).

3.5 Insights on Social Innovation actions and indicators from CCC Action Plans

Mission Cities are provided a template and a guidance document to create their CCCs: social innovation is included in the Action Plan template (pg. 22; see Figure 8) and guidance document (pg. 39 - 40). As it can be seen from Figure 8, cities are invited to define their social innovation actions (interventions), related barriers, opportunities, stakeholders involved, and co-benefits. Social innovation indicators can be considered both progress and outcome indicators.

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4.2 Module C-2 Social Innovation Interventions

This module lists the actions taken by the city to support and foster social innovation initiatives or non-technological innovation more broadly (e.g., in entrepreneurship, social economy, social awareness & mobilization, social cohesion and solidarity, etc) aimed to address the systemic barriers and leverage the opportunities identified in Module A-3[5]. It also includes:

- A description of the innovations (what do they innovate?).
- Systemic barriers /opportunities addressed by these innovations (from Module A-3).
- Stakeholders involved in the innovation.
- Additional enabling levers (e.g., technical, policy/ regulatory, democracy/ participatory, fiscal/ financial; learning and capabilities, behaviour change).
- Foreseen impact on climate neutrality and co-benefits.

C.2.1 Sample Table: Relations between social innovations, systems, and impact pathways

Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
(Indicate name of intervention)	(Describe the substance of the intervention)	(Refer to barriers and opportunities identified in Module A-3)	(List leaders and all stakeholder involved and affected, referring to the stakeholders mapped in Module A3)	(Describe how intervention enables climate neutrality)	(Indicate how intervention helps achieve the impact listed in Module B-1)

[5] For more guidance on social innovation, please refer to the NetZeroCities Quick Read on Social Innovation,to the NetZeroCities Report on indicators & assessment methods for social innovation action plans and the Social Innovation Toolkit. Social innovation case studies are also available on the NetZeroCities website.

Figure 8: Screenshot of the CCC AP template page related to Social Innovation (part 1)

Specific WPs and deliverables are dedicated to the analysis of Action Plans (NZC WP1; SGA-NZC WP1) that conduct overall assessments, including social innovation. Most notably, the CCC highlights are a very appreciated format by cities. A recent CCC highlight was published on "A diverse ecosystem of supporters", which provides insights from CCC signatories with whom cities are co-designing the Climate City Contracts. Figure 9 provides a screenshot of the number of signatories by group: the striking focus on Businesses as partners in the Mission to reach climate neutrality is very informative. While at the beginning of the project most resources on social innovation and stakeholder engagement were created for the direct involvement of citizens, civic organizations and universities, evidence (complemented by the same insights derived from Sensemaking sessions and cities support requests) point toward the need of cities to develop skills, actions, pathways and indicators for the involvement of, and co-design with, the private sector. Based on these insights, training in stakeholder engagement and co-design in the most recent tasks has focused on private sector engagement.

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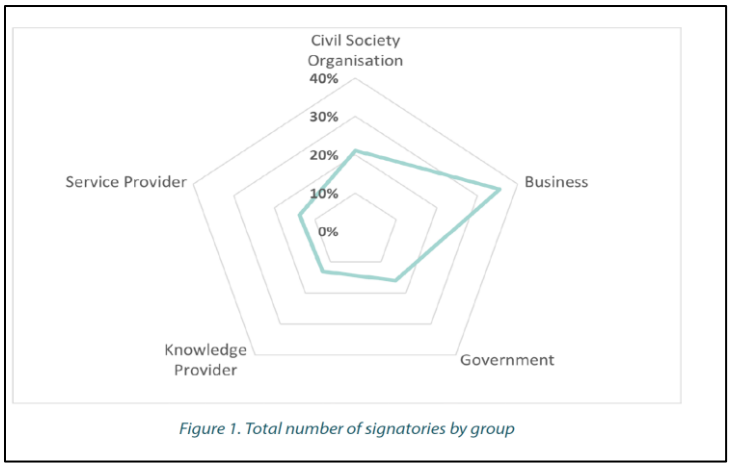

Figure 9: Screenshot of CCC highlight "A diverse ecosystem of supporters" figure representing the number of signatories by group.

Besides this key finding that should be considered for shaping future funding and policies, the analysis of CCCs is also detailed in:

SGA-NZC D1.1 – Climate City Contract Annual Trends Report V1, in particular pg.34-37, which focus on systemic levers and co-benefit indicators.

SGA-NZC D1.4 – Climate City Contract Case Studies Anthology V1, which is focused on stakeholder engagement approaches, collaboration models and private sector partnerships.

SGA-NZC D1.10 CCC Resource pack , i.e. pg. 33 (see Figure 10 for an example of co-design indicators)

Did you know?

In **Cluj-Napoca**, the MEL system is rooted in co-creation and citizen engagement. The city collaborates with academia, the private sector, NGOs, and residents using its Civic Innovation and Imagination Centre platform to define and refine indicators. This participatory approach ensures policies are shaped by both expert insights and public input.

The city prioritizes real-time monitoring, expanding its sensor network to track air quality, congestion, and green space. Citizen engagement is central, with surveys, digital platforms, and public consultations feeding directly into decision-making. Looking ahead, the Cluj 2030 platform will centralize all MEL data for public access, enhancing transparency and accountability. By balancing quantitative and qualitative data and continuously refining indicators, **Cluj** ensures its climate policies remain effective, inclusive, and investment-ready. This dynamic MEL framework positions Cluj as a leading example of data-driven, participatory urban sustainability.

Figure 10: Screenshot of the SGA-NZC D1.10 CCC Resource pack

3.6 CCC Social Innovation Actions and Indicators Analysis

Across the NetZeroCities project (not specifically in NZC WP2), all the co-benefit indicators selected by cities in their CCCs have been coded in a Notion database, specifically, the CCC Action Plan "Module B3 – Co-benefits of Impact Pathways & Indicators for Monitoring, Evaluation and Learning"

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. This source of data created outside WP2 can be analysed to provide valuable information on cites' selection of social innovation indicators. It should be noted that "co-benefits" refers to "outcome indicators", while social innovation is a lever (that is, a mean to the end of reducing ghg emissions and improving other co-benefits), and therefore can be expected to be found mostly as a "process" rather than as an "outcome" indicator.
In the database, a total of 1,631 city indicators were extracted and mapped against the most relevant NZC Indicators. According to NZC D2.4 (Comprehensive Indicator Framework), four NZC Indicators are categorised under Social Innovation, namely:
(1) **Skills and capacity building** of public officials, citizens and urban stakeholders regarding social innovation for climate neutrality,
(2) **Empowerment and inclusion**, by co-creation and co-production of social innovation initiatives and policies with citizens and all urban stakeholders,
(3) **Regulation and support for social innovation programs** and initiatives through funding, public procurement and other types of support (i.e., public-private partnerships) to scale beyond small scale and pilots, and
(4) **top-down systemic solutions for climate neutrality that include social innovation as policy making**, thus encompassing wider organisational change as well as specific strategic actions (i.e., urban planning or favouring resource circularity through social initiatives - energy communities).

Based on the above, 12 city indicators (0.7%) matched to these Social Innovation indicator categories. Cities (Figure 11), however, do not appear to use or track the term Social Innovation explicitly. Instead, indicators related to skills and capacity building, stakeholder collaboration, and similar aspects, understood as dimensions of Social Innovation, are more frequently linked to broader, more representative NZC Indicators that do not directly reference the term. Examples include Citizen involvement in the co-creation/design of climate neutrality actions (77 matches), Policy support for climate action (29), Citizen awareness on climate action (26), and public capital invested in climate action (21), as shown below in Figure 11.

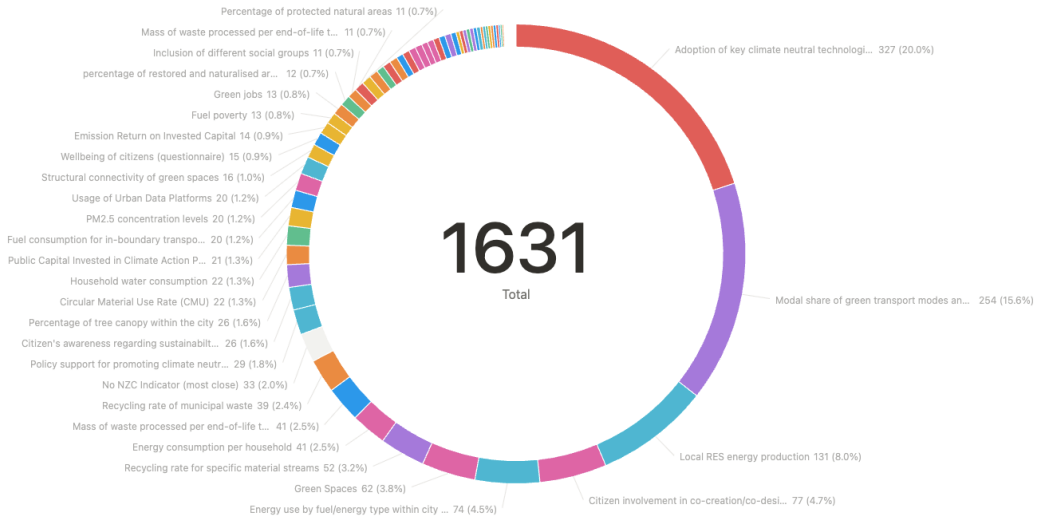

Figure 11: Number of Indicators Selected by City (Source: Notion Database)

Another insight emerged when the CCC actions were coded with "Social Innovation" as a lever of change. With this categorisation, Social Innovation was identified for 534 out of 4,524 actions (8.6%). In addition, the analysis revealed that Social Innovation was never used as a standalone lever, but always in combination with at least one other lever.

These quantitative results are in line, and can be better interpreted, with the qualitative insights gained interacting with cities (mostly through user panels and Seasonal Schools): while the term "social innovation" is popular among researchers and funding bodies including OECD and the European

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Commission, the majority of citizens are not fully aware of its meaning, and often refer to that concept as “citizens engagement” (also when referring to citizens as co-creators of solutions), social entrepreneurship, “citizens-led solutions”, “stakeholder-led solutions” or behaviour change (which is a very different concept), “collaboration”. In 2022, to face this issue, The NZC WP dedicated to Social Innovation (WP9) decided to take several actions, including the use of the term “People-based solutions” as sub-title to NZC publication on Social Innovation, and to merge the Seasonal School session of Social innovation with citizen engagement since it seems more appropriate to explain the two levers jointly to clarify the overlaps and differences.

Illustrative examples of Social Innovation actions and indicators proposed by Mission cities in their Climate City contract Action Plans (Module c2) are provided in Appendix B.

4 Dissemination and evidence of use of SI indicators and resources

4.1 Use of Social Innovation Resources on the NZC Portal

The use of social innovation resources on the NetZeroCities portal can provide evidence of the use of the created resources by portal-registered users. A total of 10 articles/documents, 48 case studies and 41 methods on Social Innovation, and an explanatory video, are currently available on the NZC portal, which account for a total of 24,276 interactions by registered portal users.

The focus page on Social Innovation is the most used resource, accounting for 1069 interactions (as of 13.08.2025). This resource has also been updated frequently, making it a one-stop shop for Social Innovation on the NZC portal, as it also contains the interactive tools of social innovation actionable pathways.

The detailed list of portal resources on social innovation and related interaction by portal registered users can be found in Appendix C (to be noted that the portal KPIs only track the number of interactions by register portal users, and not the total number of visits by users that are not registered and might for example find the resource through a search engine or link without being registered).

Within the 100 resources on social innovation available on the NZC, the most popular pages on social innovation are:

Overview of Social Innovation pages:

- focus page on Social Innovation: 1069 interactions
- Seasonal School Presentation on Social Innovation: 445 interactions
- Social Innovation: People-Based Solutions for Climate-Neutral Cities - Kick-off webinar: 385 interactions
- Social Innovation Toolkit: 373 interactions
- Methods for social innovation and meeting facilitation: 324 interactions

Specific social innovation methods:

- Impact and Feasibility Analysis: 634 interactions
- Scenario-building with backcasting: 592 interactions
- Scale up out deep: 455 interactions

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- Motivation Matrix: 451 interactions
- Defining the Challenge with Challenge Map: 445 interactions

4.2 Dissemination and Scientific Publications

Blog post on Social Innovation

For further outreach and dissemination of Social Innovation Indicators and frameworks developed with NZC, a blog post was published (authored by Mondal & Bresciani of Polimi). The blog post highlighted two publications on social innovation: one on the use of non-GHG indicators by cities (Mondal, Bresciani and Rizzo, 2024) and the importance of people-centred solutions (Bresciani, Rizzo and Mureddu, 2024) in driving systemic change through Social Innovation. The blog was further shared via NZC social media (L for further reach and dissemination of emerging evidence of Social Innovation practices in cities.

Continuous contribution to relevant NZC/SGA-NZC/SGA2-NZC deliverables with knowledge on Social Innovation indicators, which include (among others):

- Presentation of social innovation actions and indicators analysis, and results in SGA-NZC WP4 seasonal schools
- Presentation of social innovation analysis and results to SGA-NZC T4.4 Sensemaking sessions
- Presentation of social innovation at the City Conference 2025 in Vilnius (information booth)
- Presentation of social innovation cases, pathways and results to the City Finance Specialist during the onboarding session (day 4)
- Input on Social innovation resources provided to JRC for the self-assessment tool
- Input on Social innovation resources provided for IPPC
- SGA-NZC WP1 CCC resources, in particular D1.10 CCC Resource pack (pg. 33)
- Policy brief development with input based on evidence from social innovation analysis
- Presentation of the NZC Social Innovation resources in related projects (SEED) through the Social Innovation thematic champions' initiative

Open Access Scientific Publications on Social Innovation

The work developed in NZC WP2 and WP9 on social innovation has been presented or published in the following scientific outlets (Table 4):

Table 4: List of Open Access Scientific Publications on Social Innovation

#	Title	Type	Date of Publication	Link to Resource
1	Bresciani, S., Tjahja, C. (2025). Social Innovation Scaling at Urban Level. In: Bresciani, S. (eds) Social Innovation Projects for Climate Neutral Cities. SpringerBriefs in Applied Sciences and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-87726-1_4	Book chapter	22.04.2025	https://link.springer.com/book/10.1007/978-3-031-87726-1
2	Bresciani, S., Rizzo, F. & Mureddu, F (2024). Assessment Framework for People-Centred Solutions to Carbon Neutrality. A Comprehensive List of Case Studies and Social Innovation	Book	17.03.2024	https://netzerocities.app/resource-4172

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	Indicators at Urban Level. SpringerBriefs in Applied Sciences and Technology. Springer Cham ISBN 978-3-031-53111-8 https://doi.org/10.1007/978-3-031-53111-8			
3	Mondal, R., Bresciani, S., & Rizzo, F. (2024). What Cities Want to Measure: Bottom-Up Selection of Indicators for Systemic Change toward Climate Neutrality Aligned with Sustainable Development Goals (SDGs) in 40 European Cities. Climate 2024, 12(3), 41; https://doi.org/10.3390/cli12030041	Article	08.03.2024	https://www.mdpi.com/2225-1154/12/3/41
4	Bresciani, S., Rizzo, F., & Deserti, A. (2022). Toward a Comprehensive Framework of Social Innovation for Climate Neutrality: A Systematic Literature Review from Business/Production, Public Policy, Environmental Sciences, Energy, Sustainability and Related Fields. Sustainability, 14(21).	Article	24.10.2022	https://netzerocities.app/resource-4073
5	Bresciani, S., Tjahja, C., Komatsu, T., & Rizzo, F. (2023). Prototyping for Policy Making: Collaboratively Synthesizing Interdisciplinary Knowledge for Climate Neutrality. In: International Conference 2023 of the Design Research Society Special Interest Group on Experiential Knowledge (EKSIG) Conference proceedings (pp. 104-116), Politecnico di Milano, Italy. ISBN: 9788894167436	Conference Proceeding	19.06.2023	https://netzerocities.app/resource-4070
6	Bresciani, S., Tjahja, C., Komatsu, T., & Rizzo, F. (2023). Social innovation for climate neutrality in cities: actionable pathways for policymakers. In De Sainz Molestina, D., Galluzzo, L., Rizzo, F., Spallazzo, D. (eds.), IASDR 2023: Life-Changing Design, 9-13 October, Milan, Italy.	Conference Proceeding	19.06.2023	https://netzerocities.app/resource-4071
7	Bresciani, S., Rizzo, F., & Deserti, A. (2022). Designing Systemic Change for Urban Ecosystems: A Framework for Assessing Social Innovation. In Cumulus Conference Proceedings Series 10/2023 Detroit (pp. 779-795). USA. ISBN 979-8-218-07901-7	Conference Proceeding	2.11.2022	https://netzerocities.app/resource-4072

5 Conclusions, outlook and implications for future policies and research agenda of the Mission "Cities" in FP10

This deliverable summarises NZC work on Social Innovation carried out in WP2 and WP9, including support documents, tools and analysis of Mission Cities' selection of Social Innovation actions and indicators. As the NetZeroCities project comes to an end, the insights outlined in this deliverable can serve to set the direction for continuing the work on Social Innovation in SGA-NZC, SGA2-NZC, as well as in related projects and in shaping future research directions.

The analysis and the testing with cities outlined that cities conduct several social innovation actions but do not utilize the term "social innovation" (which is often mistakenly understood as actions for social inclusion), and rather refer to it as stakeholder engagement (even when referring to social innovation and not mere engagement), stakeholder-led solutions, people-based solutions, collaboration, co-creation, citizen empowerment, and even behavioural change (which is a related but different concept).

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Results highlight cities' perceived relevance of social innovation actions (defined with diverse terms) to enable the systemic change needed to reach the Mission of climate neutrality by 2030. These learnings will be shared with Mission Minded Cities in SGA2-NZC 1.4, in particular through the learning program and upcoming MOOC.

Research on cities' uptake of Social Innovation (CCC Action Plans but also on which action will actually be implemented) will continue in SGA2-NZC T1.3.2 with the aim of publishing a scientific paper, to be then shared with cities and policy makers. Specifically, such analysis will focus on the role of social innovation for each emission domain and lever – in particular finance (already started) since it emerged as a key lever for implementation.
The Social Innovation Actionable Pathways map and the Focus Page will continuously be updated in SGA2-NZC T1.3.2 with updates based on cities' needs and data from CCCs and Pilot City programme results as they become available. Such insights, in addition to guiding the updating of NZC resources, help to set the direction for future research, which is scientifically sound and pragmatically useful for cities. In particular, from the analysis it emerges that **more research and support is needed for cities on the key topics of:**

- Longitudinal assessment of mitigation actions' actual implementation: the contribution of social innovations per sector and lever (in particular for financing actions)
- Co-designing and co-creating with the private sector to identify methods and best practices for financing climate actions
- Integrated approach with other urban planning, in particular with Adaptation actions, and the New European Bauhaus
- Behavioural change related to emission sub-domains and categories of actions
- Relation of indicators to standardized sectors and categories such as SDGs, scope 3 emissions, ESGs
- Capacity and capability building on social innovation for climate neutrality for urban stakeholders (including public administrators)

These research directions are based on 4 years of work and the analysis of more than 100 cities' documents, testing and sensemaking session, and should thus be considered not only by researchers, but also to design calls for projects in FP10 for the Missions Cities and Adaptation (to coordinate also with the Missions Water and Soil), as well as the upcoming New European Bauhaus Facility and related projects. All the massive knowledge produced in NetZeroCities on Social Innovation and climate neutrality should be further exploited for educational purposes, addressing public administrators and urban consultants with executive programs (online and in person or hybrid), in bachelor and master university programs, as well as adapted to school (primary, secondary, vocational), for example with dedicated calls in the Erasmus+ program or MSCA doctoral networks and European university alliances.

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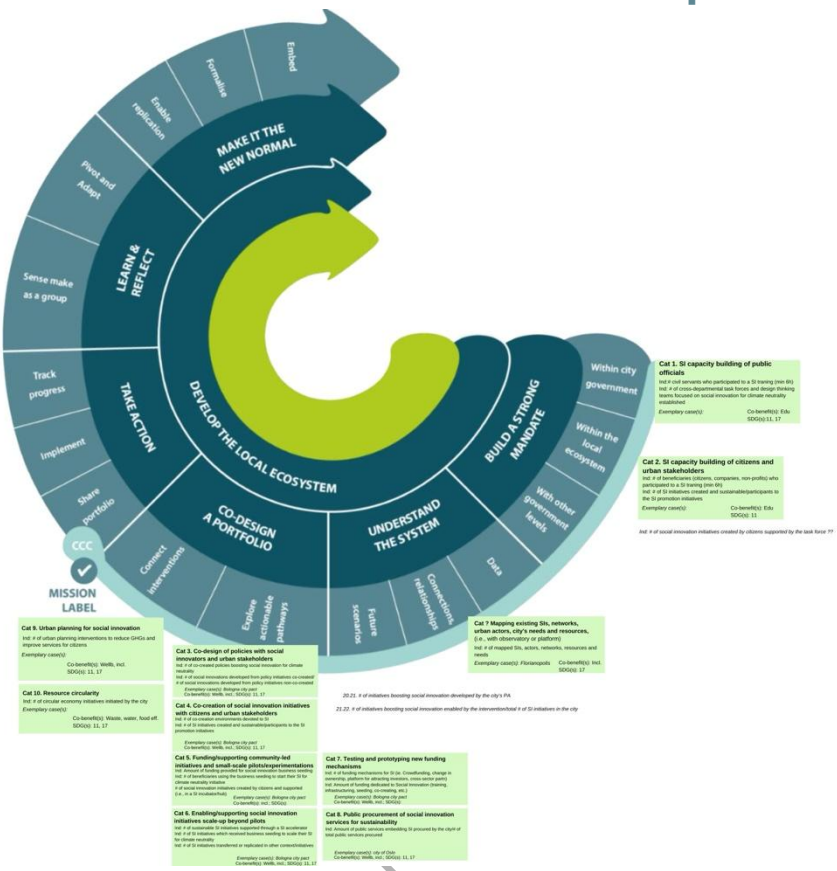
Appendix A. Social Innovation Actionable Pathways categories and the NZC Transition Map



Appendix B. Illustrative Examples of Mission Cities' Social Innovation actions and indicators

- **Barcelona**
  - The "Government's Measure to promote urban innovation in Barcelona" and the "Measure of Social Innovation Government 2021/2023" aim to improve people's quality of life, combat climate emergency, foster urban resilience, improve responses to social problems, and facilitate citizens' access to municipal social services by incorporating digital tools and AI, promoting citizen participation, equity, and digital transformation. The "Proactive City" call aims for a **quantifiable social return**.
- **Cluj-Napoca**
  - At least 2 social innovation initiatives that are adopted by the wider population.
  - Minimum 3 solutions for climate neutrality co-created and co-implemented by the local community.
  - Social innovation interventions are expected to lead to Improved quality of life as a co-benefit.
  - Interventions like "Behavioral, perception and modelling, analysis on the individual adaptation of residents & businesses to climate neutrality" are designed to identify individual climate-neutral behaviors and experiment with local policies.

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- **Espoo**
  - The "Quality of life" indicator measures **Adoption of climate-friendly lifestyle** as a co-benefit.
  - "Circular and sharing economy companies in Espoo" measures **Local job and value creation** and **Green & digital transition of local economy** as co-benefits, linked to circular economy initiatives that involve social innovation.
  - "My Espoo on the Map survey" is used for dialogue with residents and urban planning, indicating a measure of **citizen input and engagement**.
  - "Democracy and active citizenship" is identified as a co-benefit for an unnamed indicator.
- **Florence**
  - Social innovation interventions aim for **Awareness, consensus** and **Participation of whole society to the energy transition**.
  - Workshops identified needs that imply indicators for social innovation, such as **Informing, raising awareness, and training citizens of different ages and groups** on topics like waste management, urban greening, and energy. Also, **increasing the awareness of actors in the territory** and the **number and diversity of involved actors** in climate neutrality efforts.
- **Guimarães**
  - "Participatory budget" and "Placemaking" are social innovation interventions that aim for **Improved sense of belonging and social inclusion** and **Empowerment and inclusion**. These imply indicators related to the number of participatory projects and levels of social inclusion/belonging.
  - The "Community Climate Challenge" intervention provides incentives for good practices, implying an indicator for **community participation in climate challenges or good practices adoption**.
- **Heidelberg**
  - The subsidy program for photovoltaic balcony modules and the GGH's strategy imply indicators for the **participation of low-income households in PV installations or building renovations** that are affordable.
- **Izmir**
  - "Empowering marginalized and disadvantaged groups" through vocational training and services to bolster household economies implies indicators for the **number of participants in such programs** or **improvement in the household economies of these groups**.
  - The "Social Dialogue Team" aims to foster community engagement and ensure residents' access to essential services.
- **Kalamata**
  - Data gathered from the **Consultation Platform** (mission.kalamata.gr)
  - The establishment and operation of "Energy Communities" imply indicators for the **number or activity level of energy communities**, or **citizen participation in them**.
  - The city focuses on recording the **social impact to detect obstacles to the participation of weak social groups** to ensure a just transition.
- **Klagenfurt**
  - The "Climatefund" intervention aims for a **strengthened relationship of various actors** as a co-benefit.
  - Social innovation aims to ensure **all social groups are included in the transition** towards climate neutrality.
- **Kozani**

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- Social innovation interventions, such as "Upskilling and reskilling" and "Awareness-raising campaigns," aim for **Increased social participation** and **Better and more direct representation of citizens**.

- **Lahti**
  - "Social innovations created and tested in Lahti" is an outcome for mobility and transport.
  - Social innovation aims to support residents in **changing their consumption and mobility habits** through co-creation and citizen participation.
- **Lappeenranta**
  - Social innovation seeks **New innovative ways to motivate residents for better recycling effort**. This implies an indicator for the number of new initiatives or changes in recycling rates.
  - The city bike system has an indirect impact of **increased social equality**.
- **Leuven**
  - "Social justice" interventions commit to **structurally including objectives on social justice**.
- **Limassol**
  - The "Let 100 flowers bloom" intervention aims for **Dissemination, improved collaboration, and social change**, implying indicators for the number of citizen/stakeholder initiatives or collaboration rates.
  - "Community-driven initiatives" are noted as early changes in social innovation for waste reduction, energy saving competitions, and urban farming.
- **Madrid**
  - **Local job creation through new models of energy (co-)production and retrofitting** is a co-benefit for social innovation in building energy efficiency renovations.
  - Social innovation efforts for electricity generation aim to **improve communication and governance**.
  - The city is working to integrate the social character in its actions to ensure **equity and inclusiveness**, involving social organizations.
- **Malmö**
  - Malmö's social innovation efforts through "Civil society Climate Contract" and grassroots initiatives (e.g., urban co-design, urban farming, "carbon weightwatchers") imply indicators for **citizen and NGO engagement and participation**.
  - Collaborative design processes with residents contribute to mobility solutions that ensure **more equal access to mobility**.
- **Mannheim**
  - CoLAB aims to empower and support citizens' own actions in energy retrofitting, energy saving, mobility choices, and sustainable consumption, implying indicators for **citizen engagement and behavioral change** promoted through the "House of Change" and digital tools.
  - Targeted funding and programs for low-income households and tenants imply indicators for the **engagement/participation of vulnerable groups in energy transition initiatives**.
- **Parma**
  - Social innovation is expected to lead to **Awareness, consensus** and **Participation of whole society to the energy transition**.
  - Workshops identified the need to **systematize existing projects**, **inform, raise awareness, and train citizens**, **increase the awareness and diversity of involved actors**, and **change behaviors related to mobility**.

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- **Seville**
  - "Strengthening social cohesion, integration, and equity" are key axes and expected co-benefits of climate actions.
- **Sonderborg**
  - Social innovation aims for **various society groups to be involved in planning and execution of CO2 neutrality** and a **high acceptance rate of technological solutions**.
  - It also seeks a **strong sense of ownership** among stakeholders and citizens, and a **high rate of social inclusion**.
  - The rural area development programs imply indicators for **citizen involvement in local development programs** focusing on sustainability, heating, transportation, energy, and waste.
  - "Sharing economy programs" and "Smart City digital platforms" imply indicators for the **adoption of sharing economy initiatives** or **use of digital platforms for sustainable choices**.
- **Stockholm**
  - **Participation in an online citizen panel** (4,500 participants react to city development, refurbishment, safety, and climate questions).
  - The "SCALE Stockholm project" involves citizens and businesses in co-creative "Transition Arenas," implying indicators for **engagement in these arenas**.
  - The overall community program aims to improve the lives of those with **least economic resources without increasing their emissions**.
- **Tampere**
  - Social innovation aims for **Engagement and ownership to reaching climate-neutrality through co-creation**.
  - The "Carbon Neutral Actions Programme" focuses on **co-creation of needed actions with citizens** and supporting residents in **changing consumption and mobility habits**.
- **Thessaloniki**
  - Social innovation interventions involve **social awareness and information actions for citizens**, **participatory planning for sustainable transport**, and **collaborative mobility**, aiming to improve living conditions and road safety.
  - "Application for adoption and digital management of planted trees" is a social innovation intervention to increase tree planting and citizen participation.
- **Turku**
  - The "RESPONSE project" utilizes a **peer mentoring method** to increase resident awareness and gather insights from residents of positive energy districts.
- **Valencia**
  - The focus of social communication on the Mission's benefits aims for a **positive social perception of the mission** by citizens.
  - **Activation of participatory processes in urban planning** is a short-term change.
  - "Colab-lab" is a public accelerator supporting startups with **triple impact: social, economic, and environmental**.
- **Valladolid**
  - The "Innovation and Sustainability Hub" is relevant for **co-creation, acceleration, and knowledge transfer of innovative projects under public-private collaboration**.
  - The "Local Mission Platform" is a space for **stakeholders to work towards climate neutrality**.

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- Social innovation interventions include "Public Procurement of Innovation for the circular economy and climate neutrality" and "Energy Communities in rural entities".

- **Vitoria-Gasteiz**
  - Social innovation involves promoting the **social acceptance** of a decarbonized heat network.
  - The city aims to encourage the **participation of vulnerable groups** in decarbonization initiatives.
  - Social innovation interventions include "Public Procurement of Innovation for the circular economy and climate neutrality" and "Energy Communities in rural entities".
- **Zaragoza**
  - The "Right to energy" intervention includes an "Energy Advice Point" that provides audits and emergency aid, implying indicators such as **number of citizens receiving energy advice/audits** or **number of households receiving emergency aid for energy debts**.
  - This intervention aims for **increased public awareness and expert advice on energy-saving measures**.
- **City of Kranj**
  - Kranj builds on local initiatives and partnerships with NGOs, experts, and businesses to enhance **citizen participation in green energy** (i.e. number of PV households), promote "**one car by household**" policy to cut transport-linked emissions, and support circular economy solutions through public–private collaboration across industries, SMEs, public services, and farming. The goal is to foster innovative, locally based circular economy actions developed jointly by industry, farmers, the City, NGOs, and citizens.
  - Kranj also prioritises **learning and awareness** building at two levels: **for citizens** (e.g. Circular Economy Centre Zarta, One Stop Shop) **and for technical and management staff** within city structures.
- **City of Porto**
  - Porto fosters entrepreneurship and sustainable innovation through incubators such as URTEC, which supports startups and social enterprises with mentorship, resources, and collaboration spaces.
  - The city promotes **social economy initiatives** like Porto Solidário (over €3M in housing aid in 2023), Good Food Hubs (linking local farmers to consumers), and the **WAKE UP! pilot project** (encouraging sustainable consumption).
  - To raise awareness, Porto launched the Climate Pact, involving stakeholders in climate planning, and the **"Towards Carbon Neutrality 2030" talk series**, which drew 500+ participants. Schools also play a role through the **Eco-Escolas programme**, engaging 48 institutions in climate education with municipal support.
- **Gävle**
  - Gävle municipality fosters social innovation, learning initiatives, and household-level experimentation to foster behavioural change towards climate neutrality. **The Learning for Sustainable Development (LHU) programme** equips young people with sustainability competencies through experiential learning in collaboration with local stakeholders.
  - **The Sustainable Everyday Life campaign** engages 32 households (2023–2024) in exploring sustainable living across five domains, namely mobility, food, housing, consumption, and finance, through peer exchange, challenges, and practical activities. These socially innovative initiatives illustrate how

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municipalities can strategically embed behavioural insights (BI) to promote systemic transformations and climate-neutral lifestyles.

- **Gothenburg**
  - Social innovation initiatives are designed to foster cross-sector multi-actor collaboration, just transition, and citizen inclusion. Specific initiatives include:
  - **The Smart Map**: A social innovation and digital platform for sharing and circular initiatives.
  - **Urban Environment Administration**: Finding social innovation solutions for mobility and greenhouse gas emissions.
  - **Green City Zone - Social innovation**: Developing the concept to include citizen inclusion and behavioural change to a larger degree.
  - **Gothenburg Green City Zone**: Emission-free transportation zones with the ambition to scale up through social innovation tools.
  - **Reallocate**: Living labs to find interventions that catalyse change in mobility practices.
  - **The urban and peri-urban food production stimulant**: A portfolio of activities to stimulate citizen and entrepreneur participation in sustainable food production.
- **Łódź**
  - **Community involvement interventions**, including the preparation of civic budgets, citizens' panels, and organised consultation meetings/walks with residents. **The VOXpopuli platform and Local Activity Centres** are described as interventions to increase residents' co-participation in decision-making processes and create spaces for collaboration and new ideas.
  - The city plans to work with internal and external stakeholders through public calls for ideas, periodic public events, or roundtables to collect information on projects and foster cooperation.
  - The city seeks to achieve co-benefits through its planned social innovation interventions, including *co-participation of residents in decision-making processes*, *improved quality of life,* and *Improved city development planning and associated economic and social benefits*
- **Aarhus**
  - The ***Centre for Innovation in Aarhus (CFIA)*** applies human-centred, design-driven methods to municipal projects, fostering collaboration for a just transition. A ***Climate Citizen Assembly*** of 36 residents deliberates on values, themes, and solutions linked to the Climate Action Plan 2021–2024.
- **Bergamo**
  - **District Networks and Participatory Governance**: Bergamo has established district networks as platforms for citizen engagement, fostering collaboration between municipal departments, institutions, and civil society. These networks enable shared responsibility for climate transition goals and embed participatory governance into the city's transformation processes.
  - **Clic.Bergamo and Urban Cohesion:** The Clic.Bergamo project positions social cohesion as a key enabler of climate transition and new urban welfare. It explicitly involves the Guarantor of Children's Rights (Garante dei diritti dell'infanzia) to ensure generational inclusivity and strengthen civic responsibility. The initiative has been institutionalised through municipal regulations that recognise civic participation as a fundamental principle for urban transformation and social inclusion.

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- **Applied Social Innovation and citizen engagement:** citizens living in the of Malpensata district were involved in designing an area that would turn from a car park into an integral part of a city. Additional measures, such as municipal smart working and the commuter travel plan (PSCL), extend social innovation into organisational and mobility domains, reinforcing behavioural and institutional change to support systemic transition.

- **Antwerp**
  - **Support Mechanisms for Vulnerable Groups:** New mechanisms are being developed to ensure the climate transition is accessible to all, with a focus on guidance, awareness-raising, and targeted support for vulnerable groups. These initiatives involve collaboration between the city and social partners such as **Woonhaven Antwerpen** and **beweging.net.**
  - **Urban Climate Fund and Innovation Space:** The Urban Climate Fund serves as a financial instrument to stimulate cooperation with stakeholders in innovative policy areas, with particular emphasis on supporting social innovation projects that contribute to climate goals.
- **Athens**
  - Athens promotes social innovation through three main initiatives: the **Athens Business Green Toolkit**, which helps small enterprises improve energy efficiency; the **Youth Climate Action Fund**, which supports social innovation projects led by young people; and the **Climate Schools Athens 2030 programme**, which raises climate awareness and fosters action in schools.
- **Bologna**
  - **Citizen Services & Mobility:** The Energy Help Desk (Sportello energia), launched in March 2023, provides citizens with information on renewables, energy efficiency, and savings. The city is also testing nudging solutions to promote behavioural change in transport (cycling and walking) and redesigning a school square on the north-east axis to improve safety and encourage active mobility.
  - **Participation & Local Engagement:** Neighbourhood Network Offices act as decentralised hubs for awareness-raising, training, workshops, walks, conferences, farmers' markets, and other activities on ecological transition. Social innovation processes include a participatory budget focused on the Mission and connections with Neighbourhood Laboratories, while the Citizens' Assembly for Climate brings participatory democracy directly into the Action Plan.
  - **Behavioural Change & Emissions Reduction:** Bologna emphasises behavioural actions as crucial for cutting CO_2 emissions, focusing on habit change through training, accessible information, and promoting a culture of energy efficiency, renewables, and climate neutrality.
- **Bordeaux Métropole**
  - **Citizen Participation & Engagement:** Bordeaux consults stakeholders through surveys, participatory budgets, and projects such as "1 Million Trees", encouraging broad citizen involvement. **A citizens' experiment, "OuiPub"**, prohibits unrequested advertising in mailboxes, reducing paper waste and promoting more sustainable practices.
  - **Neighbourhood Renewal & Education**: The city coordinates the revitalisation of 11 disadvantaged neighbourhoods (**Quartier prioritaire**) to improve housing, social diversity, connectivity, and local economic development while integrating ecological goals. **Neighbourhood centres (Maison de quartier**) also host

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educational activities led by associations to raise awareness on ecological and social transition challenges.
    - **Collaboration & Innovation:** The **ZIRI network** connects companies through monthly meetings, workshops, and working groups, facilitating exchange and collaboration around sustainability and ecological transition.
- **Bristol**
    - Bristol's planned actions are showing an **increase in "active travel rates"** (the proportion of journeys made using self-powered modes of transport) across the city, especially among groups with historically lower participation, as citizens feel safer, more confident, and welcome to walk, cycle, and wheel. This shift helps create neighbourhoods that are measurably safer, healthier, and more inclusive, where everyone can breathe clean air, enjoy high-quality green spaces, and access safe places to play, strengthening social cohesion and community wellbeing.
- **Budapest**
    - Social innovation Initiatives are led by both the Municipality and NGOs, grouped into sector-based sub-groups plus a government group, aiming to **remove social barriers and promote inclusive decision-making**. All initiatives are accessible regardless of income, origin, or social status. Initiative examples listed below:
    - **Repair Cafe** - The Repair Café is a community space where residents can meet and mend items like clothes, furniture, and electronics with the help of experts. It offers a hands-on experience of fixing things independently, while also promoting the circular economy by extending product life and encouraging re-use.
    - **Food waste reduction** - A number of food projects, facilitated by the Budapest Municipality, are working to integrate sustainability into public catering. This involves developing an integrated urban food policy and strategy for a sustainable food system through **the FOODCLIC project**. Additionally, the city is incorporating healthier and more sustainable food options into its procurement and preparation practices, while raising awareness among students via the **SCHOOLFOOD4CHANGE project**. The **DIVINFOOD** focuses on the use of neglected and underutilised crops in food chains to support healthier diets and more sustainable food systems.
    - **Transportation and Mobility initiatives** - Budapest's social innovation in transport focuses on three key programmes. The **MOL Bubi bike-sharing scheme** provides a green commuting alternative, having achieved over 10 million rides. **The BudapestGO app** simplifies public transport with real-time data and ticketing, encouraging a shift away from cars to reduce pollution. Furthermore, the **Hungarian Cyclist Club's "Bicibusz"** initiative builds community by organising children to safely cycle to school, promoting healthy habits and sustainable living from a young age.
- **Copenhagen**
    - The city emphasises the active involvement of Citizens as a prerequisite for achieving climate neutrality. Actions include engaging residents, local communities, schools, institutions, the private sector, and the research community. Key initiatives include ***Renewable Energy Communities***, enabling collective investment, production, and sharing of clean energy, and ***Flexumers4Future***, which applies a meso-governance model to work with building owners on systemic climate challenges.
- **Cork**

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- **Cork as a Learning City:** Cork is developing into a learning city, with a network of organisations dedicated to helping **citizens access lifelong learning**. A key part of this is the **six Learning Neighbourhoods**, which offer a wide range of educational opportunities for everyone through collaboration and partnerships. These city-wide learning initiatives are celebrated annually during the **Cork Lifelong Learning Festival**.
- **Youth and child representation**: Comhairle na nÓg are local youth councils that provide a platform for under-18s to influence local policies and services, as they do not have the right to vote. Other initiatives support this effort, including the **URBACT Playful Paradigm network,** which uses games to promote social inclusion and energy awareness. This aligns with Cork's status as a child-friendly city, which follows the principles of the UN Convention on the Rights of the Child.
- The city monitors and evaluates indicators such as the number of citizens involved in the co-design/co-creation of climate action, and citizens' awareness regarding sustainability and the environment (measured on a Likert Scale)

- **Dresden**
  - **Neutral Path Project –"ENERGISE" board game:** Using a playful and low-key approach, families can be engaged and made more aware of complex climate-related issues. Understanding the connections can bring about a change in behaviour among local citizens.
  - **Citizen's Laboratory:** To promote mutual learning and understanding, the city has created spaces where residents and city officials can meet. These rooms are designed for dialogue and the exchange of ideas, allowing both citizens and the local administration to learn from one another and work together.
- **Glasgow**
  - **Just Transition Working Group:** A cross-party working group established to develop an approach to transition away from fossil fuels, protecting communities and businesses, and enhancing opportunities.
  - **Glasgow as a Living Lab Accelerating Novel Transformation (GALLANT):** It develops innovative initiatives to support the transition to net zero while delivering the social priorities of the SDGs.
  - **Citizens Assembly:** An assembly to hear from people living across the city and understand how the city can work together to become a net-zero city in an inclusive, fair, and respectful way.
  - **Centre for Civic Innovation:** A pioneering citizen-centred design team, responsible for establishing a design-led approach to working across the Council and engaging with the city.
  - **Thriving Cities Initiative:** An iterative approach to support cities in addressing unsustainable consumption to help achieve the targets of the Paris Agreement and improve equity, quality of life, and economic livelihoods.
- **Grenoble**
  - **Mobilise citizens and economic actors:** Promote citizen questioning and involvement, develop a participatory budget, invent sustainable consumption practices, set up personalised advice for travel modes, raise awareness among children, and participate in the organisation of the biennial of cities in transition.
  - **Citizens' Convention for the Climate:** A flagship process for the Metropole in terms of social innovation, addressing barriers related to citizen involvement, behavioural change, and vulnerable groups.
- **Helsingborg**

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- **Climate Dialogues:** Testing different tools and methods for carrying out productive community dialogues so that the city and residents can together reflect on challenges and needs connected to behavioural change necessary for climate neutrality.
- **Circular economy with new outdoor recycling:** Outdoor recycling is a place where materials that would otherwise have been thrown away are now instead becoming new resources for schools. 50% of the city's schools and preschools have picked up materials the outdoor recycling centre.
- **H22 Expo initiative:** A major investment in innovation that transformed Helsingborg into a citywide testbed for sustainable solutions, fostering collaboration with residents, businesses, and academia.
- **Habiteum, Helsingborg's workshop for quality of life:** Where city administrations, companies, citizens, associations, and businesses co-create for better environmental and public health.

- **Košice**
  - **Awareness raising - Working with the community and for the community**: Using **"Exchangers / Výmenníky"** (transformed old heat exchanger stations into community centres) for organising community events that will include topics on climate change consequences and mitigation, presented through art, creative industries, or volunteer activities.
  - **Expand community gardens in "Exchangers":** Not only for growing vegetables but also as a community meeting space.
- **Krakow**
  - Krakow is improving the tools of participation and dialogue through a citizen panel, civic budget, financing of social initiatives, workshops with residents, consultation of solutions, education and consultancy. The city aims to develop solutions with civil society for climate neutrality. The city's **"Innovation Atelier"** is recognised as a dedicated meeting place for different types of stakeholders for co-creation and collaboration.
- **Leipzig**
  - **EnAct4CleanCities pilot project:** Aims to provide clear, relevant information and support to property owners and stakeholders, using a data-based and digital approach to increase knowledge and acceptance and activate them for change. It measures the Total number of people involved in capacity building activities (i.e., awareness campaigns for increasing awareness of social innovation for climate neutrality, citizens, urban stakeholders, etc.)
  - **Smart City Challenge:** The City of Leipzig's annual Smart City Challenge is to focus even more strongly on the topic of "digital solutions for the climate" in future. Founders, start-ups, students and established companies are invited to take part in the annual innovation competition to find innovative digital solutions for given municipal and civil society issues. From all the ideas submitted, three solutions are selected for each issue, which are further developed with the city administration, and one is implemented as a pilot.
- **Liepāja**
  - The city focuses on empowering Energy Communities as an enabling social innovation intervention. The aim is to create different communities for energy production, ensuring a higher share of renewable energy sources by fostering citizen and entrepreneurial participation.
  - Additionally, the city prioritises building awareness, public trust, and promoting behavioural change among citizens. The city assesses progress made in these areas with a robust set of indicators, such as, "*% of citizens who think that their*

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city is committed to involving citizens in decisions related to reaching climate neutrality", *% of citizens who agree that it is a priority for cities to make changes to reach climate neutrality, etc.).*

- The Social innovation initiatives are monitored with several indicators, including *the number of SI accelerator activities, the number of new social innovation funding tools implemented, the number of social innovation services procured and the number of public procurement procedures implemented.*

- **Lund**
  - The city aims to strengthen the local community, improve public health and improve social cohesion through social innovation interventions, through Neighbourhood-based sustainable action programmes. The focus is on increasing **citizen engagement** and involvement of broader groups of citizens through **deliberative forums** (participants are reimbursed and selected through a representative process to ensure broad participation).
  - **Circularity and repair initiatives** such as Återburkarna, engage long-term unemployed citizens, thus fostering social inclusion and citizen training alongside the repair and reuse of items that would otherwise have been discarded.
- **Milan**
  - **Focus on Marginal groups:** Social innovation interventions focus more specifically on marginalised groups, such as The **Energy Bank initiative by A2A** (supports individuals facing energy poverty), **the Bella Dentro** project by Fondazione Cariplo (valorisation of unesthetic fresh products in cooperation with social cooperatives that work with vulnerable individuals) and **the Vesti Solidale** project by Fondazione Cariplo (creation of job opportunities for marginalised groups providing waste collection services for recycling and reuse).
- **Nantes**
  - **Pilot Cities – Climate Challenges** proposed to 1000 households to support individual behaviour changes through collaborative workshops and achievable goals.
  - **Great Debates:** Nantes Métropole organized two Grand Debates over the last decade: the first on energy transition in 2016-2017, and the second on the Fabric of Our Cities in 2023. These debates brought together residents and professionals to discuss these topics, and their proposals are reviewed by elected officials to guide metropolitan policies in a **direct citizen consultation approach**.
- **Paris**
  - **Developing solidarity and cooperation in favour of the climate:** The Action Plan provides specific incentives for low-income households, such as facilitating the replacement of obsolete household appliances, and promoting the energy upgrading of public social housing buildings to improve housing assistance.
- **Rzeszów**
  - **Urban Lab:** A space for experimenting with cooperation solutions between city authorities, residents, and companies.
  - **Social Dialogue Commission for Tree Protection:** Gives residents the opportunity to influence administrative decisions regarding tree felling.
  - **Green Fund for Rzeszów:** Provides an opportunity to finance green initiatives for residents and businesses who benefit from green infrastructural development within their localities.
- **Stavanger**

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- **UngLab (YouthLab):** YouthLab is a participation method developed by Stavanger municipality, where youths are recruited to interview other youths. This has proved to be an effective way to ensure participation and feedback from youths on different themes and topics.
- **Real green things (Grævla grønne greier):** Reel Green Things is an initiative from Stavanger municipality and is an innovation project where youth are communicating with other youth. The youths working in Reel Green Things show how simple it actually is to be climate and environmentally friendly. This is done through a podcast and posting on social media, which are the areas where the other youths are spending their time. The goal of the project is to inspire youth in Stavanger to take more sustainable choices in their everyday life, and at the same time raise awareness among individuals, private enterprises and organisations for what they can do to become more environmentally friendly.

- **Suceava**
  - **Centre for Innovation and Civic Imagination (CIIC):** Suceava city opened in 2023 the Centre for Innovation and Civic Imagination (CIIC) with activities related to communication between local public administration and citizens. This structure provides information, support, technical expertise and communication channels related also to climate neutrality. Local, national and European events are promoted through this new upgraded facility, and interaction between citizens, students, young generation experts, businesses and NGOs is facilitated. The intervention is meant to stimulate and encourage civic engagement and innovation, increase support and participation in all actions that will allow to achieve climate neutrality.
  - **Smart citizens and 'open' government:** Promoting citizen participation in decision-making and developing smart government solutions that support the overall objectives of the Climate City Contract and facilitate better community engagement in climate change efforts.
- **Vilnius**
  - **Education of the population and dissemination of information**: Through the creation of competence centres/online platforms, training, and workshops, the city systematically provides information on climate change and fosters mutual learning and organising educational events in city communities.
  - **Creation of an innovative climate fund:** This fund is contributed to by residents, businesses, etc. Stakeholders. The fund is created to be used to implement community-based climate protection ideas and projects, encouraging resident communities to take ownership and climate action; it also builds closer relationships between resident communities and businesses.

Appendix C. Social Innovation resources on the NZC portal and their usage

Table C1: Social Innovation Resource Top Interactions on the NZC Portal

No.	Resource Name	Resource Type	Interactions	Uploaded
Articles and Documents				
1	Social Innovation for Climate Neutrality: full collection of resources, cases and methods	Article	1069	13.12.2023

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2	Methods for social innovation and meetings facilitation	Article	324	27.08.2024
3	[Open Access Book] Social Innovation Projects for Climate Neutral Cities: Making Municipalities Sustainable with People-Based Solutions	Article	17	25.06.2025
4	Seasonal School Presentation on Social Innovation	Document	445	6.02.2024
5	Social Innovation Toolkit	Document	373	3.1.2023
6	Social Innovation: People-Based Solutions for Climate-Neutral Cities - Kick-off webinar | Thursday 13th February 2025	Document	385	17.02.2025
7	Social Innovation Actionable Pathways - map with links to case studies	Document	366	6.02.2024
8	Social Innovation Business Model Canvas	Document	244	15.09.2022
9	Pilots Cities projects - Social Innovation Activities	Document	191	21.02.2025
10	Social Innovation & Urban Mobility webinar: Insights from Turku & Zaragoza | 29th April 2025	Document	91	12.05.2025
Case Studies/ Visual Case Studies				
1	Lada and Velilla Carrion River Social Innovation Platform	Case Study	31	20.09.2022
2	1.5 Degree Lifestyles	Visual Case Study	61	31.08.2023
3	Agroecology	Visual Case Study	74	31.08.2023
4	Applause	Visual Case Study	57	31.08.2023
5	Citizens' Climate Assembly in Barcelona	Visual Case Study	293	27.05.2025
6	Better Reykjavik	Visual Case Study	107	31.08.2023
7	Blok 19 Renewal Program	Visual Case Study	268	15.09.2022
8	Brainport Smart District (BSD)	Visual Case Study	42	31.08.2023
9	Citizen Collaboration Pacts	Visual Case Study	373	15.09.2022
10	City Experiment Fund	Visual Case Study	114	31.08.2023
11	City Studio Program	Visual Case Study	62	17.11.2022
12	Clean Cities ClimAccelerator	Visual Case Study	80	19.09.2022
13	Climate Quarter Project	Visual Case Study	49	31.08.2023
14	Climate Meal	Visual Case Study	62	31.08.2023
15	Cloughjordan Ecovillage	Visual Case Study	302	15.09.2022
16	EcoHouse Antwerp	Visual Case Study	133	22.09.2022
17	El Día Después	Visual Case Study	64	31.08.2023
18	Elektrizitätswerke Schönau (EWS)	Visual Case Study	38	31.08.2023
19	Entrepatios Las Carolinas	Visual Case Study	54	17.11.2022
20	EVA Maakt Het Plantaardings	Visual Case Study	38	31.08.2023
21	Green Squares	Visual Case Study	47	31.08.2023
22	Just Transition Listening Platform	Visual Case Study	53	17.11.2022
23	KLIK (Križevci Climate Innovation Laboratory)	Visual Case Study	82	15.09.2022
24	Local Energy Communities	Visual Case Study	94	17.11.2022
25	Milan Food Policy, Milan, Italy	Visual Case Study	252	04.07.2024
26	Nappi Naapuri (Nifty Neighbor):	Visual Case Study	294	13.09.2023
27	Online transparency platform for budgeting and governance	Visual Case Study	264	06.05.2024

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28	Paris 15-min City	Visual Case Study	60	31.08.2023
29	Participatory Budgeting: Local Voices in Resource Allocation. City of Dubrovnik	Visual Case Study	278	08.07.2024
30	PentaHelix:	Visual Case Study	79	15.09.2022
31	Play!UC:	Visual Case Study	51	31.08.2023
32	Pop-up Återbruk in Stockholm, Sweden	Visual Case Study	610	09.07.2024
33	Positive Energy Districts (PEDs) in Norway	Visual Case Study	276	29.05.2024
34	Ride Sharing Service	Visual Case Study	28	31.08.2023
35	Real Junk Food Berlin	Visual Case Study	39	31.08.2023
36	Residents Assemble for Climate, Tartu, Estonia	Visual Case Study	247	31.07.2024
37	SONNET Bristol City Lab	Visual Case Study	84	15.09.2022
38	SONNET Mannheim City Lab	Visual Case Study	269	19.09.2022
39	Smart House Training Program:	Visual Case Study	326	13.09.2023
40	Superblocks (Vitoria-Gasteiz):	Visual Case Study	305	19.09.2022
41	SynAthina:	Visual Case Study	47	27.09.2022
42	The co-creation toolkit, City of Espoo (Finland)	Visual Case Study	329	27.06.2024
43	Torino Social Innovation	Visual Case Study	276	19.06.2024
44	Turku's Climate Team	Visual Case Study	399	27.06.2024
45	VeniSIA (Venice Sustainability Innovation Accelerator) Venice, Italy	Visual Case Study	229	02.07.2024
46	Viable Cities	Visual Case Study	226	13.09.2023
47	You Decide	Visual Case Study	51	23.09.2022
48	Zklaster	Visual Case Study	325	19.09.2022
Methods				
1	Context Map Canvas	Method	237	09.09.2022
2	Ethnographic Fieldnotes	Method	229	16.10.2022
3	Ethnographic Interview	Method	215	09.09.2022
4	People and Connections Map	Method	307	13.09.2022
5	PESTEL	Method	276	13.09.2022
6	System Map	Method	189	21.10.2022
7	Observation of Context	Method	262	16.10.2022
8	Frameboards	Method	277	16.10.2022
9	Problem Definition	Method	236	16.10.2022
10	Empathy Map	Method	267	09.09.2022
11	Scenario-building with backcasting	Method	592	05.09.2022
12	5W Technique	Method	335	16.10.2022
13	Defining the Challenge with Challenge Map	Method	445	09.09.2022
14	Futures Table as a component in scenario building	Method	439	20.08.2023
15	Design the Challenge	Method	206	16.10.2022
16	Idea Card	Method	293	06.09.2022
17	Impact and Feasibility Analysis	Method	634	27.08.2024
18	KJ Ideation	Method	230	08.09.2022
19	Value Motivation Matrix	Method	451	09.09.2022
20	Pugh Chart	Method	177	17.10.2022

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21	Value Proposition Canvas	Method	166	17.10.2022
22	Motivation Matrix	Method	451	09.09.2022
23	Idea Rating/Selection	Method	387	08.09.2022
24	Customer journey	Method	277	09.09.2022
25	Experiment Canvas	Method	220	09.09.2022
26	Service Blueprint	Method	404	14.09.2022
27	Social Business Model Canvas	Method	267	15.09.2022
28	Desktop Walkthrough	Method	370	08.09.2022
29	Experience Prototype	Method	243	16.10.2022
30	Cultural Probes	Method	439	16.10.2022
31	Field Experiment	Method	293	10.09.2023
32	Most Significant Change	Method	393	08.09.2022
33	Outcome Harvesting	Method	273	10.09.2023
34	Impact metrics	Method	237	16.10.2022
35	Five Configurations for Scaling Up	Method	230	31.08.2023
36	Social innovation observatory: the case of Florianopolis	Method	277	31.08.2023
37	WHO Framework for setting up a scaling strategy	Method	266	08.09.2022
38	Levers of a Sustainable City	Method	223	31.08.2023
39	Scale up out deep	Method	455	05.09.2023
40	Social Innovation Canada	Method	412	05.09.2023
41	TACSI	Method	269	05.09.2023

The **focus page on social innovation** was created on the Knowledge Repository to help cities and other consortium users to find the list of all NZC resources on social innovation for climate neutrality in cities. **It includes:**

- **Getting started resources:** quick read and short video NZC Social Innovation webinars - People-Based Solutions for Climate-Neutral Cities
- **Books and toolkits:**

  The NZC Social Innovation Toolkit

  Edited book "Social Innovation Projects for Climate Neutral Cities - Making Municipalities Sustainable with People-Based Solutions" (open access) published by Springer containing 8 chapters written by the NetZeroCities consortium partners

  Social Innovation Actionable Pathways map: The Social Innovation Actionable Pathways document with interactive links to the case studies

- **NZC Seasonal Schools resource:** Link to page on the Knowledge Repository
- **Learning about Social Innovation:**

  NetZeroCities course for all cities: "Online planning Lab course" starting in September 2025 - with sessions on social innovation.

  Social Innovation Learning Club: Group Page

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- **50 Social Innovation Case studies**
- **Methods to implement social innovation in cities**
- **Social Innovation assessment: process and outcome indicators:**
- NZC Comprehensive indicator framework,
- NZC catalogue of social innovation indicators
- **NZC Deliverables on Social Innovation:**
- SI observatory for climate neutrality
- SI methodologies for design, prototyping, testing, monitoring
- SI methodologies for SI scale up
- SI matchmaking service pool blueprints, customer journeys
- SI experimenting services pool blueprints, customer journeys
- SI capacity building services pool blueprints and customer journeys
- Report on indicators & assessment methods for social innovation action plans

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